



EuroGO-SHIP
Enhancing ocean observations

D5.1 Report summarising RI requirements and potential help that they can give to the new RI under what circumstances

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About this document

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List of Abbreviations

Please note: The acronyms and full names of the European research infrastructures, research projects, data aggregators and service providers, coordination and the funding body JPI Oceans that EuroGO-SHIP engaged with are given in Table 1 of this report.

Abbreviation	Definition
AISBL	Association Internationale Sans But Lucratif (International non-profit association)
BGC	Biogeochemical
CERN	European Organization for Nuclear Research; formerly (1952–54) called Conseil Européen pour la Recherche Nucléaire
CNR-ISMAR	Institute for Marine Sciences of the Italian National Research Council
DBCP	Data Buoy Cooperation Panel (OceanOPS)
EC	European Commission
EC DG ENV	European Commission Directorate-General for the Environment
EC DG MARE	European Commission Directorate-General for Maritime Affairs and Fisheries
EC DG RTD	European Commission Directorate-General for Research and Innovation (or DG Research)
EMBL	European Molecular Biology Laboratory
EMO BON	European Marine Omics Biodiversity Observation Network
EOSC	European Open Science Cloud
ERA	European Research Area
ERIC	European Research Infrastructure Consortium
ESFRI	European Strategy Forum on Research Infrastructures
ESO	European Southern Observatory
FAIR	Findable, Accessible, Interoperable, and Reusable
FAO	The Food and Agriculture Organization (FAO) of the United Nations (UN)
G7	Seven economically most important capitalist countries, which are the United States, Japan, Germany, France, United Kingdom, Italy and Canada, whose finance ministers meet several times a year to discuss economic policy
G7 FSOI	G7 Future of the Seas and Ocean Initiative
GEOCOMAR	Institutul Național de Cercetare-Dezvoltare pentru Geologie și Geoecologie Marină (The National Institute for Research and Development of Marine Geology and Geoecology)
GOOS	The Global Ocean Observing System
GO-SHIP	Global Ocean Ship-based Hydrographic Investigations Programme
ICES	International Council for the Exploration of the Sea
IEEE	Institute of Electrical and Electronics Engineers
IMR	Institute of Marine Research
IOC	Intergovernmental Oceanographic Commission
IODE	International Oceanographic Data and Information Exchange
IPCC	Intergovernmental Panel on Climate Change
KPI	Key Performance Indicator
MAS	Marine Autonomous System



MI	Marine Institute
MINKE	Metrology for Integrated marine maNagement and Knowledge-transfer nEtwork
MS(s)	Member State(s)
MSFD	Marine Strategy Framework Directive
MSY	Maximum Sustainable Yield
NODC(s)	National Oceanographic Data Centre(s)
NORCE	Norwegian Research Centre, Norway
OBIS	Ocean Biodiversity Information System
OBON	Ocean Biomolecular Observing Network
ODIS	Ocean Data and Information System
ODV	Ocean Data View
OP	Ocean Practice
OPFN	Ocean Practice Federated Network
OTGA	Ocean Teacher Global Academy
QUID	Quality Information Documents (CMEMS)
R&I	Research and Innovation
R/V	Research Vessel
RBINS	Royal Belgian Institute of Natural Sciences (RBINS)
RI	Research Infrastructure
ROOS	Regional Operational Oceanographic Systems
SOCAT	Surface Ocean CO ₂ Atlas
SOP(s)	Standard Operating Procedure(s)
TAC	Thematic Assembly Centre (CMEMS) e.g. Copernicus marine In-situ TAC
TNA	Transnational Access
TSC	Technical Support Centre
UN	United Nations
UNEP	United Nations Environment Programme
VLIZ	Flanders Marine Institute



1. Executive Summary

*The main aim of this report is to **evaluate the Research Infrastructure (RI) landscape that the new EuroGO-SHIP RI will sit within, determine the requirements existing RIs have, and what services these RIs can offer the new research infrastructure.***

Over the last two decades, the European research infrastructure landscape has evolved from a handful of national and intergovernmental organisations into a mature system with pan-European Research Infrastructures (RIs) prioritised through the European Strategy Forum on Research Infrastructures (ESFRI) and many established as European Research Infrastructure Consortia (ERICs). National and European Research and Innovation (R&I) facilities contribute by providing access to cutting-edge equipment, and laboratories, and it is now widely recognised that pooling resources between countries leads to an increase in capacity of wider technical expertise and advancement of scientific capabilities.

In this study, activities focused on understanding the European landscape relevant to potential EuroGO-SHIP services. With the help of multiple marine related RIs, we explored the possibilities to leverage from existing services in the future and to create new ones where a need is identified. EuroGO-SHIP evaluated the potential of the existing RI Landscape to deliver proposed services identified by the Hydrographic community. This was carried out using a 2-stage process, where phase I was conducted through semi-structured interviews with 6 groups and phase II activities included a EuroGO-SHIP RI workshop (or online interaction) with 21 groups (including the 6 from phase 1). This report combines information collected in phases I and II and focuses on services EuroGO-SHIP can provide to the community and services across RIs that can benefit from closer cooperation. The text that follows summarises what we learned about the RI landscape in the EuroGO-SHIP project.

Results in this study clearly show that (at a high level) there is some overlap of the services proposed by EuroGO-SHIP with services supplied by RIs who are initially engaged with EuroGO-SHIP (Figure 1). All RIs showed strong support for EuroGO-SHIP and willingness to partner on some services (



Figure 2) with many expressing an interest in co-developing services and/or be kept informed of EuroGO-SHIP service developments (

Figure 3).

Information gathered from EuroGO-SHIP RI stakeholders (established Research Infrastructures, RI projects, data integrators, coordination bodies, funders) will help guide the continued development of the EuroGO-SHIP “Statement of Requirements” which is being refined in WP2 of the European Research Infrastructure for hydrography EuroGO-SHIP concept project. Results from this report will be used specifically to inform EuroGO-SHIP deliverables D2.5 “*Synthesised statement of requirement report for EuroGO-SHIP*” and D5.2 “*Summary of the range of possible RI structures, with preferred option*”.

Assessment of existing services & gap areas

EuroGO-SHIP is working to strengthen Europe's capability in international scientific hydrography with plans to offer various services. To identify overlaps with existing RIs, our RI stakeholders helped us to review the ten proposed EuroGO-SHIP services. It is clear from the results that the supply of reference materials (e.g., carbon and nutrients) and accreditation for the hydrographic community (e.g. laboratory or process) need attention since only ~15% provide such a service. Results showed that there are very few RIs with the capability to measure transient tracers and low nutrient concentrations.

We noted that the RIs in Europe are open to collaboration and want to achieve greater efficiency and synergy, aligning with European Commission goals. It is evident that the RIs in this study are keen to partner with EuroGO-SHIP in areas where they have expertise particularly in the areas of best practices, training, data curation and pan-European cooperation. This was reflected in the expression of interest on future developments of EuroGO-SHIP. Readers interested in the finer details, are referred to section 4.3.1, *EuroGO-SHIP Survey*, of this report. Our sincere thanks to all the participating RIs.

Global Challenges

A key finding in the workshop activity on “*RI-based concepts to provide solutions for global challenges related to our ocean and waters*” was that there is decreasing focus on scientific research within the RIs, with many of the RIs more technology-driven. The RIs see their role as a provider of high quality infrastructure services, supports, facilities and data, rather than directly addressing research questions such as those in the inherent global challenge scenarios. This highlights a gap area where a need exists to better connect scientific researchers in fisheries, environmental, and climate monitoring with the RIs in future funded research projects.

Potential future structure of EuroGO-SHIP

While many challenges lie ahead, the overall impression from participants in this study is that a need exists for a EuroGO-SHIP research infrastructure. From the discussions, legal entity



options included (a) as an ERIC which offers high-level support, but this is challenging due to the current ESFRI context and long process duration, and (b) as an AISBL, a more pragmatic choice since it offers a simple legal structure and an easier transition into a formal operation, however, financing difficulties could arise. Establishing and maintaining new pan-European research infrastructures (ESFRI projects, ERICs) requires strong support from national and European funding sources. Without this support, their long-term sustainability is at risk. Feedback on whether EuroGO-SHIP should be integrated into a more consolidated RI, suggests that doing so will require strong political will and coordination at multiple levels. The overall conclusion is that further analyses is required before the most suitable option is decided. The final decision will depend on EuroGO-SHIP specific goals, long-term vision and strategic priorities.

The main focus of this report is to identify service gaps that the new EuroGO-SHIP RI can provide and NOT a comprehensive overview of the multiple services of each participating RI. This report exclusively contains the results and findings from the EuroGO-SHIP RI workshop held on 27th of June 2024 in Venice, Italy and from online interviews of a small number of RIs who were unable to attend the workshop in-person. It is important to note that any additional information or conclusions presented after the completion of this report are not included in this document. The workshop serves as an initial step in our exploration of the topic. It is anticipated that future projects will use this information to delve deeper into the subject matter as more information becomes available.



Figure 1. EuroGO-SHIP RI Services: Synergies - Groups who are also a provider of similar services.

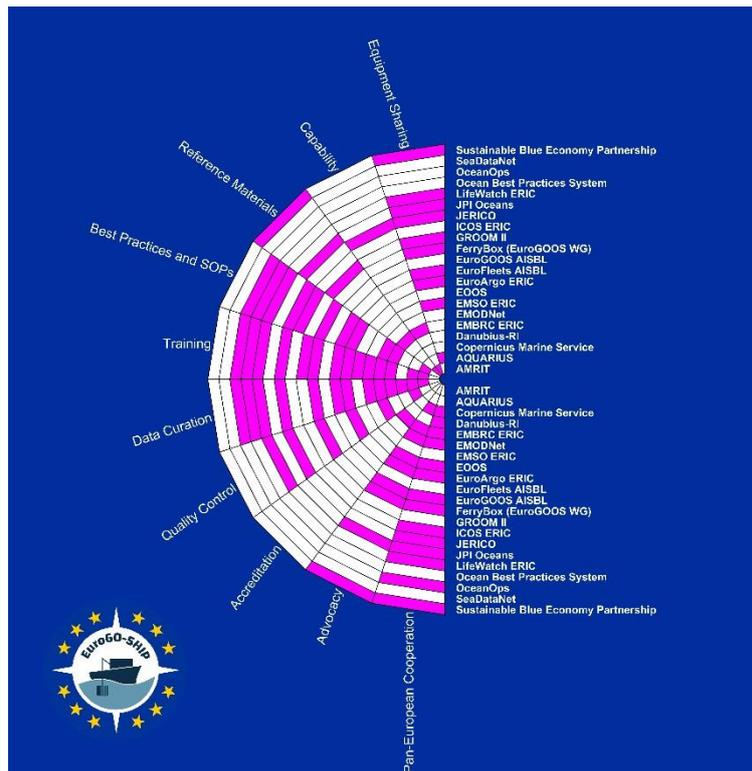


Figure 2. Groups who want to partner with EuroGO-SHIP on particular services.

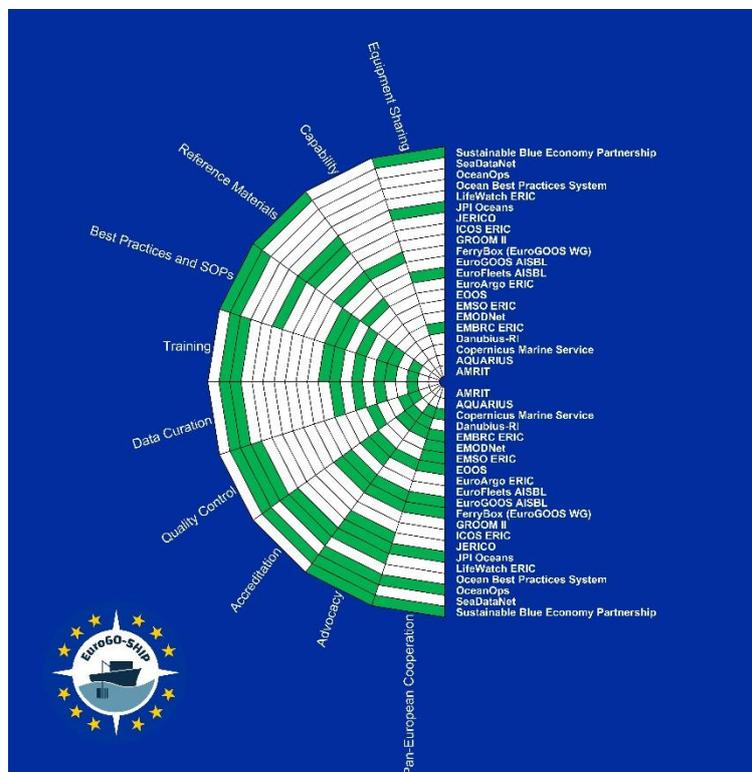


Figure 3. Groups who have an expression of interest in co-developing particular EuroGO-SHIP services or to be kept informed of EuroGO-SHIP service development.



2. Research Infrastructure Landscape Mapping

European Landscape of RIs

The RI landscape has changed a lot over the last two decades. In 2000, some national research infrastructures and institutional laboratories existed with very few intergovernmental organisations such as CERN (European Organization for Nuclear Research), ESO (European Southern Observatory) and EMBL (European Molecular Biology Laboratory). Today, the European landscape is more mature thanks to the establishment of pan-European RIs prioritised through ESFRI with 28 established as European Research Infrastructure Consortia (ERICs), and many national and European RI facility offering common access programmes through networks. National Research and Innovation (R&I) facilities and laboratories prioritise national roadmaps and contribute to the European Research Infrastructures (RIs) by providing access to laboratories and cutting-edge equipment.

The common perspective across the European Research Infrastructure (RI) landscape is that pooling resources leads to observing systems and member countries having access to a larger pool of technical expertise than they could afford alone. Existing RIs have developed a distinct set of services for their members, including data centres, calibration laboratories, model platforms and observing infrastructure elements.

EuroGO-SHIP's ambition is to use the research infrastructure framework and concept that has so successfully supported the needs of multiple other communities to move beyond project status into a more formalised structure. A concept for a EuroGO-SHIP research infrastructure that supports the needs of the existing ICES, GO-SHIP, and other relevant hydrographic observation networks in delivering their missions and supporting legislation (e.g. Marine Strategy Framework Directive (MSFD)) will be developed. The diversity of services already developed by RIs means that some of the services EuroGO-SHIP may need are probably already in existence. We will therefore also move beyond the state-of-the-art in the RI landscape of multiple RIs operating independently by proposing a structure that only creates new services where they do not exist elsewhere or where further support is required by the community.

Engagement exercises with existing RIs, carried out in the EuroGO-SHIP project, brought together representatives from RIs and relevant associated structures serving European Marine Science (Table 1). The expected output from these activities was to examine existing capacity and assess where EuroGO-SHIP has a significant value to add to the existing RI landscape.

Information in this report will feed into EuroGO-SHIP T5.2 "RI Governance" which aims at producing, by the end of the project, a report (D5.2 Summary of the range of possible RI structures, with preferred option) that will explore potential governance and architecture solutions for the EuroGO-SHIP RI and undertake an initial consultation to determine which of these is most viable.

Table 1. List of the 21 European research infrastructures, research projects, data aggregators and service providers, coordination and funding bodies that EuroGO-SHIP engaged with.

ESTABLISHED RESEARCH INFRASTRUCTURES	
EMBRC ERIC	European Marine Biological Resource Centre <i>Access to marine organisms and facilities.</i>
EMSO ERIC	European Multidisciplinary Seafloor and Water Column Observatory <i>Observations on fixed platforms that are moored in the ocean.</i>
Euro-Argo ERIC	European contribution to the Argo programme <i>Argo floats are autonomous instruments that profile and drift through the ocean. The name Argo was chosen because the array of floats works in partnership with the Jason earth observing satellites that measure the shape of the ocean surface (In Greek mythology, Jason sailed on his ship Argo in search of the golden fleece).</i>
EuroFleets AISBL pending	European Research Vessel Operators Coordination <i>An alliance of European marine research infrastructures to meet the evolving needs of the research and industrial communities.</i>
ICOS ERIC	Integrated Carbon Observation System <i>Surface carbon observations in European waters and components observing Carbon in the Atmosphere and Terrestrial Ecosystems.</i>
LifeWatch ERIC	European e-Science Infrastructure for Biodiversity and Ecosystem Research <i>Provides e-Science research facilities to scientists investigating biodiversity and ecosystem functions and services in order to support society in addressing key planetary challenges.</i>
RESEARCH INFRASTRUCTURE PROJECTS	
AMRIT	Advance Marine Research Infrastructures Together <i>Advancing the EOOS and focusing on streamlining European marine research infrastructures.</i>
AQUARIUS	Aquatic Research Infrastructure Services for the health and protection of our unique, oceans, seas and freshwater ecosystems <i>A highly comprehensive suite of integrated research infrastructures appropriate to addressing significant challenges for the long-term sustainability of our oceans, seas and freshwater ecosystems.</i>
DANUBIUS-RI	International centre for advanced studies on river-sea systems <i>River and Estuary infrastructure.</i>
GROOM II	Gliders for Research Ocean Observation & Management, Infrastructure and Innovation <i>Gliders, autonomous instruments that are piloted through the ocean.</i>
JERICO-RI	Joint European Research Infrastructure of Coastal Observatories <i>Coastal observing infrastructure, including multiple observing platforms.</i>
Bluepartnership	Sustainable Blue Economy Partnership (SBEP) <i>Unites European and international efforts to promote a sustainable, resilient, and innovative blue economy by fostering research, innovation, and policy alignment across marine and maritime sectors.</i>
DATA INTEGRATORS	
Copernicus Marine Service	Copernicus Marine Service <i>Delivers high-quality marine data, forecasts, and analysis, enabling users to monitor and understand the state of the ocean in near real-time. Linking in-situ observations through to satellites and modelling for end users.</i>
EMODnet	European Marine Observation and Data Network <i>A focal point for in-situ marine environmental and human activities observations, data and data products. EMODnet aggregates and provides free access to marine data and data products across Europe, supporting sustainable ocean management and research.</i>
SeaDataNet AISBL	Pan-European infrastructure for ocean & marine data management <i>A distributed Marine Data Infrastructure for national data centres and the management of large and diverse sets of in-situ ocean observations. SeaDataNet provides a standardised</i>

	<i>infrastructure for managing and sharing marine and oceanographic data across European research institutions.</i>
COORDINATION / OVERSIGHT / FUNDING	
EOOS	European Ocean Observing System <i>Coordinates and integrates Europe's in-situ ocean observing activities to support sustainable ocean management, research, and policymaking.</i>
EuroGOOS AISBL	European Global Ocean Observing System International non-profit association <i>Advances and coordinates operational oceanography in Europe, promoting collaboration among European marine organisations to improve ocean observations, forecasting, and services.</i>
FerryBox (EuroGOOS Task Team)	FerryBox <i>Coordinating and advancing the use of FerryBox systems across Europe, which are automated instruments installed on ships to collect continuous oceanographic data, supporting environmental monitoring and research.</i>
OBPS AISBL	Ocean Best Practices System <i>Backed by the IOC through IODE and GOOS, provides publication, discovery and access to relevant and tested methods, from observation to application, as well as a foundation for increasing capacity.</i>
OceanOPS	Joint Centre for Oceanography and Marine Meteorology <i>in-situ</i> Observations Programmes Support (formerly JCOMMOPS) <i>Coordinates and monitors the global network of ocean observing systems, ensuring data collection and dissemination for climate and marine research.</i>
JPI Oceans	The Joint Programming Initiative Healthy and Productive Seas and Oceans <i>A pan-European platform that increases the efficiency and impact of research and innovation for sustainably healthy and productive seas and oceans. Fosters collaboration among European countries to address marine and maritime challenges through coordinated research and innovation efforts.</i>

Where: ERIC = European Research Infrastructure Consortium and an AISBL = Association Internationale Sans But Lucratif (International non-profit association). In Belgium, if you want to set up a non-profit association, you have the choice between ASBL and AISBL. The former is a group of natural or legal persons pursuing a non-profit purpose whereas the latter is a group of natural or legal persons pursuing a non-profit and international purpose.

Please note: To make it easier to read this report, all of groups above are repeatedly referred to as RIs.



3. Research Infrastructures Engagement Strategy

Key to understanding EuroGO-SHIP's role in the existing complex research infrastructure landscape is to have a clear understanding of the capabilities of other marine research infrastructures in various stages of development e.g., EuroArgo, EMSO, JERICO, Eurofleets.

EuroGO-SHIP Task 5.1 “RI landscape”, was therefore carried out in collaboration with existing RIs, **to examine existing capacity and assess where EuroGO-SHIP has a significant value to add to the existing RI landscape.**

As there are many voices in this area with overlapping priorities, there was a need to enable one-to-one interactions with the existing RIs via a 2-stage process, firstly to explain the philosophy of the EuroGO-SHIP programme and secondly to explore the results of the first phase to the RIs, so they can consider how they might be able to supply services to support the identifications meeting.

As part of WP5 “RI structure, governance & financial model”, Task 5.1 “RI landscape” was split into two phases. The first phase of activities was the semi-structured interviews (online) with pre-selected RIs (ICOS-ERIC, GROOM II, Eurofleets+, EuroArgo ERIC, JERICO, EMSO ERIC) of which the results are captured in the WP5 milestone 8 report. The second phase was a focused workshop with multiple activities aimed at capturing information on the capabilities of the RIs, research projects, data aggregators and service providers, and gather information to assess where EuroGO-SHIP has a significant value to add to the existing RI landscape. This EuroGO-SHIP RI workshop was organised to run alongside the second EuroGO-SHIP general assembly meeting hosted in Italy during June 2024.

EuroGO-SHIP RI Workshop Aim: Determine the needs of relevant RIs from the EuroGO-SHIP RI and assess what facilities, capacities or services they can offer EuroGO-SHIP, and what access arrangements might be required.



4. EuroGO-SHIP RI Engagement Methodology

Our methodology for EuroGO-SHIP began with an initial concept or scope for the research infrastructure. After consultation with EuroGO-SHIP partners it was decided to follow a two-step process starting with online semi-structured interviews and then a dedicated workshop to take place back-to-back with the second EuroGO-SHIP annual meeting and GA (general assembly).

4.1. Engagement Phase 1 – Semi-structured Interviews

Within EuroGO-SHIP the concept is refined through consultation (WP4), demonstration (WP3) and co-design (WP2).

Six key RIs were selected to conduct one-to-one online consultative meetings via video conference in 2023. Three of these RIs were already formalised European Research Infrastructure Consortium (ERIC), and three RI were projects who are currently in the process of transitioning toward an official status as RI.

One of the main aims of the stakeholder engagement with the selected RIs was to introduce the concept of EuroGO-SHIP, which received a unanimous positive response from each representative. Some had a high awareness of the work carried out by both the international GO-SHIP programme and of European Hydrography programmes. Others less so, which led to a very fruitful exchange of ideas and exploration of the opportunities that a potential EuroGO-SHIP RI would provide.

There was also **clear will to collaborate across common working areas and appetite for the provision of services EuroGO-SHIP could provide in the short, medium and long term. Best Practices, Training, Sensor Testing, Calibration and shared deployment opportunities were identified as services of interest to the RIs from a EuroGO-SHIP RI.** Additionally, it was evident that **experience, services and activity of existing RIs could be leveraged by EuroGO-SHIP to accelerate development avoiding duplication of activity where processes have already been established.**

Some examples were management of the potential EuroGO-SHIP equipment pool with regard not only to scheduling but also logistical aspects such as shipping and insurance, of which Eurofleets has vast experience. The ICOS ERIC and Euro-Argo ERIC provided valuable feedback with regards to data, the value of ownership and management for long term sustainability considering the high value of data provided by the hydrography community.

A question related to overlap of activities was included and put to each RI to establish if there were many common areas of work to avoid duplication of efforts. However, **it was found where areas overlapped they were viewed as complimentary rather than redundant.** This was especially true in the case of Euro-Argo ERIC and EMSO ERIC where **although similar data**



is collected it was under different circumstances and in different environments and thus would lead to opportunities for comparison and verification of results.

In the next phase – the RIs who participated in Phase 1 and many other marine groups would come together to continue exploring and refining what their requirements are and what potential services the future EuroGO-SHIP can provide.

4.2. Engagement Phase 2 – Activity Focused Workshop

A workshop was organised on the 27th of June to coincide with the EuroGO-SHIP Annual Meeting & General Assembly held from the 25th – 26th June 2024 in Venice, Italy.

4.2.1. Workshop Objectives

The main objectives of the workshop were to:

1. Facilitate networking between ocean observing related Research Infrastructures and projects and increase awareness of available and emerging RI services and facilities.
2. Explore how a EuroGO-SHIP RI can support the observing community to address challenges related to managing natural resources (ocean and waters).
3. Help plan the next steps and opportunities for EuroGO-SHIP within the RI landscape.

The delegates were contacted and invited to the EuroGO-SHIP project workshop for Research Infrastructures. The invitee list included 20 RI representatives, European Commission representatives (EC DG RTD, EC DG MARE), the EuroGO-SHIP coordinator, Workpackage 5 leader, Task 5.1 leader and other EuroGO-SHIP partners.

4.2.2. Invited Research Infrastructures

Invited representatives from European Research Infrastructures, RI projects and coordination bodies were identified by their activities and how they most closely aligned with EuroGO-SHIP (

Table 2). Experts in data handling including metadata and real-time data, were also invited along with representatives from key European marine data aggregators providing *in-situ* data to end users which included SeaDataNet (European infrastructure for national data centres), EMODnet (and the European Atlas of the Seas) and Copernicus Marine Service (or CMEMS - Copernicus Marine and Environmental Monitoring Service).

Representatives for each RI group, listed in Table 2, engaged with EuroGO-SHIP; this included the RIs who participated in Phase 1 (semi-structured on-line interviews) and RIs who were unable to attend the workshop in person due to unforeseen circumstances.

Twenty key RIs were invited to attend a workshop to coincide with the EuroGO-SHIP General Assembly that was held in Venice, Italy in June 2024 (Figure 4). Out of 20 RIs, 18 confirmed their attendance and two were unable to attend however online meetings with the EuroGO-SHIP coordinator and Task 5.1 leader were scheduled for August 2024. Five of the RIs are already formalised as a [European Research Infrastructure Consortium \(ERIC\)](#), four are established or, were in the process of establishing as a legal entity in Brussels as an International non-profit association (AISBL) and the rest are RI projects who are currently in the process of transitioning to official status as RIs, or are frameworks, or offering services through European channels (Table 2).



Figure 4. Logos of Invited Participants.

Two RIs were unable to attend the Venice workshop, they were Copernicus Marine Service and LifeWatch. Online meetings took place with them on the 12th and 29th August. There were some last-minute cancellations from AMRIT, GROOM and EMBRC as their flights were cancelled. Online meetings these RIs were arranged for 2nd of September 2024.



Table 2. List of Invited Participants.

RI Acronym	RI Full Name	Status	Contact Name	Contact Role
1. AMRIT	Advance Marine Research Infrastructures Together	Horizon Europe Project Mar 2024 – Feb 2028	Laurent Mortier	Project Coordinator
2. AQUARIUS	Aqua Research Infrastructure Services for the health and protection of our unique, oceans, seas and freshwater ecosystems	Horizon Europe Project Mar 2024 – Feb 2028	Aodhán Fitzgerald	Project Coordinator
3. Copernicus Marine Service (CMEMS)	Marine component of the Copernicus Programme of the European Union	Funded by the European Commission (EC) and implemented by Mercator Ocean International	Pierre-Yves LeTraon	Scientific director of Mercator Ocean
4. DANUBIUS ESFRI	International Centre for Advanced Studies on River-Sea Systems	Accepted in the ESFRI roadmap to become an ERIC.	Adrian Stanica	Head of pan-European DANUBIUS-RI
5. EMBRC ERIC	European Marine Biological Resource Centre	ERIC (founded in 2018)	Nicolas Pade	Executive Director
6. EMODnet	European Marine Observation and Data Network	European Commission (EC) <i>in-situ</i> marine data service of the EC DG MARE (Directorate-General for Maritime Affairs and Fisheries)	Kate Larkin / Vicente Fernandez	Head of Secretariat / Science Officer
7. EMSO ERIC	European Multidisciplinary Seafloor and water column Observatory	ERIC (founded in 2016)	Ingrid Puillat	Director General
8. EOOS	European Ocean Observing System	Framework	Laurent Delauney	EOOS chair
9. Euro-Argo ERIC	Euro-Argo European Research Infrastructure Consortium	ERIC (founded in 2014)	Yann-Herve DE ROECK	Programme Manager
10. EuroFleets+ AISBL pending	European Research Vessel Operators Coordination	AISBL to be established in 2025	Aodhán Fitzgerald	Project Coordinator
11. EuroGOOS AISBL	European Global Ocean Observing System	AISBL established in 2013	Inga Lips	Secretary General
12. FerryBox	FerryBox	Task Team in EuroGOOS	Andrew King	Co-Chair



13. GROOM II	Gliders for Research, Ocean Observations and Management: Infrastructure and Innovation	Project (GROOM (FP7 2011-2014, GROOMII 2020-2023)	Laurent Mortier	Project Coordinator
14. ICOS ERIC	Integrated Carbon Observation System	ERIC (Established in 2015)	Werner Kutsch/Richard Sanders	Director General/ Director, ICOS Ocean Thematic Centre
15. JERICO-RI	Joint European Research Infrastructure of Coastal Observatories	Projects	Laurent Delauney	Project Coordinator
16. LifeWatch ERIC	LifeWatch	ERIC (founded in 2017)	Christos Arvanitidis	Chief Executive Officer
17. OBPS AISBL	Ocean Best Practices System	AISBL established in 2024	Rene Garello	Co-chair of Steering Committee
18. OceanOPS	Oceanography and Marine Meteorology <i>in-situ</i> Observations Programmes Support	GOOS Observations Coordination Group	Mathieu Belbéoch	Manager
19. SeaDataNet AISBL	SeaDataNet	AISBL established in 2019	Serge Scory	Chair
20. Bluepartnership	Sustainable Blue Economy Partnership	Project Sept 2022 – Aug 2029	Benjamin Kürten	Project Partner

Prior to the workshop, invited participants attended an online webinar ‘EuroGO-SHIP services and facilities’, on the 5th of June 2024 at 1400 CET [via MS Teams], by the EuroGO-SHIP Project Coordinator Elaine McDonagh. Participants were also provided with a copy of the webinar presentation slides, the Workshop Agenda and a Travel Pack for Venice. Attendees representing RI entities were asked to consider how their services might align with those offered by EuroGO-SHIP in the capacity of provider, or partner, or if they had an ‘expression of interest’.

Twenty posters, one for each participating “RI” (prepared in advance by the Marine Institute), were on display at the workshop venue (see Appendix 1). The purpose of the posters was to represent each participating RI in a consistent way, and the content was checked and approved in advance by each RI representative.

The format of the workshop was activity focussed where the participants were invited to take part in four individual and group activities:

- Activity 1: Research Infrastructures ‘Speed Dating’
- Activity 2: EuroGO-SHIP Survey
- Activity 3: Global Challenge Scenarios and RI Solutions
- Activity 4: EuroGO-SHIP Future RI

Please see Appendix 2 for detailed descriptions of each activity. In all 30 people registered who were invited Research Infrastructure delegates and EuroGO-SHIP partners. At the workshop, presentations were given by the EuroGO-SHIP coordinator, the host institute (CNR-ISMAR), and representatives from EC, DG MARE and EC, DG RESEARCH (i.e. DG RTD).

Since the RIs who engaged with EuroGO-SHIP are at varying stages of maturity, (from research projects to very mature RIs with ERIC status), we decided to group them into the following categories (Figure 5; Table 1):

- Established RI (mostly ERICs and an ASIBL)
- RI Projects (still at the research funded project stage of development)
- Data Integrators (collate data from member states and create useful products for intermediate users, e.g. researchers and SMEs)
- Coordination/Oversight & Funding (coordinate and/or monitor ocean observing activities, or provide funding for research projects at the request of Member States - a JPI Ocean representative was present)

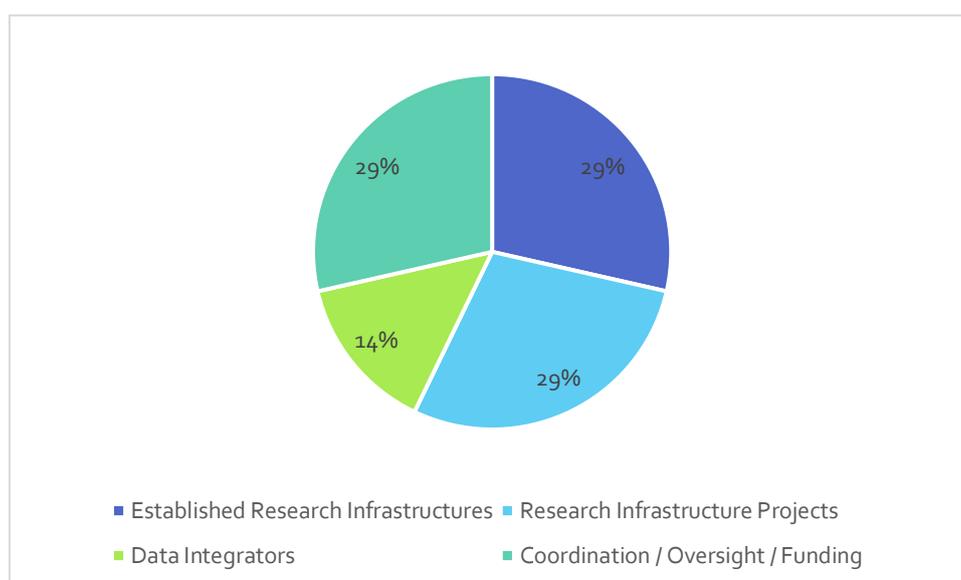


Figure 5. Workshop participants grouped by category.



4.3. Analysis of Workshop Activities

4.3.1. EuroGO-SHIP Survey

Since EuroGO-SHIP plans to provide a range of services for the hydrography community, we wanted to investigate if any of the proposed EuroGO-SHIP services overlap with services that existing RIs already provide. Workshop participants were asked to review the list of proposed EuroGO-SHIP services from three different perspectives to identify the providers, partners/collaborators, and interested users of defined services from EuroGO-SHIP and other RIs.

The three perspectives were:

- **As a Provider:** do the services already exist and who provides them?
- **As a Partner:** if the services already exist, how can they be accessed?
- **As an Expression of Interest:** are there services others are interested in co-developing?

The expected output was to obtain a better understanding of RI gaps and needs that could be addressed, or services that could be provided by a EuroGO-SHIP RI.

The following are the **list of proposed EuroGO-SHIP services** at the time of the workshop:

1. Equipment Sharing: European Marine Equipment Pool
2. Capability, e.g., transient tracers, low concentration nutrients
3. Reference materials, e.g., carbon and nutrients
4. Best Practices & SOPs (standard operating procedures)
5. Training: online, on land/lab, at sea
6. Data curation: data pathways and metadata
7. Quality control: primary (on ship during cruise) and secondary (data from multiple cruises cross calibration; uncertainty measurements)
8. Accreditation e.g. lab or process accreditation
9. Advocacy (raise the profile of hydrography and ocean obs use cases)
10. Pan-European cooperation, e.g., parameter expert groups

These services are still being scoped and will emerge over the lifetime of the project.

We expect that the services will continue to evolve through ongoing and future discussions with research infrastructure representatives. Prior to the workshop, invited participants attended an online webinar ‘EuroGO-SHIP services and facilities’, on 5 June 2024 at 1400 CET, by the EuroGO-SHIP Project Coordinator Elaine McDonagh (see presentation slides in Appendix 3). Attendees representing RI entities were asked to consider how their services might align with those offered by EuroGO-SHIP in the capacity of provider, or partner, or if they had an ‘expression of interest’.



Parameters of interest to EuroGO-SHIP

- Temperature
- Salinity
- Oxygen
- Carbon system parameters
- Nutrients
- Transient tracers
- Velocity (ADCPs)

At the workshop, participants were highly engaged in the activities with many providing additional information by email after the event for which we were very grateful.

It is important to note that the results presented in this report are not comprehensive since our primary focus was on what EuroGO-SHIP can do to support existing RIs, identifying common services and exploring what future partnerships would benefit the hydrographic community.

The following figures and tables show high level results, grouped by RI category (Figure 6 – 8) and the number of RIs who provide similar services to those proposed by EuroGO-SHIP (Tables 3 – 5). This information helps EuroGO-SHIP identify what categories the main providers of similar services are in, where gaps exist in the marine RI landscape (Figure 6; Table 3;) and areas where RIs can support each other and work together (Figure 7; Table 4).

Table 6 provides an overview of the number of services each stakeholder provides, wants to partner on, and who expressed an interest in co-developing future services and being kept informed of EuroGO-SHIP activities.

The rest of this section provides more nuanced information with more details on what services the RIs provide, what services they want to partner on, and what services they want kept informed about and/or co-develop with EuroGO-SHIP in future projects. Further detailed tabulated information provided by the participating RIs are presented in Appendix 4.

Our sincere thanks to all the participating RIs.



Figure 6. Summary plot showing overlap of services proposed by EuroGO-SHIP and services supplied by RIs grouped by category.

Table 3. Number (and percentage) of RIs who provide similar services to EuroGO-SHIP.

EuroGO-SHIP RI Services: Synergies – RIs who are also a PROVIDER of similar services	Number RIs	Percentage (%)
1. Equipment Sharing	9	43
2. Capability	6	29
3. Reference materials	3	14
4. Best Practices & SOPs	16	76
5. Training	15	71
6. Data Curation	13	62
7. Quality Control	11	52
8. Accreditation	3	14
9. Advocacy	11	52
10. Pan-European Cooperation	13	62



Figure 7. Research Infrastructure categories who want to PARTNER on EuroGO-SHIP services.

Table 4. Number (and percentage) of RIs who want to partner on EuroGO-SHIP services.

EuroGO-SHIP RI Services: RIs who want to PARTNER in the future	Number RIs	Percentage (%)
1. Equipment Sharing	10	48
2. Capability	3	14
3. Reference materials	5	24
4. Best Practices & SOPs	11	52
5. Training	14	67
6. Data Curation	13	62
7. Quality Control	6	29
8. Accreditation	1	5
9. Advocacy	9	43
10. Pan-European cooperation	14	67



Figure 8. Research Infrastructure categories who expressed an interest in co-developing future services and being kept informed of EuroGO-SHIP activities.

Table 5. Number (and percentage) of RIs who expressed an interest in co-developing future services and being kept informed of EuroGO-SHIP activities.

EuroGO-SHIP Services: RIs EXPRESSING AN INTEREST to be kept informed	Number of RIs	Percentage (%)
1. Equipment Sharing	4	19
2. Capability	1	5
3. Reference materials	5	24
4. Best Practices & SOPs	9	43
5. Training	8	38
6. Data Curation	6	29
7. Quality Control	6	29
8. Accreditation	9	43
9. Advocacy	12	57
10. Pan-European Cooperation	10	48

Table 6. Number of services each stakeholder either provided (orange), was interested in partnering with EuroGO-SHIP (pink) or who expressed an interest in co-developing future services and being kept informed of EuroGO-SHIP activities.

RIs with synergies with EuroGO-SHIP services	No. of Services	RIs who would like to PARTNER with EuroGO-SHIP building services	No. of Services	RIs who EXPRESSED AN INTEREST in being kept informed about EuroGO-SHIP services	No. of Services
AMRIT	6	AMRIT	2	AMRIT	0
AQUARIUS	5	AQUARIUS	4	AQUARIUS	0
Copernicus Marine Services	6	Copernicus Marine Services	5	Copernicus Marine Services	6
Danubius-RI	5	Danubius-RI	2	Danubius-RI	3
EMBRC ERIC	9	EMBRC ERIC	8	EMBRC ERIC	6
EMODNet	6	EMODNet	6	EMODNet	4
EMSO ERIC	4	EMSO ERIC	3	EMSO ERIC	2
EOOS	3	EOOS	3	EOOS	6
EuroArgo ERIC	7	EuroArgo ERIC	7	EuroArgo ERIC	2
EuroFleets AISBL pending	5	EuroFleets AISBL pending	4	EuroFleets AISBL pending	4
EuroGOOS AISBL	2	EuroGOOS AISBL	2	EuroGOOS AISBL	5
FerryBox (EuroGOOS WG)	6	FerryBox (EuroGOOS WG)	7	FerryBox (EuroGOOS WG)	5
GROOM II	7	GROOM II	3	GROOM II	0
ICOS ERIC	8	ICOS ERIC	2	ICOS ERIC	0
JERICO	4	JERICO	7	JERICO	2
JPI Oceans	2	JPI Oceans	4	JPI Oceans	5
LifeWatch ERIC	6	LifeWatch ERIC	6	LifeWatch ERIC	2
Ocean Best Practices System	3	Ocean Best Practices System	3	Ocean Best Practices System	2
OceanOPS	4	OceanOPS	4	OceanOPS	5
SeaDataNet	0	SeaDataNet	0	SeaDataNet	6
Sustainable Blue Economy Partnership	2	Sustainable Blue Economy Partnership	4	Sustainable Blue Economy Partnership	5

As a Provider do the services already exist and if so, who provides them?

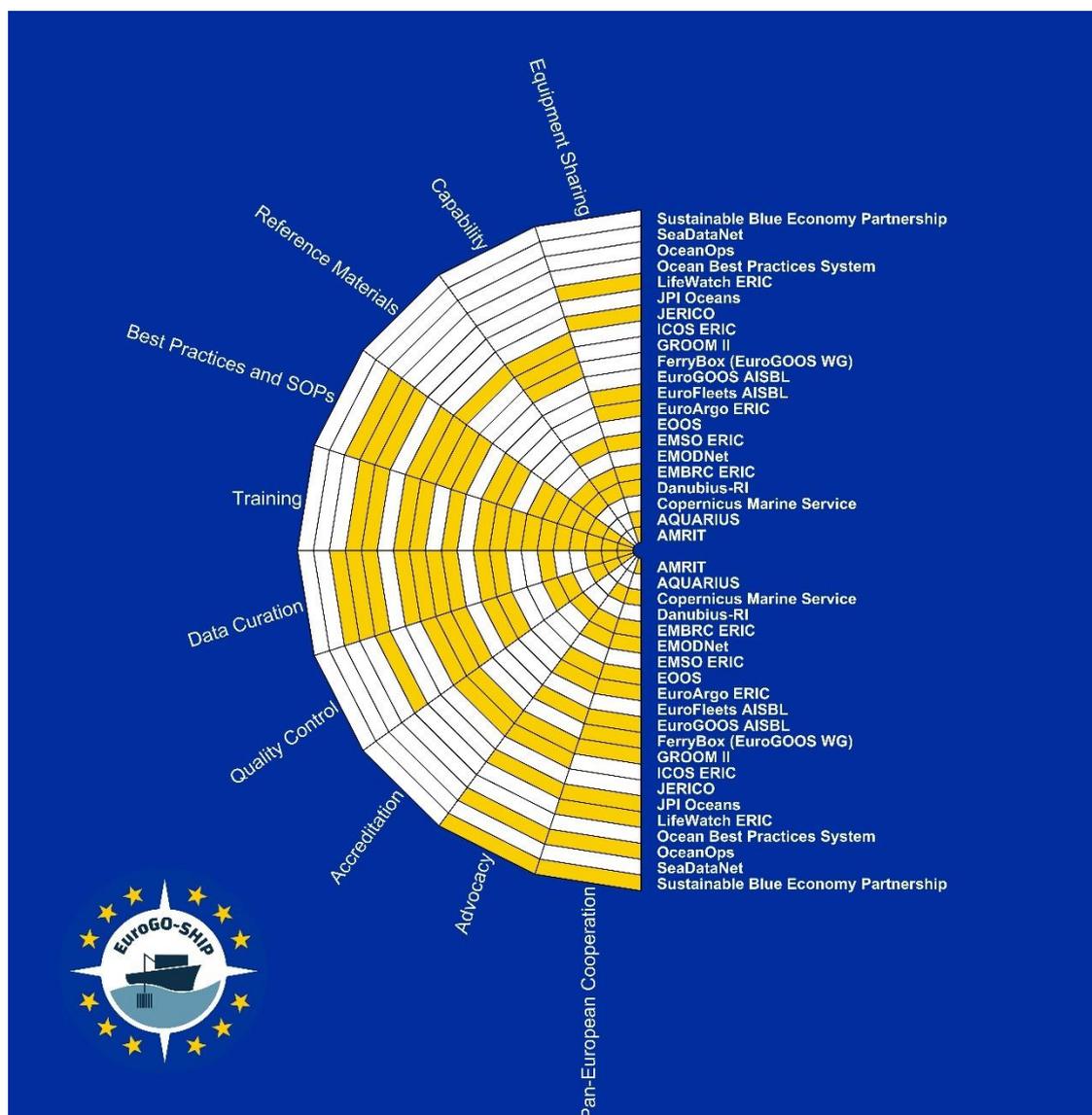


Figure 9. EuroGO-SHIP RI Services: Synergies - Groups who are also a provider of similar services.

Common Services provided by Established Research Infrastructures

Training and developing best practices are the services that overlap most with EuroGO-SHIP services for the **established Research Infrastructures group**. Most training offered is a mixture of online training material and courses in time series analysis, data analysis and data management. EuroFleets have on-board training of ship's crews by experts, and the ocean thematic centre of ICOS ERIC have summer schools (open) plus training for station PIs in the ICOS network. Sharing of Best Practices is also prevalent with all RIs acknowledging the importance of sharing best practices. EMBRC ERIC identified the European Marine Omics Biodiversity Observation Network (EMO BON), "which has been submitted to the Ocean Best

Practices. We are also working extensively on these concepts in the OBON UN Decade programme”.

Equipment Sharing and Quality Control were the second most prevalent service with Research Infrastructures offering access to on-board equipment e.g. EuroFleets pool equipment database can be shared and training of vessel crews to ensure understanding of the importance of the quality of the data. LifeWatch offer open software for use and HPC is available to run software.

Data Curation was the third most frequent service with EMBRC’s data strategy *“aligned with the UN Decade data strategy developed by IODE”* and Euro-Argo ERIC’s Argo programme *“conceived with open and free access to data, with both near real time and Q-Ced by experts’ data repository (GDAC), duplicated at NOAA and Ifremer (Coriolis)”*.

Gaps in Services Provided by Established Research Infrastructures

Noticeable areas with limited services were related to Accreditation and Reference Materials.

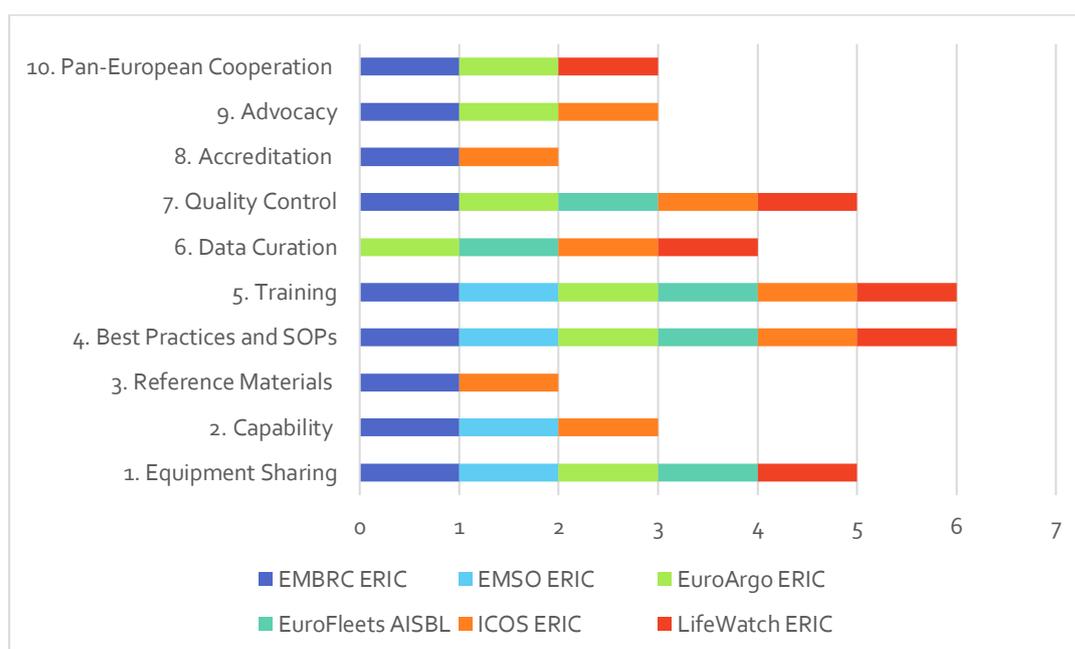


Figure 10. List of services provided by Established Research Infrastructures.

Common Services provided by Research Infrastructure Projects

In the **Research Infrastructure Projects** group Best Practices and SOPs services were the most frequent services. AMRIT provides technical support to the implementation of best practices and GROOM states *“the Marine Autonomous Systems (MAS) community in GROOM RI and more widely has developed a wealthy approach for a large number of best practices that are relevant also for GO-SHIP Hydrography”*. Since 2010, JERICO is a major best practices provider which are available in the Ocean Best Practices System (OBPS). AQUARIUS mentions that *“best practices and SOPs can be shared on the AQUARIUS Training Hub/online and with vessel*

crews/operators”. Danubius are focussed on different methodologies and standards which are specific to river-sea continuum, they recognise a positive possible link with ocean best practices.

Equipment Sharing, Training and Data Curation were the second most prevalent services. EuroFleets have “vessel profiles available online outlining capability of RVs to take relevant samples/data. Scientists can apply via TNA (for access to vessels and equipment)”. Danubius, once they are an established ERIC, will have “the capability to share equipment through Supersites and Observation Node (DANUBIUS components), e.g. Black Sea ISTROS vessel + equipment”. Training is an important activity in the Research Infrastructures Projects, training tools for AMRIT are available, JERICO provide training for instrumentation usage (sensors to platforms), an AQUARIUS training hub is in development and Danubius has an “e-learning office (to share know how regarding observations, modelling, analysis and impact), ongoing work to produce training material, room for collaboration on themes connected with the ship-based observations”.

As part of Data Curation, AQUARIUS “ensures data arising from all TNA projects reaches the correct/appropriate repositories + infrastructures operators are on-board + have the correct structures in place”. It is also a core activity of AMRIT however GROOM states “this service no longer makes sense today if it is carried out in a disconnected way between acquisition platforms. In addition, Marine Autonomous Systems (MAS) data management systematically calls on reference data from R/V based hydrology”.

Data Curation

Gaps in Services Provided by Research Infrastructure Projects

Areas with limited services in the proposed EuroGO-SHIP services were Accreditation and Reference Materials, Capability and Advocacy.

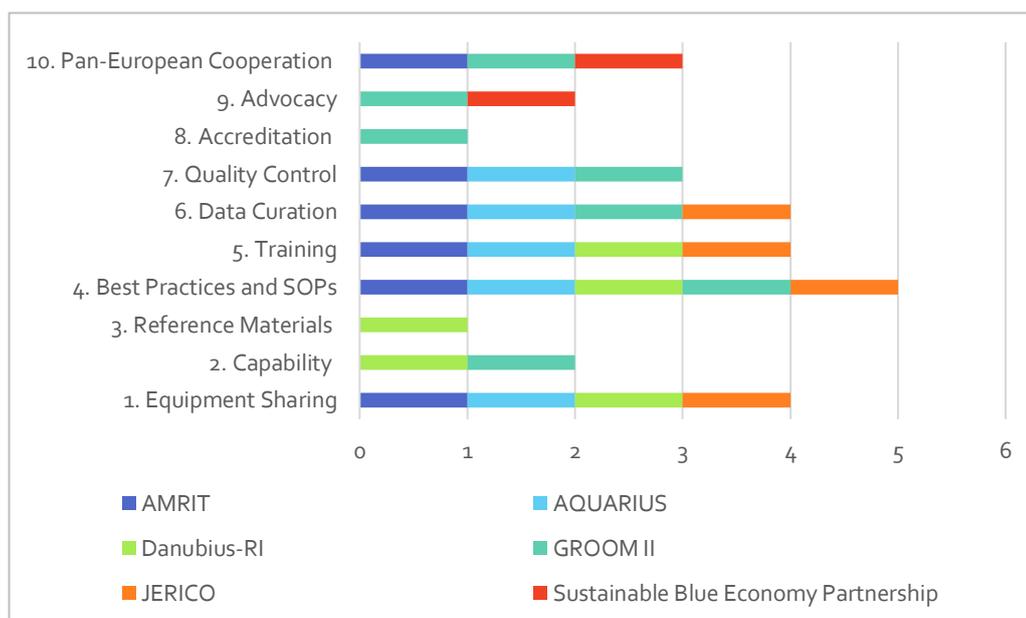


Figure 11. List of services provided by Research Infrastructure Projects.



Common Services Provided by Data Integrators

In the **Data Integrators** group the most common services are Best Practices and SOPs, Training, Data Curation, Quality Control, Advocacy and Pan-European Cooperation. EMODnet has *“best practices and reference on in-situ data and associated metadata, web services and ocean data and data products publishing (using open-source software and OGC standards, etc.)”*. Copernicus has training available *“e.g. visualise, download and use of Copernicus Marine products and services, use for applications (MSFD, Transport, etc.)*. Six to seven training events per year”. Data Curation is completed for all data managed by Copernicus and EMODnet has stated that *“data coming from RI observations should be accessible in EMODnet in a standardised and interoperable format (FAIR)”*.

The importance of Quality Control is evident within this group with Copernicus stating *“secondary quality control for In-situ data (Thematic Assembly Centre) and QC for modelled data for reanalyses, analyses and forecasts. Quality Information Documents (QUID) available for all products. The Copernicus Marine Service In-situ TAC carries out QC using a common approach for all the different platforms feeding into the system”*.

For Advocacy, EMODnet is *“strongly engaged in the promotion of value of in-situ data and data products for their use by different range of stakeholders (policy makers, scientists, blue economy sector) and the promotion of EU data and products services at global level (e.g. linking to the UN ocean decade)”*. Both Copernicus Marine Services and EMODnet are involved in Pan-European Cooperation with cross cutting working groups in Copernicus and EMODnet is a *“European network (>100 experts) of people working on in-situ data and data products generation and publishing for different parameters (physics, chemistry, biology, bathymetry, seabed habitats and human activities)”*.

Gaps in Services Provided by Data Integrators

Areas with limited services are Equipment Sharing, Capability, Reference Materials, and Accreditation however data providers are not expected to have equipment or reference materials to share.

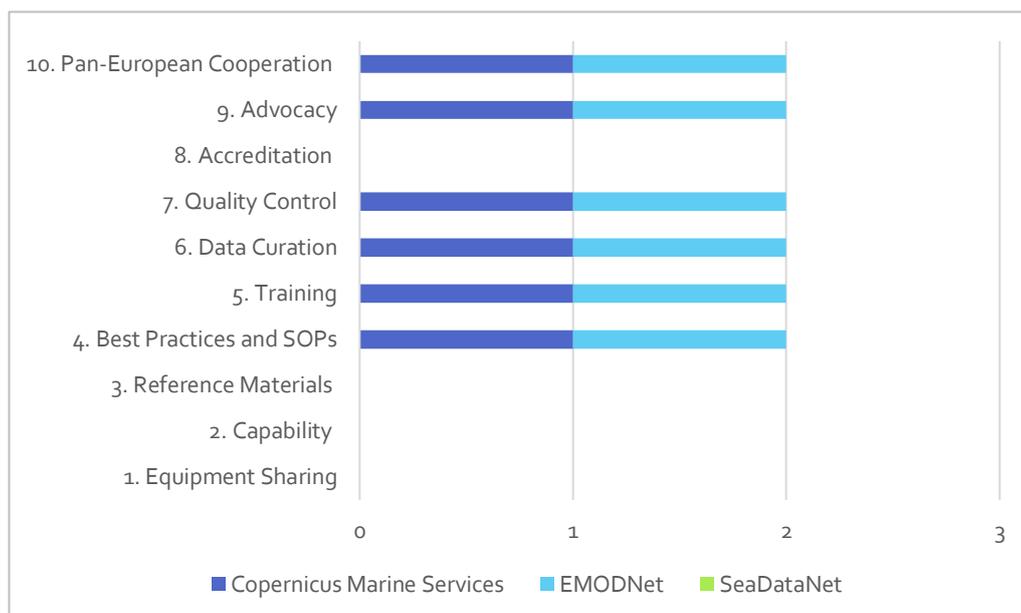


Figure 12. List of services provided by Data Integrators.

Common Services for Provider in the Coordination/Oversight & Funding Organisations

Predictably, the most common service for the Coordination/Oversight and Funding Organisations group is Pan-European Cooperation. EuroGOOS and FerryBox have a number of EU member representatives and the EOOS “operational committee is the place to meet every RI and EU entity”. OceanOPS “encourage and support the planning of observing network implementation to enable (pan-European) synergies and opportunities”, and “Pan-EU cooperation is in the core business of JPI Oceans”.

Best Practices & SOPs, Training, Data Curation and Advocacy are the second more frequent services in this group. OceanOPS “set and disseminate the standards and best practices of metadata harmonisation across the Observations Coordination Group (OCG) networks”. Ocean Best Practices System (OBPS) can “provide access to qualified practices/methods (endorsement process) and will help depositing practices in a repository and provide a way to have them submitted for endorsement” while best practices are available online for the FerryBox community, the EuroGOOS Task Team activities and within the JERICO RI.

For Training, EOOS is organising a EOOS Technological Forum and FerryBox have provided training through different EU and national projects. Ocean Best Practices System also provide training within the Blue-Cloud 2026 EU project and through webinars, and courses delivered by the Ocean Teacher Global Academy (OTGA) in the Flanders Marine Institute (VLIZ).

Ocean Best Practices System are undertaking data curation and establishing an Ocean Practice Federated Network (OPFN) while also linking with the International Oceanographic Data and Information Exchange (IODE) and the Ocean Data and Information System (ODIS).

Ferrybox Task Team and OceanOPS are also establishing metadata pathways and leading metadata standardisation and integration.

For Advocacy, “EOOS is very well suited to help to federate advocacy” while OceanOPS “promote standards and best practices on instruments (installation, deployment, recovery, metadata, EEZ, etc.); develop agreements with EuroGO-SHIP and GO-SHIP program and end users; enhance communication to foster community understanding of engagements; report to the stakeholders, IOC and WMO member states and report 'system' level metrics (report card, bulletin)”. JPI Oceans states “As intergovernmental platform for ministries of its member countries, JPI Oceans offers a direct conduit from science to policy”.

Gaps in Services Provided by Coordination/Oversight & Funding Organisations

Areas with limited services are Equipment Sharing, Reference Materials, Accreditation, Capability and Quality Control. It would not be expected that these organisations would provide equipment, reference materials, capability or quality control.

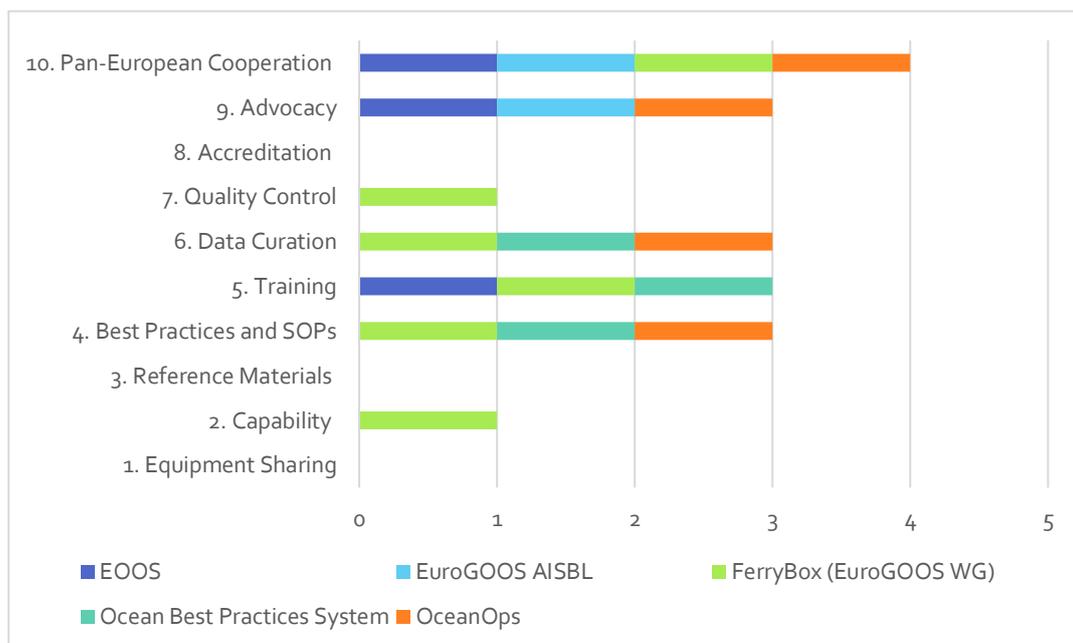


Figure 13. List of services provided by Coordination / Oversight and Funding Organisations.

As a Partner - if the services already exist, how can they be accessed?



Figure 14. EuroGO-SHIP RI Services: Groups who want to PARTNER on a service in the future.

Common Services for Partnering – Established Research Infrastructures

In the Established Research Infrastructures group, the most frequent services were Best Practices and SOPs, Training and Data Curation. The sharing of best practices is recognised as being important. EMBRC “encourage the use of their SOPs and protocols, they are open access, and are working on creating a mechanism for incorporating non-EMBRC partners in the observatory”. LifeWatch “exchange best practice knowledge with other RIs on how to develop research products”. Euro-Argo share best practices on “data collection and metadata through Infra-Tech projects e.g. George, AMRIT, etc.”. Euro-Argo also recognise the benefit of cross-network training sessions as does EMBRC, “if there is a biological component”.

EuroFleets has suggested *“on-board training of ship’s crews and technicians by experts from the hydrographic community”*.

For Data Curation, EMBRC *“are exploring where to store large imaging datasets from observatories. We are encouraging the use of certain metadata standards, e.g. MlXs and Darwin Core”*. Euro-Argo have highlighted the importance of FAIR data and the European Open Science Cloud (EOSC). EMSO are using data curation to *“generate/update a sensor registration system that provide automated harmonised metadata”*. EuroFleets propose sharing *“real time data provision from RVs and streamlining of the data pathways”*, while LifeWatch have suggested *“sharing experience gained by the development of services dedicated on Data Management”*.

The second most prevalent services are Equipment Sharing and Pan-European Cooperation. EMSO ERIC suggest sharing sensors, EuroFleets have a database of vessels and marine equipment that can be shared and LifeWatch suggest sharing of HPC, data and software. Euro-Argo has stated *“at deployment phase of an Argo profiler, a reference cast is a real benefit. Hence your material sharing could be of benefit for the cruises of opportunity we use”*. Collaboration in marine research and observations is fundamental to, according to EMBRC, *“avoid duplication and improve interoperability”*. LifeWatch are interested *“in joining a European RI expert group that is relevant e.g. water column biology”*.

Gaps in Services for Partnering by Established Research Infrastructures

Areas with limited services identified in this group were Capability, Reference Materials, Accreditation, Quality Control and Advocacy.

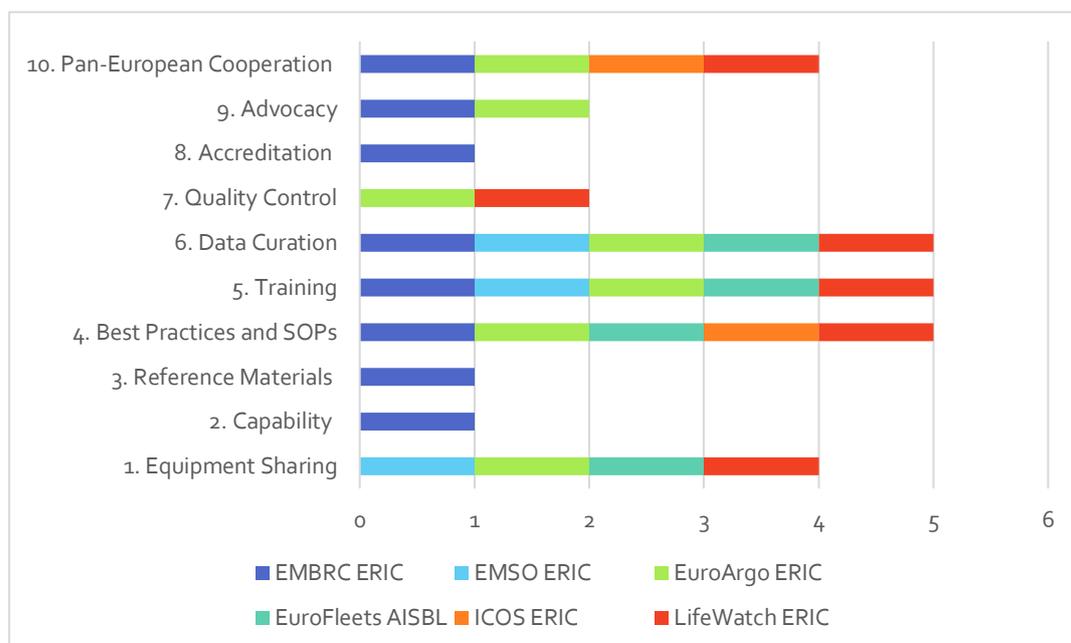


Figure 15. Established Research Infrastructures who would like to partner with EuroGO-SHIP services.

Common Services for Partnering – Research Infrastructure Projects

For the Research Infrastructures Projects, the main area identified is Equipment Sharing. AQUARIUS has suggested sharing their infrastructure database and profiles while GROOM has stated that *“GROOM partners have intercalibration needs and make important use of large CTD (SBE911), Rosettes, ... and could share them. They could also provide ‘mini’ sensors as well that are often intercalibrated during hydrographic cruises by being installed on the Rosettes (or the full glider)”*.

Sustainable Blue Economy Partnership (SBEP) – *“European Marinas Network (Scoping Action):*

- *Aims to explore potential of marinas as infrastructures for ocean observation, ocean research and citizen science.*
- *Explore Marinas to be used to improve observation data quality, coherency and coverage.*
- *Possible outcomes (to be explored):*
 - *Establish a coordinated network of marinas across Europe engaged in environmental monitoring and data collection.*
 - *Develop standardised, user-friendly sensor packages and data collection protocols for marinas to adopt (salinity, temperature, turbidity, and sea-level sensors).*
 - *Create a centralised, open-access data repository for the environmental data collected by the marina network.*
 - *Participating countries: DE, lead IT and GR”*

For Reference Materials, AMRIT *“can help for the definition/management of metadata”*, and GROOM states, *“support by Marine Autonomous Systems (MAS) to reference carbon measurements done by R/Vs”*.

SBEP – *“Ocean Carbon Capacities (Knowledge Hub) - Key areas are the supply of reference materials, the under sampling of surface CO₂ concentrations in crucial Ocean areas, and the need for regular audits. Concrete:*

- *DIC reference for EU (autonomy)*
- *New observation systems on RVs--> new data into SOCAT*
- *Evolution of surface ocean CO₂ observations in EU*
- *6 participating countries: BE, DE, NO, IR, PL, GR/LEAD NO, DE+GR”*

Training and Data Curation, the AQUARIUS training hub can share training guidelines and *“TNA projects can be requested to collect water samples during funded cruises and ensure all underway data & metadata is submitted to the appropriate data repositories”*. Training courses for Marine Autonomous Systems (MAS) within GROOM are *“rather specific to the platform. However, they can be run on R/V cruises or during cruises (e.g. the 2022 EuroFleets+ Floating University managed by UGOT)”*. For Danubius *“there is interest for identifying common data pathways and adopt (for specific data) standard metadata catalogues to increase data availability”*.

Again Pan-European Cooperation is essential, JERICO states *“RIs need to federate! And expertise needs to be shared”*. Danubius are interested in sharing information on *“some parameters if measured in river-sea continuum (mainly all parameters of the list for carbon system - refer to ICOS work)”*. Sustainable Blue Economy Partnership states *“as legal entity JPI Oceans is engaging in strategic projects and initiatives and regularly hosts expert group meetings for its Joint Actions”*.

Gaps in Services for Partnering by Research Infrastructure Projects

Areas with limited services identified for the Research Infrastructures group are Accreditation, Advocacy and Quality Control.

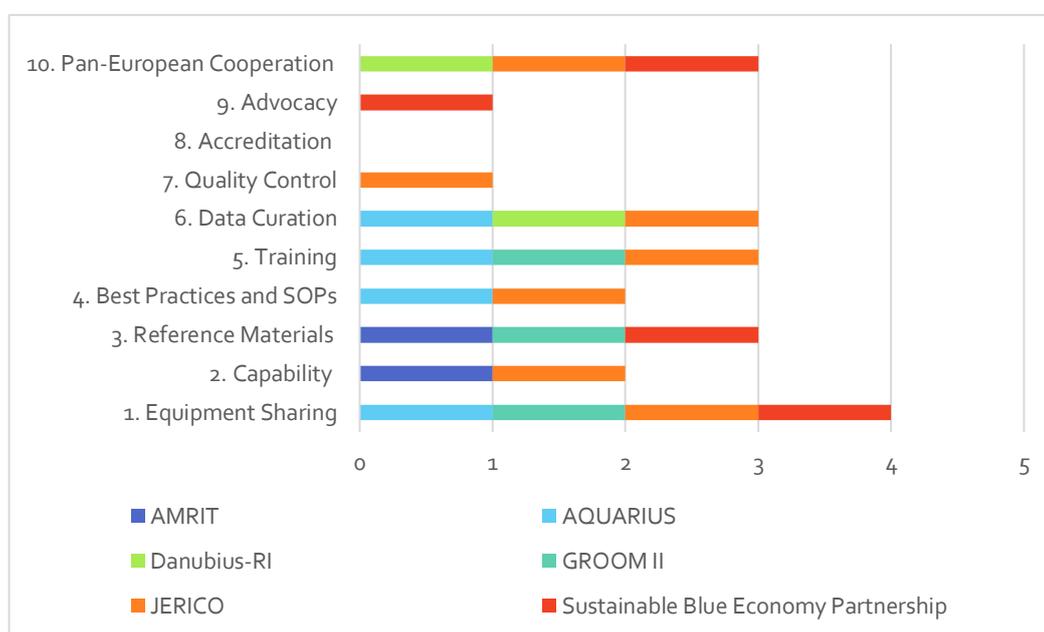


Figure 16. Research Infrastructure Projects that would like to partner with EuroGO-SHIP services.

Common Services for Partnering – Data Integrators

For the Data Integrators group, the most common services identified are Training, Data curation, Quality Control, Advocacy and Pan-European Cooperation.

Training can be provided by Copernicus *“to explain the value of ocean observations for predictions”* and EMODnet can provide *“training of in-situ data flow and data products generation”*. For Data Curation, Copernicus can provide *“an In-Situ Thematic Assembly Centre (In-situ TAC) to ensure higher uptake of hydrographic data from EU nations”*. EMODnet can facilitate access *“to in-situ data, and data products, being generated by providers and the RIs. Data coming from RI observations should be accessible in EMODnet in a standardised and interoperable format (FAIR)”*.

For Quality Control, Copernicus can ensure *“in-situ TAC to ensure hydrographic data ingested in Copernicus Marine are directly useable (fully processed including quality control steps) for*

model validation or data assimilation” and EMODnet’s “in-situ data and products have passed certified QC procedure and have quality flag on the metadata that can be used across the RIs”.

For Advocacy, Copernicus has emphasised the importance of *“the EC working together on the Ocean Observing system design which is important issue that must be addressed to move toward a sustained monitoring and observing system in place in Europe”*. Similarly, EMODnet feels strongly about the *“promotion of value of in-situ data and data products to stakeholders and promotion of EU data and products services at global level”*.

For Pan-European Cooperation, Copernicus Marine Service has *“working groups to analyse how to ingest data from the in-situ hydrography networks”*. Copernicus Marine Service is interested in sitting on the EuroGO-SHIP parameter working groups.

Gaps in Services for Partnering by Data Integrators

Areas with limited services identified are Equipment Sharing, Capability, Reference Materials, and Accreditation however it is not expected for the data integrators group to provide such services.

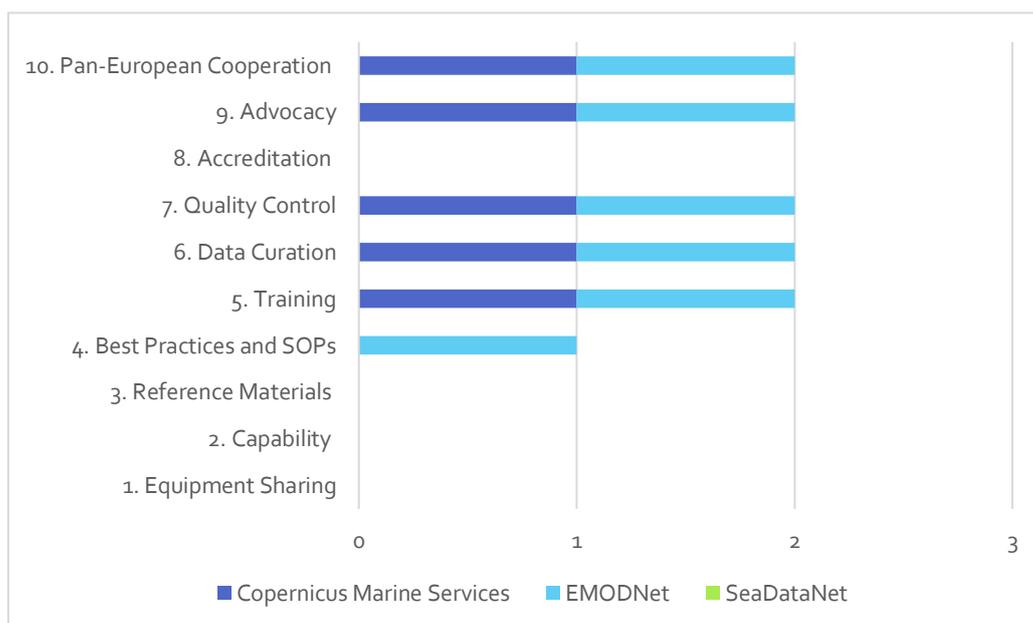


Figure 17. Data Integrators who would like to partner with EuroGO-SHIP services.

Common Services for Partnering – Coordination/Oversight and Funding Organisations

For the Coordination/Oversight and Funding Organisations group the most common services were Training and Pan-European Coordination.

EOOS is happy to *“co-organise trainings and workshops on side of EuroGOOS Task Teams and Working Groups”* while FerryBox has suggested partnering for *“training for some of overlapping parameters (e.g. nutrient sampling for QC of FerryBox data)”*. Ocean Best Practices System recommends training through the virtual lab (Vlab) within the Blue Cloud



2026 EU project and OceanOPS has advised that they are involved in *“in-person training workshops organised by UN (e.g. DBCP training workshop in Tunis) and organise online training with partners (e.g. ODV data collection for BGC-ARGO)”*.

There is strong support for Pan-European Cooperation in this group, the advice is to join the EOOS Operation Committee and to look to ROOSes, working groups and task teams of EuroGOOS for collaboration as *“these are open to community members whether EuroGOOS members or not”*. JPI Oceans is *“engaging in strategic projects and initiatives and regularly hosts expert group meetings for its Joint Actions”*.

For Best Practices & SOPs, Ferrybox are suggesting *“developing best practices for the parameters we have not addressed yet together with EuroGO-SHIP”*.

Ocean Best Practices System (OBPS) has highlighted the Ocean Biodiversity Information System (OBIS) which can *“provide access to qualified practices/methods (endorsement process)/Best Practice can be sorted with different levels of maturity”* and OBPS *“through IEEE can work towards standardization (harmonization) for the most mature best practice”*.

OceanOPS are suggesting partnering with other RIs to *“help Observations Coordination Group (OCG) network in setting up best practices and standard operating procedure which are GOOS compliant”*.

For Data Curation sharing of knowledge and collaboration is key, OceanOPS suggests *“Collaboration with EuroGOOS Task Team (TT) for metadata curation delivery of WMO ID metadata sharing (e.g. FP TT, High Frequency Radar TT, Tide Gauge TT)”*. FerryBox are happy to share knowledge on data curation. Ocean Best Practices System has stated *“metadata describing the OBP/curation of deposited BP”*.

For Advocacy, *“EOOS is the place to advocate for a RIs and EU entities dedicated to marine science, observation and blue economy”*. EuroGOOS’s *“core capacity is at the science/partner and policy interface/connecting community needs with stakeholders/policy makers”*.

The FerryBox Task Team *“could establish connection between different FerryBox Task Teams partners and EuroGO-SHIP”* and JPI Oceans *“chairs the EOOS resource forum, and in this capacity (plus AMRIT) may be a valuable partner”*.

Gaps in Services for Partnering by Coordination/Oversight and Funding Organisations

Areas with limited services are in the Capability, Reference Materials, Accreditation, Equipment Sharing, Quality Control services however it is not expected these would be covered by these organisations.

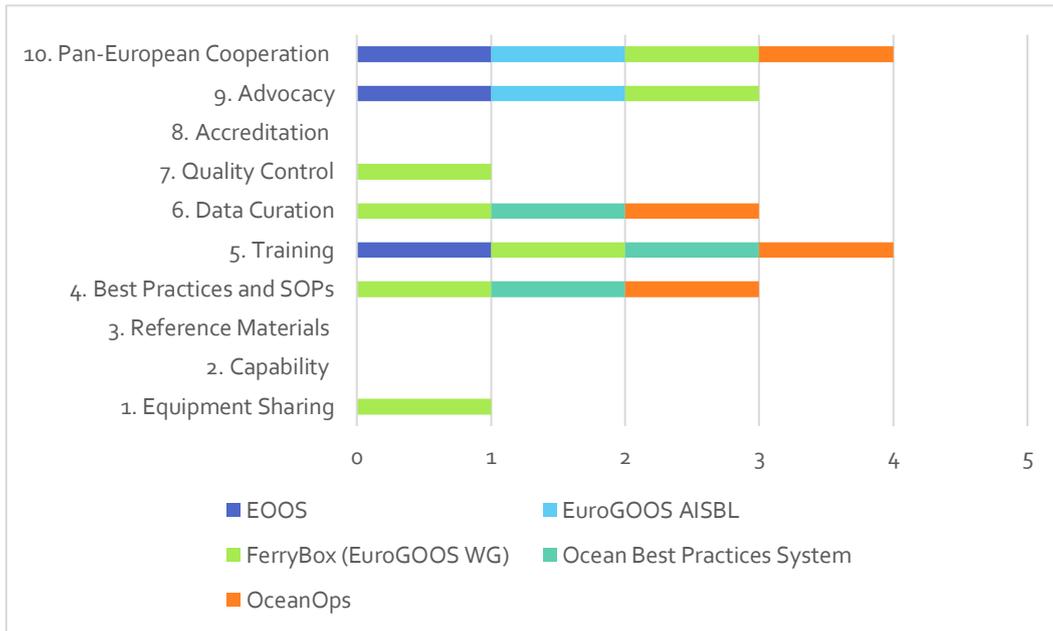


Figure 18. Coordination / Oversight and Funding Organisations who would like to partner with EuroGO-SHIP services.

As an Expression of Interest – are there services others are interested in co-developing



Figure 19. EuroGO-SHIP Services: Groups who have an EXPRESSION OF INTEREST in EuroGO-SHIP services.

Common Services with an Expression of Interest in the Established Research Infrastructures
 Accreditation is the most common service identified. Both EMBRC and Euro-Argo have expressed an interest and would like to be kept informed. LifeWatch has emphasised how important it is “to ensure high levels of quality. The ISO accreditation process is painfully long. Implementation and maintenance is very costly. Would like to find out if there are any options to help the RIs achieve accreditation at a lower cost. LifeWatch follows FAIR data policy management practices”.

The second most common services that this group have expressed an interest in are Equipment Sharing, Best Practices & SOPs, Training, Advocacy and Pan-European Cooperation.

For Equipment Sharing both EMBRC and EuroFleets have expressed an interest, as long as there is a biological component in the case of EMBRC and EuroFleets has proposed that their *“existing database of LEXIs can be shared for ease of scheduling + deployment. Cruise schedule published online for opportunity to take samples / spare berth capacity”*.

For Best Practices, SOPs and Training, EMBRC are hoping *“to develop imaging-based observation in our observatory in the next couple of year”* and EuroFleets suggest *“sharing of best practices in Hydrography with the RV community”*. They also suggest that there is *“potential to organise training cruises, specifically on hydrography”*.

For Advocacy both EMBRC and LifeWatch have expressed an interest, LifeWatch has stated *“Advocate for RIs where you can trust the quality of the data and research produced. Large number of scientific community are unaware about what the RIs do. Researchers often work in isolation or in small projects and do not realise what support RI services are available to them. co-design / co-developing with the research community is important to build trust. KPI of Lifebloc (based on blockchain technology) registers how much the datasets are searched/used each year”*. EMBRC and EMSO have expressed an interest in Pan-European Cooperation.

Gaps in Services with an Expression of Interest for Established Research Infrastructures

Areas of limited services were in Capability, Reference Materials, Data Curation and Quality Control.

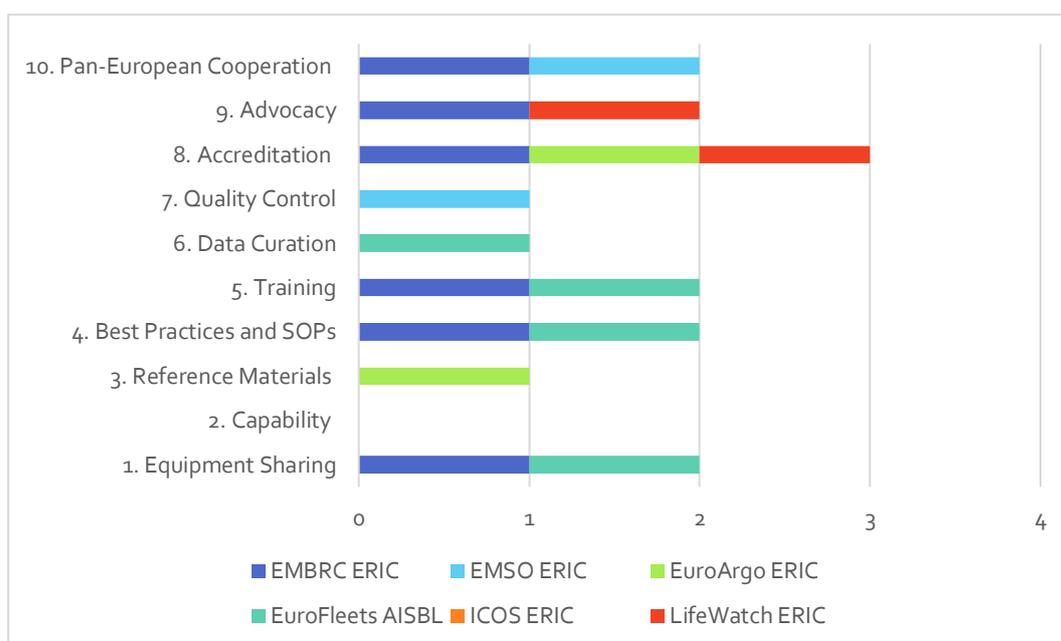


Figure 20. Established Research Infrastructures who have expressed an interest in EuroGO-SHIP services.



Common Services with an Expression of Interest in the Research Infrastructures Projects

The most common service in this group is Advocacy. Sustainable Blue Economy Partnership are interested in connecting, as is Danubius but only when they have established themselves as an ERIC. JERICO has stated *“need to advocate for coastal observations and their sustainability for the JERICO community. Joining with other ocean observation RIs in this effort is in mutual interest”*.

For Reference Materials, Sustainable Blue Economy Partnership have noted that *“synergies and cooperation are foreseeable”* and JERICO has stated that *“reference materials are recurring issue for JERICO - so far no efforts, but definitely a need and willingness to participate, possible link to MINKE?”*.

Sustainable Blue Economy Partnership

Equipment Sharing – *“Close cooperation with the Advance Marine Research Infrastructures Together (AMRIT) initiative is advisable.*

AMRIT key objectives:

- *Ensuring the seamless operation of marine observation platforms.*
- *Facilitating the full nominal use of sensors and expediting their evolution.*
- *Leveraging the complementarity of various observation platforms.*
- *Ensuring the overall coherence of the ocean data value chain; landscape analysis.*
- *Contribution to EOOS; Develops the technical support centre TSC.*

BEST PRACTICES - Follow-up on lessons-learned and results of the H2020 MINKE project - Metrology for Integrated Marine Management and Knowledge-Transfer Network”

Gaps in Services with an Expression of Interest for Research Infrastructure Projects

Areas of limited services were in Capability, Training and Data Curation.

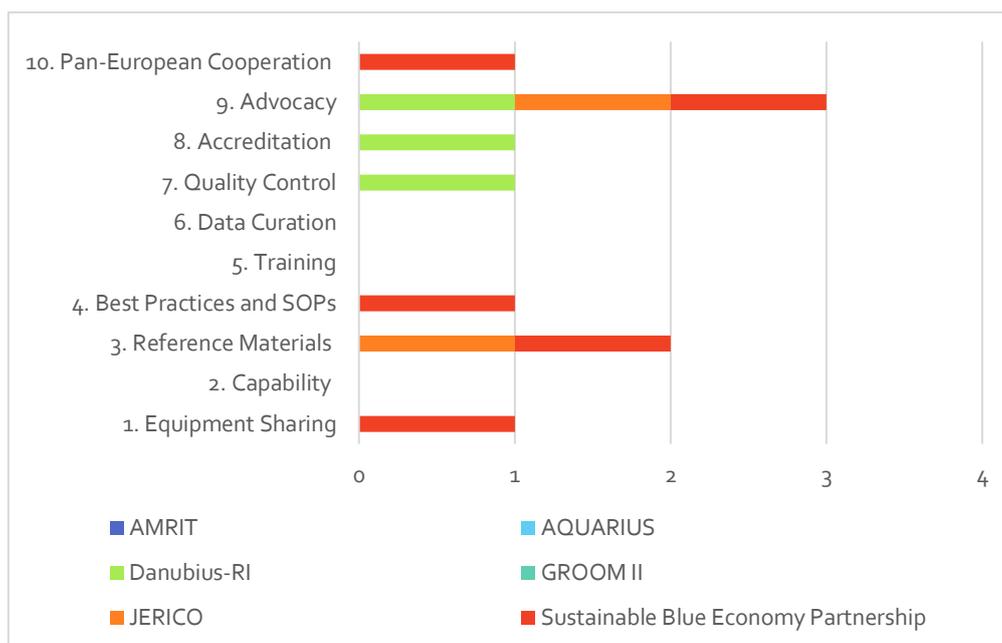


Figure 21. Research Infrastructure Projects who have expressed an interest in EuroGO-SHIP services.

Common Services with an Expression of Interest in the Data Integrators

The most common services selected in this group are Best Practices and SOPs, Training, and Data Curation. EMODnet is interested *“in continuing collaboration as best practices and reference in in-situ data and data products publishing”* and have stated they *“should be involved in the data flow from all existing and new RIs to make in-situ data accessible in the EMODnet portal in a standard format (FAIR Data)”*. EMODnet are also interested in *“following and providing in-situ data flow and data products generation trainings”* and SeaDataNet have highlighted data management for best practices and training. SeaDataNet are keen to partner up with RIs to assist them with data related activities.

Quality Control, Advocacy and Pan-European Cooperation are the second most frequent service identified. SeaDataNet have stated that *“National Oceanographic Data Centres (NODCs) are strongly “suggested” to be certified”*, and EMODnet have stated that they need to speak with *“RI experts on parameters to facilitate the standardization of data and metadata formats to make them FAIR and accessible to other EU and global marine data portals”*.

Gaps in Services with an Expression of Interest for Data Integrators

Areas with limited services are in Equipment Sharing, Capability, Reference Materials but once again this is not expected from this group.

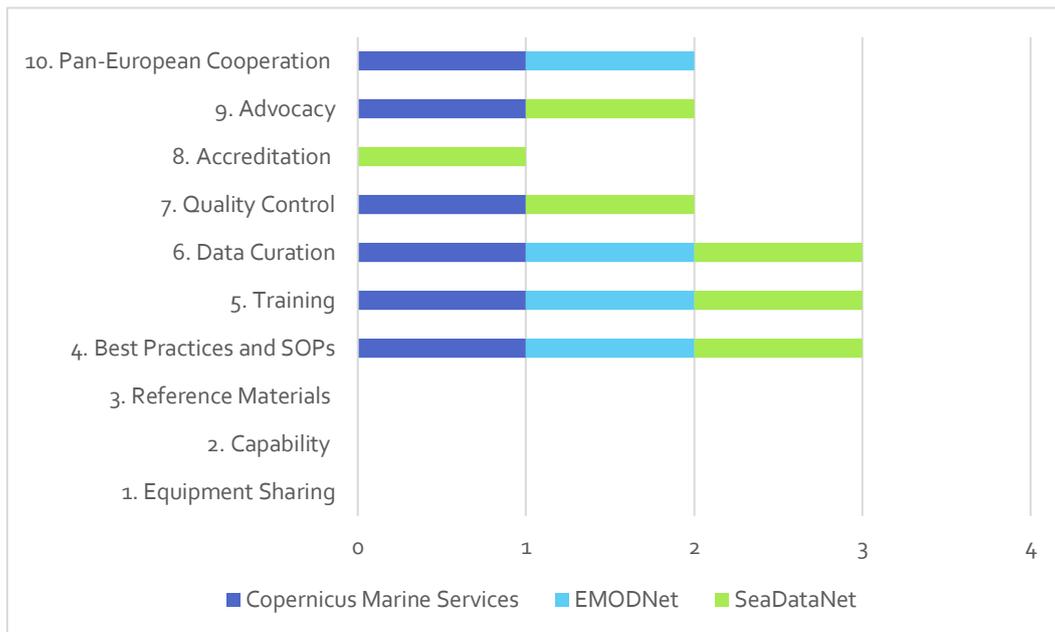


Figure 22. Data Integrators who have expressed an interest in EuroGO-SHIP services.

Common Services with an Expression of Interest in the Coordination/Oversight and Funding Organisations

The most common services identified in this group are in Accreditation, Advocacy and Pan-European Cooperation. For Accreditation, EOOS draws attention to the gap between accreditation of observations in marine science, they have highlighted the MINKE H2020 EU project for including in EU marine activities. There are possible collaborations with EuroGOOS (through the ROOSes) and FerryBox, and OceanOPS have stated that *“an Ocean Practice (OP) AISBL is under creation (IMR, IEEE Frame, RBINS), members will be Institute, and the OP AISBL needs to be granted access to EU projects as a partner”*.

For Advocacy, EuroGOOS has stated they are *“working towards the improvement and visibility of ocean observations in general. EuroGO-SHIP as part of this community fits perfectly there”*. OceanOPS recommends that it is important to *“advocate for GOOS at EU level and globally (e.g. G7 - FSOI). Increased connections between GOOS are needed with other international agencies (FAO, UNEP, ...)”*.

For Pan-European Cooperation, EuroGOOS can *“provide a platform, and/or serve as multiplier into the community”*, OceanOPS believe there is an opportunity to *“develop Pan-European partnerships & pilot projects to facilitate deployment / recovery of instruments, including with the civil society and industries (e.g. CMA-CGM, Vendee Gbse – a shipping and logistics group)”*

Training was also considered important with EOOS offering to *“participate and help to federate, to make visible Trainings & Workshops with RIs and EU entities”* EuroGOOS is interested in revisiting joint training efforts. OceanOPS are providing *“training to EuroGO-SHIP on metadata management and reporting on the OceanOPS website”*.



For Best Practices and SOPs, EOOS *“is supporting Ocean Best Practices System and is willing to follow further collaboration dedicated to best practices. EOOS is the place to federate RIs and EU entities to progress in the topic”*. EuroGOOS facilitates the exchange of information on best practices and SOPs within its community and JPI Oceans has suggested to *“follow-up on lessons-learned and results of the H2020 MINKE project - Metrology for Integrated Marine Management and Knowledge-Transfer Network”*.

For Data Curation and Quality Control, EOOS has indicated its support to *“improve data quality provided by various RIs and projects. Through the GOOS operation committee EOOS can foster their process”*. OceanOPS *“encourages the community to share all their metadata with OceanOPS! Engage the community to benefit from OceanOPS metadata expertise. Training with planning tool and support to operation (ship of opportunity)”*. OceanOPS also *“assist certain OCG networks in the improvement of their quality control. Set-up operational data systems. Monitor quality control performance to trigger EuroGO-SHIP improvements in that domain”*.

For Capability and Reference Materials, FerryBox are *“interested in collaboration for low nutrient (and high nutrient) concentration measurements or transient tracers. Some efforts now are spent in microplastic sampling as well as algae species sampling”* and they have indicated that Reference Materials are *“extremely important in terms of their same collection for checks/quality control of their underway measurements”*. JPI Oceans foresee synergies and cooperation in Reference Materials also.

Gaps in Services with an Expression of Interest for Coordination/Oversight and Funding Organisations

Areas of limited services are in Equipment Sharing though this is not expected from these organisations.

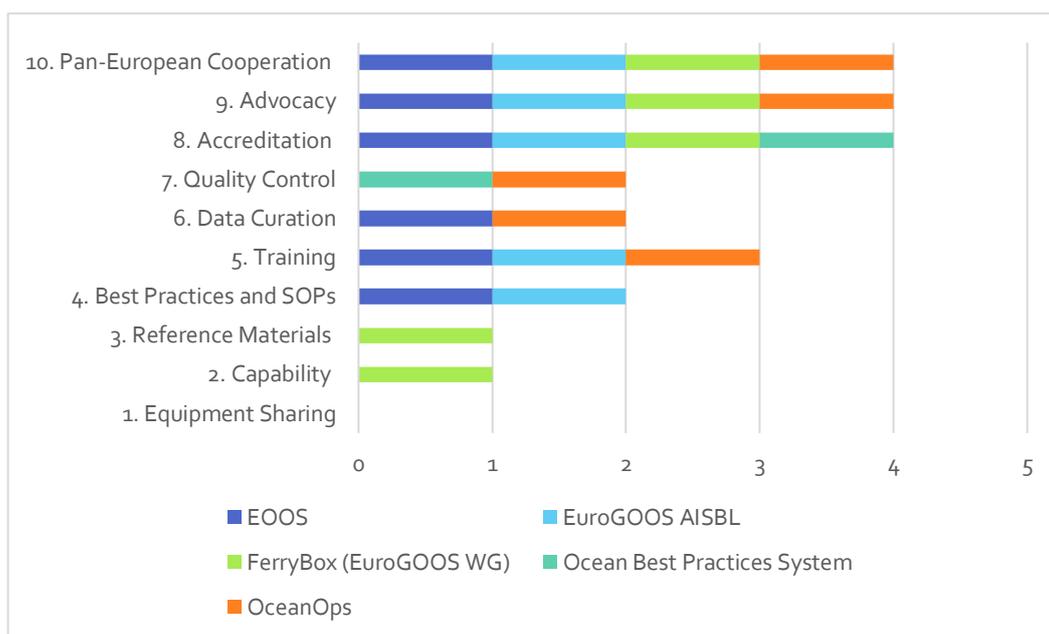


Figure 23. Coordination / Oversight and Funding Organisations who have expressed an interest in EuroGO-SHIP services.

4.3.2. Global Challenge Scenarios and RI Solutions

The objective of this activity was to explore how RIs could be combined to tackle global challenges relevant to our ocean and waters. Three groups were created, and three global challenge scenarios were identified.

Expected Output: Scenarios where combined RIs (including EuroGO-SHIP) could collaborate for research and innovation. Identification of synergies on RI functions. Identification of any needs or gaps. Identification of potential funding sources. RI-based concepts to provide solutions for global challenges related to our ocean and waters.

Horizon Europe’s Mission Ocean, Seas and Waters is aligned with the European Green Deal and the EU’s commitments under the United Nations Sustainable Development Goals, particularly Goal 14 – “Life Below Water”. It aims to mobilise research and innovation efforts across Europe and beyond to address the urgent challenges facing marine environments and ensure their long-term health and vitality.

The three **Global Challenge Scenarios** were:

- 1. Sustainable Fisheries Management:** Need to implement and enforce sustainable fisheries management practices and ensure that fish stocks are maintained at levels that can produce maximum sustainable yield (MSY) by specified deadlines. This may involve reducing overfishing, implementing science-based quotas, and minimizing bycatch.



2. **Pollution Reduction:** Need to reduce marine pollution from various sources, including plastics, chemicals, and nutrient runoff, by a certain percentage over a specified period. For example, reducing plastic waste entering the oceans by 50% by 2030, as outlined in the European Union's Plastics Strategy.
3. **Climate Change Resilience:** Need to enhance the resilience of marine ecosystems and coastal communities to the impacts of climate change, such as ocean acidification, sea level rise, and extreme weather events, by implementing adaptation measures.

Each group was provided with an outlined Global Challenge Scenario and concept template (see Figure 24) related to managing natural resources (ocean and waters) that are aligned with Mission Ocean, and correlate with Horizon Strategy 2025-2027.

Global Challenges and Research Infrastructure Solutions

EuroGO-SHIP Research Infrastructure Workshop
 Thursday, 27 June 2024
 Institute for Marine Sciences (CNR-ISMAR), Venice, Italy

Global Challenge Description	
Project Concept	Potential Solutions
Research Infrastructures to be involved	Specific role of EuroGO-SHIP
Innovation	Blue Economy
International Cooperation	Public Engagement
Any other considerations?	

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Figure 24. Global challenge scenario and concept template.

Each Group was asked to use the provided RI magnets and magnetic board to show which RIs could be best combined to provide services to the research and innovation community to address the allocated global challenge. **The main rule was that EuroGO-SHIP services must be included in each one.** Each Group was also asked to create a project concept (on the provided template) to address the global challenge scenario, explaining how the RIs can be

used synergistically to conduct the necessary research and innovation, and provide potential solutions. Horizontal considerations were also included for discussion (e.g. each group must address EuroGO-SHIP services; international cooperation, blue economy; innovation; public engagement, etc.).

Each Group presented the outcomes of their work. One common feature was the willingness to include as many RIs as possible, but also clustering them according to their different functions and their positions in the wider RI ecosystem. The need to collaborate was acknowledged, as well as the overlap across some RI functions.

There were additional insightful inputs from the EC representatives Zoi Konstantinou (Policy Officer, EC, DG MARE) and Nicolas Segebarth (Policy Officer, EC, DG RESEARCH), including highlighting the need for cooperation and possibly consolidation.

A



B

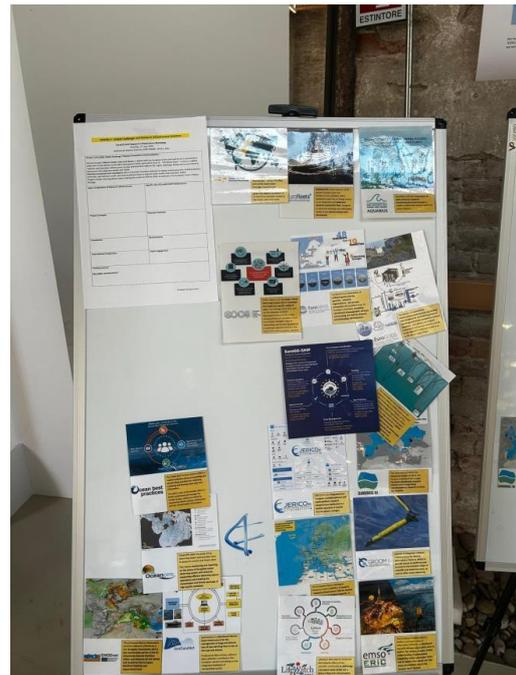


Figure 25. Global Challenge Scenarios activity: Yellow group working on Pollution Reduction. (A) Group working on task. (B) Magnetic board close-up.

<p>Global Challenge Description: Pollution prevention and remediation aims to develop innovative solutions to reduce marine pollution, including plastics, chemicals, and nutrient runoff, and restore polluted areas to improve water quality and ecosystem health. Targets include reducing plastic waste entering the oceans by 50% by 2030, as outlined in the European Union’s Plastics Strategy.</p>	
<p>Project Concept:</p> <ul style="list-style-type: none"> ▪ Litter-tracking ▪ Lateral (from land) source of pollutants ▪ Emerging pollutants / new contaminants ▪ Microplastics ▪ Nutrients from land (side products from agriculture and human activities) 	<p>Potential Solutions:</p> <ul style="list-style-type: none"> ▪ Database of measured pollutants in the ocean – integrated tools to increase visibility of the problems ▪ Particle tracking models (JERICO and DANUBIUS working on some models) ▪ Data needed to improve and validate forecast/backtracking models ▪ Earth Observation data to detect and predict pollution
<p>Research Infrastructures to be involved: Land-based Infrastructures for river sources and discharges, e.g. DANUBIUS RI RIs - in charge of tracking spread of pollutants and suppliers of data – JERICO, DANUBIUS, SeaDataNet, EMODnet</p>	<p>Specific role of EuroGO-SHIP:</p> <ul style="list-style-type: none"> ▪ Piloting best practices ▪ Providing information on the problem and providing a platform to ‘set’ the data (bringing the datasets and information together to form a solution) ▪ Coordinate Research Vessels tasked with addressing the problem ▪ Could have long-term background value – to be a knowledge base for prevention and remediation <p>(side comment: the polluters are also the people who pay for the clean-up)</p>
<p>Innovation</p> <ul style="list-style-type: none"> ▪ Sensors/Low-cost sensors from citizen science to help monitor pollution (LandSeaLot project/ DANUBIUS RI) ▪ Integration of different data sources ▪ Providing solid training material/methodologies: ‘How to integrate Real-Time data’ to support the tracking and implementation of the solution. ▪ Minke EU Project: testing metrology and calibration of sensors is missing in the RI landscape 	<p>Blue Economy: Marine litter start-ups (new organisations, initiatives and companies) dealing with the problem – to provide insights and requirements of solutions.</p>
<p>International Cooperation Ocean is global and no boundaries</p> <ul style="list-style-type: none"> ▪ ENVRI Board ▪ Decade Ocean – pollution is one of the UN Ocean Decade challenges (Challenge 1 Understand and beat marine pollution) ▪ Free waters initiative <p>Funding</p> <ul style="list-style-type: none"> ▪ Partnerships with blue economy as a unique way of funding for pollution challenge – ▪ Watch for relevant Calls- ▪ NGOs 	<p>Public Engagement:</p> <ul style="list-style-type: none"> ▪ Connect with stakeholder communities within citizen science, awareness on the importance of clean oceans ▪ Inspire prevention and clean-up through knowledge and data – use art and entertainment channels (projects, media) ▪ Promote good practices – i.e., use washing bags to capture micro plastics in fleece clothing.

Any other considerations?

- Find way and need to increase and sustain observations –
- Looking at future – new pollutants on the horizon – important to keep watch and include in planning
- Coordination of field campaigns
- Be mindful of the silver lining:
 - Farmers use the nutrients from pollution – problem is the source of pollution
 - Rubber ducks in ocean – showed ocean currents – example on how to detect and forecast pollution in the ocean

A



B

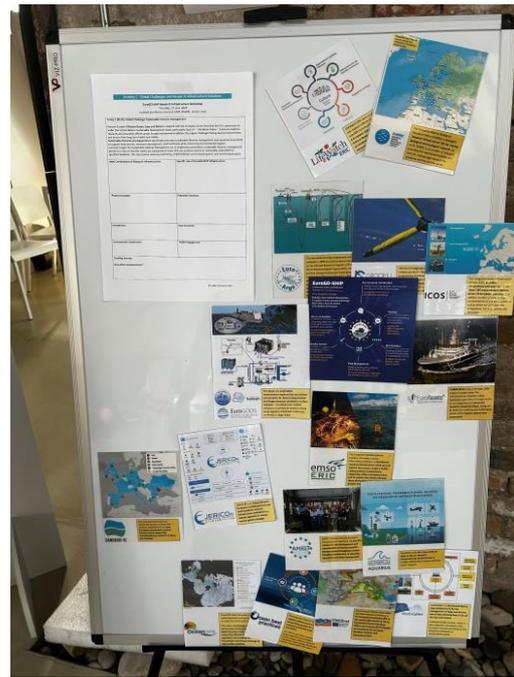


Figure 26. Global Challenge Scenarios activity: Blue group working on sustainable fisheries management. (A) Presenting outputs. (B) Magnetic board close-up.

In terms of the scenario on ‘sustainable fisheries management’, this was especially challenging given the difficulties of engaging with the sector and obtaining commercial data which was often not forthcoming.

<p>Global Challenge Description</p> <p>Sustainable Fisheries and Aquaculture specifically promotes sustainable fisheries management and aquaculture practices to support food security, economic development, and livelihoods while minimising environmental impacts. Common targets for Sustainable Fisheries Management are to implement and enforce sustainable fisheries management practices to ensure that fish stocks are maintained at levels that can produce maximum sustainable yield (MSY) by specific deadlines. This may involve reducing overfishing, implementing science-based quotas, and minimising bycatch.</p>	
<p>Project Concept</p>	<p>Potential Solutions</p> <ul style="list-style-type: none"> ▪ Fisheries management needs more than just information about water properties. Supporting info includes environmental conditions and interactions with fish life cycles. ▪ Observations by parameter: temperature, salinity, acoustics, chemistry. ▪ Discussed instrumenting fishing gear with oceanographic sensors to gather observations. ▪ Discussed if there are any products that would be useful to fisheries managers - for example maps of temperature increases over time (years) in a region of interest.
<p>Research Infrastructures to be involved</p> <p>All</p>	<p>Specific role of EuroGO-SHIP</p>
<p>Innovation</p>	<p>Blue Economy</p>
<p>International Cooperation</p> <p>Suggest that an ideal project might involve policy experts, people from the fishing industry, and scientists</p>	<p>Public Engagement</p>
<p>Any other considerations?</p> <p>Fisheries assessments are done privately, including measuring environmental conditions. This is done under the Common Fisheries Policy, which has 60M Euros funding per year for its "Data Collection Framework" - the data is considered to be proprietary and is not publicly shared.</p> <p>It's very hard to convince Fisheries Managers that they need any more information.</p> <p>Discussed if anyone in the group knows the needs of the fisheries, and suggested knowledge exchange between scientists and fisheries people might be beneficial.</p> <p>Mapping of RIs – needs to be mapped along the societal challenges and the observing system to inform the new structure.</p>	

A



B



Figure 27. Global Challenge Scenarios activity: Red group working on climate change resilience. (A) Presenting outputs. (B) Magnetic board close-up.

<p>Global Challenge Description</p> <p>The specific objective of Climate Change Adaptation and Mitigation is to enhance the resilience of marine ecosystems and coastal communities to the impacts of climate change, such as ocean acidification, sea level rise, and extreme weather events, while also contributing to global efforts to reduce greenhouse gas emissions. This involves implementing adaptation measures.</p>	
<p>Project Concept:</p> <ul style="list-style-type: none"> ▪ Example 1: Establishing Marine Protected Areas (MPAs) and how RIs can contribute to the decision-making process. ▪ Example 2: Impact of marine heatwaves and enhancing preparedness (causes and consequences). 	<p>Potential Solutions:</p> <ul style="list-style-type: none"> ▪ Federating collaboration ▪ High-quality data ▪ Standardization ▪ Knowledge transfer
<p>Research Infrastructures to be involved</p> <p>We mapped the RIs according to a value chain:</p> <ul style="list-style-type: none"> ▪ Solution/Impact Oriented: SBEP, OBPS ▪ Understanding/Knowledge: LifeWatch, EuroGO-SHIP ▪ Information Central Provider: EuroGOOS, EMODnet, OceanOPS, EOOS, AMRIT, SeaDataNet ▪ Sensor/Technology: EMBRC, FerryBox, Danubius, EMSO ERIC, ICOS, JERICO, Euro-Argo, GROOM, ▪ EuroFleets, Aquarius 	<p>Specific role of EuroGO-SHIP:</p> <p>In the value chain, EuroGO-SHIP is placed in the "Understanding/Knowledge" category. It is central to providing high-quality reference data to all RIs in the "Sensor/Technology" category</p>
<p>Innovation</p>	<p>Blue Economy</p>
<p>International Cooperation</p> <ul style="list-style-type: none"> ▪ G7 FSOI, Ocean Decade, GOOS, CMEMS 	<p>Public Engagement</p>
<p>Any other considerations?</p> <p>Sustainable Blue Economy Partnership (SBEP): Alignment at the cross-national level.</p> <p>There is a decreasing focus on science within RIs, with ICOS being an exception as it facilitates science, while other RIs are more technology-driven.</p> <p>ESRI helps – RIs talk to each other for services – more integration needed.</p> <p>By mapping RIs across EU, redundancy can be identified</p> <p>Some RIs missing from the mapping exercise (AMRIT) be mindful that the picture is not complete.</p>	



This was the first time that Research Infrastructure representatives came together to look at how Research Infrastructures can address specific Global Challenge scenarios. While challenging, the activity fully engaged participants. Several discussion points were raised within each of the three groups. For instance, in their day-to-day work, Research Infrastructure participants mentioned that they are often ‘one step removed’ from the research and innovation communities, and even further from the stakeholders in policy, industry and society. The RIs see their role as providers of high-quality infrastructure services, supports, facilities and data, rather than directly addressing specific research questions such as those inherent in the ‘global challenge scenarios’.

The recommendation is that a similar activity should be carried out in the future between the Research Infrastructure community and the research, policy, industry, and society communities so that a more detailed and structured discussion can take place. The Research Infrastructure projects, AMRIT (Advance Marine Research Infrastructures Together) which will *“provide a catalyst for the development and consolidation of marine research infrastructures throughout Europe, including coordination of planning, operations and data management”*, and AQUARIUS, which will *“provide a comprehensive and diverse suite of integrated research infrastructures”*, are strategically placed to address this.



4.3.3. The Future of EuroGO-SHIP

Objective: To plan the next steps for EuroGO-SHIP as a future RI.

Expected output: Feedback and ideas on the future of EuroGO-SHIP as a new independent RI or a consolidated RI. Deeper understanding of pros and cons of both approaches (independent RI vs consolidated RI).

In this section, an "Independent RI" refers to a standalone entity that operates autonomously, focusing on its own goals and resources. Conversely, a "consolidated RI" refers to a collaborative framework where multiple RIs come together under a unified governance structure, pooling resources and expertise.

During the RI workshop in Venice, delegates discussed future potential pathways for EuroGO-SHIP to become a Research Infrastructure. Two Groups were formed to explore how EuroGO-SHIP might proceed as (a) a future **Independent RI** or (b) a future **Consolidated RI**. Information gathered from this activity will feed into EuroGO-SHIP T5.2 "RI Governance" which aims at producing by the end of the project a report (D5.2 Summary of the range of possible RI structures, with preferred option) that will determine governance and architecture solutions for the EuroGO-SHIP RI and undertake an initial consultation to determine which of these is most viable. At the workshop, Catherine Halbert and Elaine McDonagh introduced the activity. Two Flip Charts were set up on each side of the room, with 'Independent RI' (Rapporteur, Jula Falvey) and 'Consolidated +RI' (Rapporteur, Ryan Weber) as two potential choices facing the EuroGO-SHIP project after it ends, in terms of longer-term sustainability of the hydrography community established through the project.

Some clarifications were needed at the outset of this activity, for instance the difference between 'EuroGO-SHIP' and 'EuroFleets+'. This was addressed by Elaine McDonagh (EuroGO-SHIP Coordinator) and Bernadette Ní Chonghaile (Marine Institute, and representative of the EuroFleets+ and related AQUARIUS project). While EuroFleets provides the observational platform (i.e. research vessel) and some of the specialised equipment (e.g. CTD) to carry out operations, EuroGO-SHIP provides the scientific expertise needed to measure/collect and analyse high quality essential ocean variable (e.g. for salinity, carbon system etc.) data. Figure 28 visually shows the position of both EuroFleets and EuroGO-SHIP in the European RI landscape.

EU Marine Research Infrastructure Landscape

End Users: Scientific, Ocean modelling, Satellite community
Data handling: Copernicus Marine, EMODnet, SeaDataNet



Adapted image from the JERICO Report 'The Joint European Research Infrastructure Network for Coastal Observatories: Achievements and Strategy for the Future' published in 2015

Figure 28. How EuroGO-SHIP fits into the EU Marine Research Infrastructure Landscape

A discussion arose at the workshop about the different ways in which EuroGO-SHIP could exist (i.e. not all RIs need to have an ERIC structure). The flip boards appeared to have a longer list of reasons as to why the project should consider being an independent RI, vs consolidated RI (Figure 29). It was acknowledged that there would be challenges ahead, either way, but the need for the type of infrastructure and services provided by EuroGO-SHIP was evident. It was mentioned that becoming an established RI involves a substantial amount of work, with often additional responsibilities not foreseen at the outset. Those involved in EuroGO-SHIP highlighted the positive impact of the project on their work, and that the collaboration has been transformative. There was a strong motivation to continue the work of EuroGO-SHIP after the project is completed.

The following text is a compilation of information and advice for the future of EuroGO-SHIP provided by the EuroGO-SHIP RI workshop delegates with further advice/comments sent via email after the event.

a) How Euro GO-SHIP might proceed as a future Independent RI

In the current landscape of marine RIs, it is crucial to have a structured, coordinated long-term network for Research Vessel based hydrography. The option of a legal entity for this purpose is certainly an interesting one, as, in addition to the coordination function, it also makes it possible to offer 'services' to users more efficiently, and these services are now necessary if this activity is to be maintained and developed in Europe at the highest level of quality. But which form of legal entity?



European Strategy Forum on Research Infrastructures – ESFRI landmark (ERIC or AISBL or similar)

This offers advantages that are highlighted elsewhere, particularly in the form of ERICs where support (including budgetary commitment) is at the highest level. But the foreseeable size of a EuroGO-SHIP RI, the current ESFRI context which is moving in a different direction (less new landmarks, integration and consolidation), the incentive of the DG RTD toward integration, and the very long duration of the ESFRI process, make this an unrealistic choice.

If an ERIC is established with enough support from multiple nations this can help secure long-term funding. However, this will depend on the scope and the perimeter of the ERIC (e.g. an ERIC limited to a central structure working with independent distributed national facilities, or an ERIC that includes national facilities).

An AISBL (international non-profit organisation), or similar, has the merit of being pragmatic, allowing the RI to operate formally ... (SeaDataNet being an excellent example). However, financing the central hub remains difficult, in particular if the staffing requirements and other operating costs are substantial. AISBL also provides the advantage of having an open policy to become a partner, especially being open to private entities.

Other (non-commercial) legal entities (foundation, ...). Why not, particularly if it facilitates financing, but for the activity in question, which relies on specialised Research Vessels managed by national oceanographic fleets, this seems unlikely. There is a need to analyse the functions that EuroGO-SHIP will carry out and if a legal structure is needed. If yes, simple legal structures should be considered (e.g. AISBL).

Potential Benefits of an Independent RI

- Autonomy (full control over governance to fit the RI needs, decisions, strategy, focus on research priorities)
- Branding visibility (within the scientific community and by funding agencies)
- Resource allocation is aligned with the RI activities and expertise is undiluted

Potential Challenges of an Independent RI

- Significant burden related to administration (e.g. establishing governance structures), legal (e.g. complex negotiations with multiple nations) and operational (building good reputation, raising visibility) processes
- There is a risk that a lack of connection with other RIs who provide similar services could lead to confusion or inefficiencies within the scientific community
- Sustainability concerns could also become a potential issue (funding, political change, continued relevance to scientific priorities)



b) How Euro GO-SHIP might proceed as a Consolidated RI.

Euro GO-SHIP as a component of EOOS and linked to a future EOOS governance.

In the current European marine RI landscape, this seems to be the only realistic way to meet the needs expressed at all levels, particularly with a view to the European Ocean Observing System (EOOS), but above all to avoid the many current duplications, which will only increase with the creation of new RIs (JERICO RI, GROOM RI, etc.).

There are many ways of achieving this consolidation, but almost all of them remain to be studied in detail. Recent projects (GEORGE, AMRIT, TRICUSO, AQUARIUS, POLARIN, etc.) are a first step towards integrating services to achieve greater efficiency and synergy, which is what the EC is looking for.

The logical path would be to merge and/or expand the RIs, but this would require strong political will at several levels: that of the directors of the RIs and their boards, at the top management level of the organisations that run the RIs, at national level - and in a concerted manner between the various key countries. All these things seem unlikely today, because everyone prefers to preserve what already exists, which has already taken so much effort to develop.

Potential Benefits of a Consolidated RI

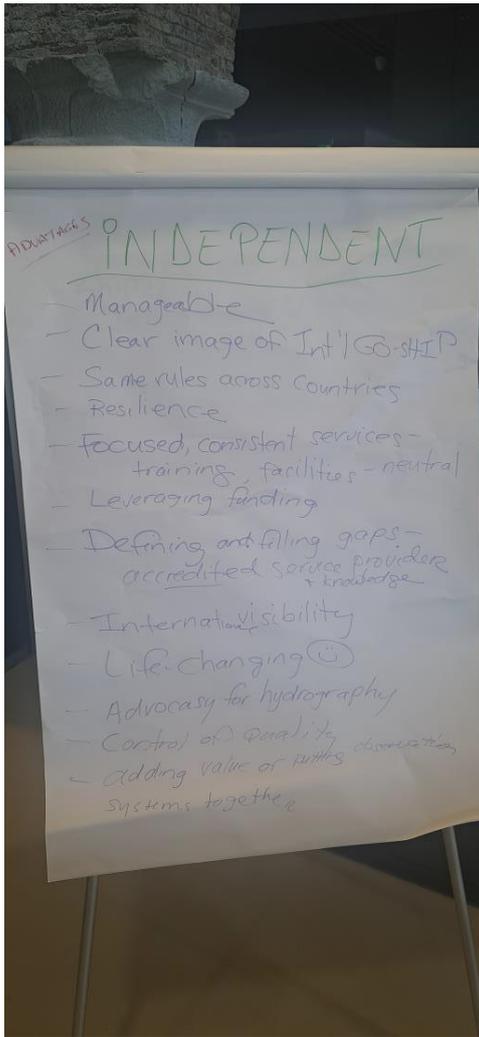
- Access to a broader scientific community (networks, partnerships, with access to knowledge on users and available databases)
- Easy access to shared knowledge / experience and administrative efficiency (governance, administrative, legal structures and operational processes)
- Lower set-up costs
- Increased credibility joining with an RI that has already established a good reputation with funding agencies
- Helps to avoid duplication of resources, services in some cases and allows a more streamlined European RI landscape and could potentially help reduce competition for limited resources

Potential Challenges of a Consolidated RI

- A loss of autonomy (need to conform with existing governance structure, strategic direction and decision-making framework, with possible limitations on pursuing independent goals) and/or becoming too dependent on other RI infrastructures
- Branding identity get diluted potentially limiting visibility
- Less flexibility with research focus
- Funding model (having to conform to pre-existing frameworks in the larger RI)
- More complex negotiations with less influence if viewed as a small part of the consolidated RI

Ultimately the final decision will depend on the specific scientific goals, long-term vision, and strategic priorities of EuroGO-SHIP.

A



B

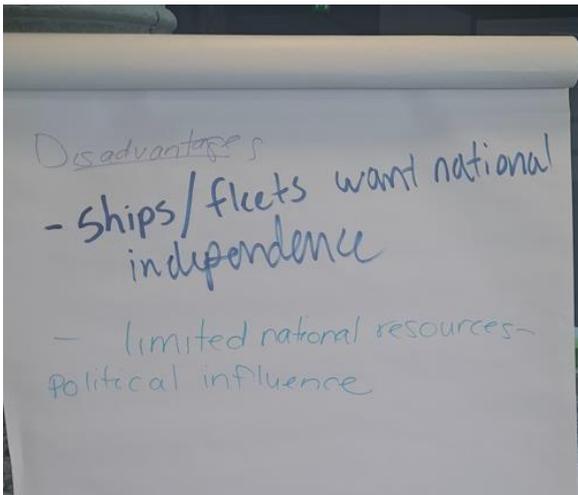
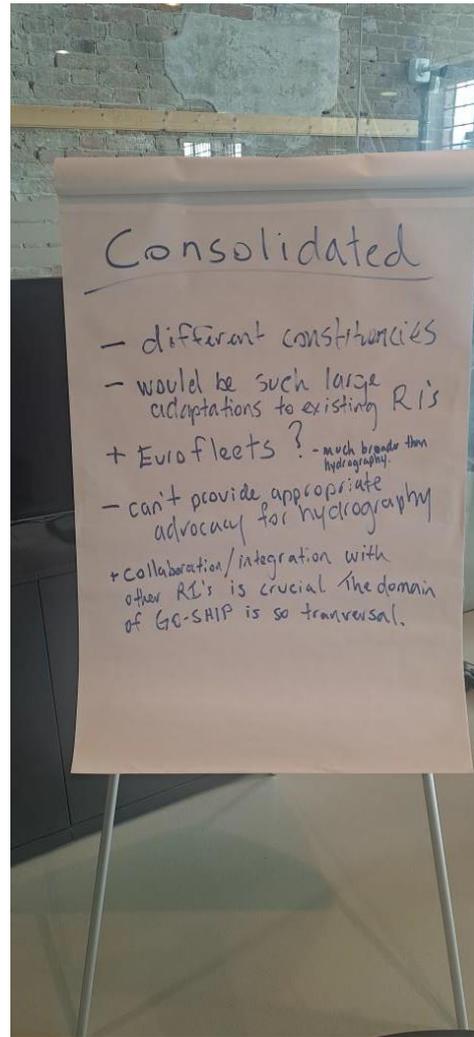


Figure 29. EuroGO-SHIP as a future RI: (A) EuroGO-SHIP as a new independent RI and (B) EuroGO-SHIP as a consolidated RI.



5. Main Outcomes & Findings

Over the last two decades, the European research infrastructure landscape has evolved from a handful of national and intergovernmental organisations into a mature system with pan-European RIs prioritised through ESFRI and many established as European Research Infrastructure Consortia (ERICs). National and European R&I facilities contribute by providing access to cutting-edge equipment and laboratories and it is now widely recognised that pooling resources between countries leads to an increase in capacity of wider technical expertise and advancement of scientific capabilities.

In this study, EuroGO-SHIP activities focused on understanding the European landscape, with the help of multiple RIs, to leverage from existing services and to create new ones only where necessary. The text that follows is a summary of what we have learned about the RI landscape in the EuroGO-SHIP project to date.

Assessment of Existing Services & Gap Areas

EuroGO-SHIP is working to strengthening Europe's ability in international scientific hydrography with plans to offer various services. To identify overlaps with existing RIs, our RI stakeholders helped us to review the ten proposed EuroGO-SHIP services. It is clear from the results that the supply reference materials (e.g. carbon and nutrients) and accreditation for the hydrographic community (e.g. laboratory or process) need attention since only ~15% (3 of 21) of RIs examined provide such a service. Results showed that there are very few RIs with the capability to measure essential ocean variables such as transient tracers and low nutrient concentrations.

We noted that the RIs in Europe are open to collaboration and want to achieve greater efficiency and synergy, aligning with European Commission goals. It is evident that the RIs in this study are keen to partner with EuroGO-SHIP in areas where they have expertise particularly best practices, training, data curation and pan-European cooperation. This was reflected in the expression of interest to be kept informed of future developments of EuroGO-SHIP.

Readers interested in the finer details, are referred to section 4.3.1. *EuroGO-SHIP Survey* of this report and the detailed tabulated information provided by the participating RIs in Appendix 4. Our sincere thanks to all the participating RIs.

Global Challenges

A key finding in the workshop activity on *“RI-based concepts to provide solutions for global challenges related to our ocean and waters”* was that there is decreasing focus on science within the RIs, with many of the RIs are more technology-driven; ICOS being an exception as it facilitates science. This highlights a gap area where a need exists to better connect scientific researchers in fisheries, environmental, and climate monitoring with the RIs in future well-resourced funded projects.



Potential Future Structure of EuroGO-SHIP

While many challenges lie ahead, the overall impression from participants in this study is that a need exists for a EuroGO-SHIP research infrastructure. From the discussions, legal entity options included (a) as an ERIC which offers high-level support but is challenging due to the current ESFRI context and long process duration and (b) as an AISBL, a more pragmatic choice since it offers a simple legal structure and an easier transition into a formal operation, however, financing difficulties could arise. Establishing and maintaining new pan-European research infrastructures (ESFRI projects, ERICs) requires strong support from national and European funding sources. Without this support, their long-term sustainability is at risk. Feedback on whether Euro GO-SHIP should be integrated into a more consolidated RI, suggests that doing so will require strong political will and coordination at multiple levels.

The overall conclusion is that further analyses is required before the most suitable option is decided. The final decision will depend on EuroGO-SHIP specific goals, long-term vision and strategic priorities.

Appendix 1 - Research Infrastructure Posters



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ABOUT AMRIT



AMRIT (Advance Marine Research Infrastructures Together) will provide a catalyst for the development and consolidation of marine research infrastructures throughout Europe, including coordination of planning, operations and data management. The project will contribute significantly to the development of the European Ocean Observing System (EOOS), including the design and implementation and Technical Support Center (EOOS TSC) that will sustain the tools and services developed by AMRIT into the future. AMRIT aims to be a cornerstone in establishing and maintaining the EOOS, upon which European ocean observing can be strengthened in the coming decades.



Project Name: Advance Marine Research Infrastructures Together. **Programme:** HORIZON.1.3.1 - Consolidating and Developing the Landscape of European Research Infrastructures. **EU Financial Contribution:** € 4 672 327,54 **Duration:** 48 months. **Start Date:** 1 March 2024 **Completion Date:** 29 February 2028 **Project coordinator:** ASSOCIATION POUR LA RECHERCHE ET LE DEVELOPPEMENT DES METHODES ET PROCESSUS INDUSTRIELS



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ABOUT AQUARIUS

AQUARIUS is a €14.5m project funded under Horizon Europe’s **Infrastructure Services** call. Coordinated by the Marine Institute, AQUARIUS will offer free access to state of the art research infrastructures across Europe to enable collaborative marine and fresh water research.

The 48-month project called Aquatic Research Infrastructure Services for the health and protection of our unique, oceans, seas and freshwater ecosystems (AQUARIUS) will provide a highly comprehensive suite of integrated research infrastructures appropriate to addressing significant challenges for the long-term sustainability of our oceans, seas and freshwater ecosystems.

For the first time, diverse research infrastructures will be combined in a single project to facilitate the work of researchers and key stakeholders focused on challenges and opportunities for both marine and freshwater systems. An impressive range of **57 research infrastructure** services will be made available to include **research vessels, mobile marine observation platforms, aircraft, drones, satellite, sensors, fixed freshwater and marine observatories** and test sites, **experimental facilities** and sophisticated **data service infrastructures**. Activity will include **training** for third level students, with all data collected within the project fed into central European Data infrastructures to inform future policy and decision making at a European and National level.

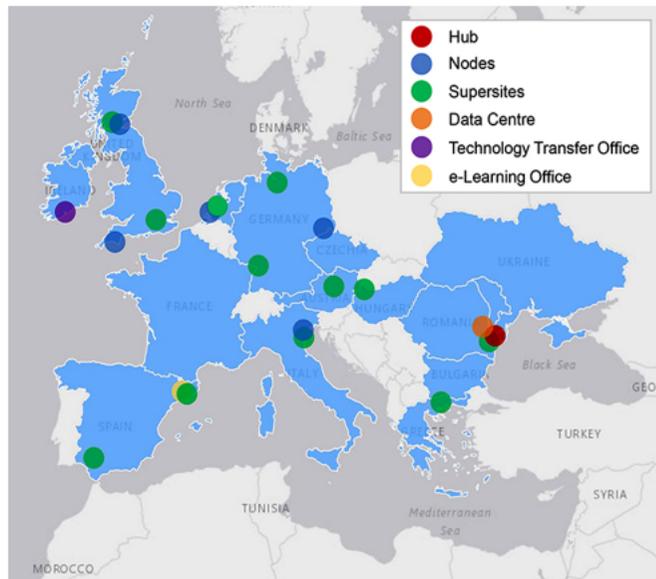


Project Name: Aqua Research Infrastructure Services for the health and protection of our unique, oceans, seas and freshwater ecosystems. **Programme:** Opening, Integrating and Interconnecting Research Infrastructures. **EU Financial Contribution:** € 14 499 999,25. **Duration:** 48 months **Start Date:** 1 March 2024. **Completion Date:** 29 February 2028.



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ABOUT DANUBIUS-RI

The International Centre for Advanced Studies on River-Sea Systems DANUBIUS-RI is a pan-European distributed research infrastructure supporting interdisciplinary research on River-Sea Systems.

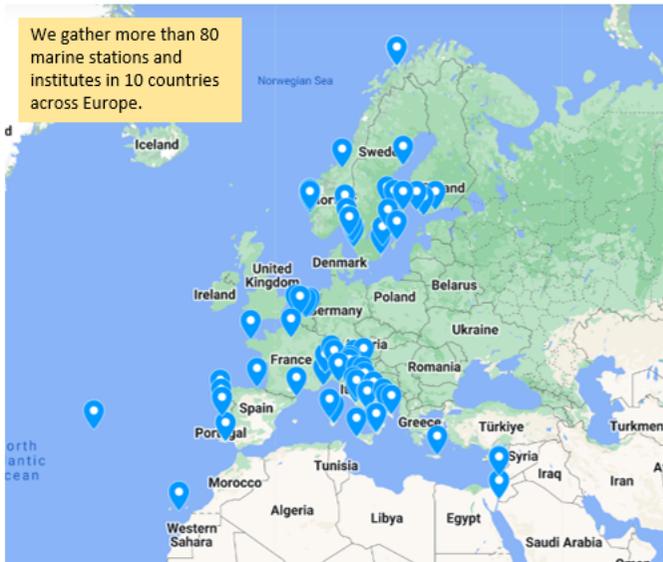
DANUBIUS-RI will fill the gap of fragmented research on European research on river-sea systems, drawing on existing research excellence across Europe, enhancing the impact of European research while maximizing the return on investment. It will provide access to a range of European river-sea systems, facilities and expertise; a 'one-stop shop' for knowledge exchange in managing river-sea systems; access to harmonized data; and a platform for interdisciplinary research, inspiration, education and training.

DANUBIUS-RI will offer a source-to-sea perspective to resolve problems arising from human impacts on River-Sea-Systems.

In 2013, DANUBIUS-RI was designated as a Flagship Project of the EU Strategy for the Danube Region ([EUSDR](#)) and in 2016 it was included on the roadmap of ESFRI (European Strategy Forum on Research Infrastructures). DANUBIUS-RI has applied for designation as an ERIC ([European Research Infrastructure Consortium](#)).



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ABOUT EMBRC ERIC

The European Marine Biological Resource Centre (EMBRC) is Europe’s ‘research infrastructure’ (RI) for marine biological and ecological research. As an RI, EMBRC is an enabler of research, providing the specialised facilities and tools for cutting edge research for academia and the private sector.

EMBRC was established in 2013 to advance fundamental and applied marine biology and ecology research – while promoting the sustainable blue economy. This is achieved by enabling access to biological resources and ecosystems, experimental facilities, and technology platforms in more than 80 research organisations in 10 European countries.

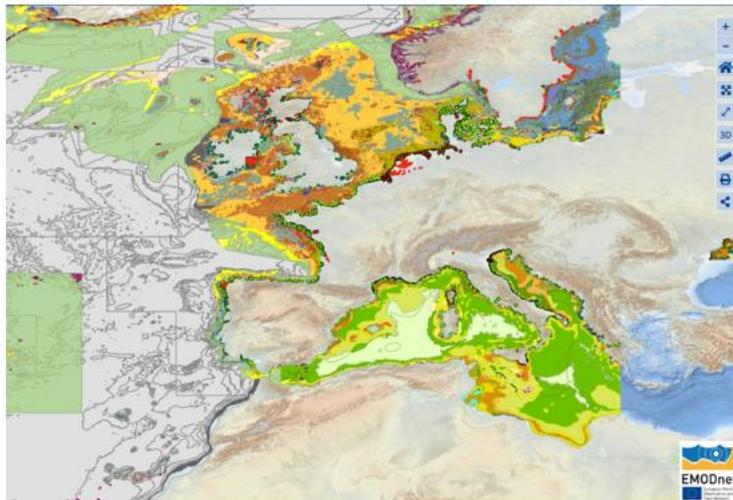
As of 2021, EMBRC operates the European Marine Omics Biodiversity Observation Network (EMO BON) to compliment marine observation with biological data, while offering insights into the genetic composition of marine biodiversity.

We have been part of the European Strategy Forum on Research Infrastructures (ESFRI) roadmap (i.e., a European instrument for the optimal use and development of ‘research infrastructures’ or RIs) since 2008. In 2018, we were designated an ‘ESFRI Landmark’ on the 2018 ESFRI Roadmap. Landmarks are ‘research infrastructures’ now considered ‘pan-European hubs of scientific excellence, generating new ideas and pushing the boundaries of science and technology’. Also in 2018, we were awarded the legal status of a European Research Infrastructure Consortium (ERIC).



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The European Marine Observation and Data Network (EMODnet) is a network of organisations supported by the EU's integrated maritime policy.

ABOUT EMODnet

The European Marine Observation and Data Network (EMODnet) is the European Commission (EC) *in situ* marine data service of the EC Directorate-General Maritime Affairs and Fisheries (EC DG MARE) and funded by the European Maritime Fisheries and Aquaculture Fund. Established in 2009, EMODnet plays a pivotal role as a trusted source of *in situ* marine environmental and human activities data and data products, serving a diverse user base across various sectors.

The EMODnet Portal (emodnet.ec.europa.eu) is a single access point to all EMODnet services, providing easy and free access to a wealth of marine data, metadata, and data products. Covering seven disciplinary themes – bathymetry, geology, physics, chemistry, biology, seabed habitats and human activities – EMODnet spans the entire marine environment from coast to open ocean, surface to deep seafloor, whilst also offering data and information on Human Activities and Blue Economy operations, from vessel density and offshore platform sitings, to hosting EU Member State Maritime Spatial Plans.

ABOUT EMSO ERIC



The European Multidisciplinary Seafloor and water column Observatory (EMSO) is a distributed research infrastructure which aims to explore the oceans, to gain a better understanding of phenomena happening within and below them, and to explain the critical role that these phenomena play in the broader Earth systems. EMSO consists in a system of regional facilities placed at key sites around Europe, from North East to the Atlantic, through the Mediterranean, to the Black Sea. Observatories are platforms equipped with multiple sensors, placed along the water column and on the seafloor. They constantly measure different biogeochemical and physical parameters, that address environmental processes such as climate change, natural hazards and marine ecosystem changes.

EMSO ERIC was established as a European Research Infrastructure Consortium by the European Commission in 2016



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eoots-ocean.eu



ABOUT EOOS

EOOS' Vision is of a European Ocean Observing System that is sustained and meets the specific needs of users. The **Strategy 2023-2027** sets out the direction of EOOS' development towards this in the coming period as it transitions from a successful initiation stage of networking and structuring towards a sustained operational phase with concerted implementation activities.

EOOS' Mission is to coordinate and integrate European communities and organisations operating, supporting and maintaining ocean observing infrastructures and activities, fostering collaboration and innovation.

By helping to secure long-term financial investment from multiple stakeholders to create infrastructures that support more sustainable ocean management, EOOS will maximise the value and benefit of European ocean observations. This will lead to improved knowledge and the production of goods and services to benefit society.

As an efficient, fit-for-purpose framework, EOOS will be an integral part of the global ocean and wider earth observing system incorporated into the Global Ocean Observing System (GOOS) and the Global Earth Observation System of Systems (GEOSS).

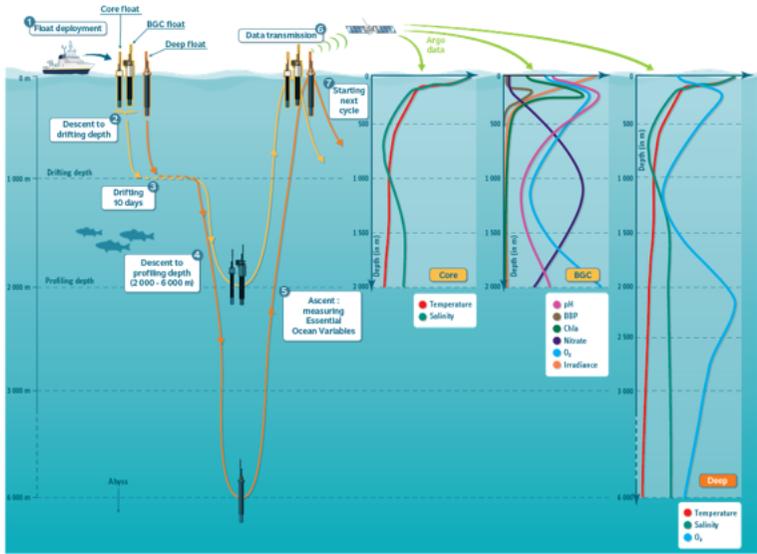
Building on the European ocean observing community's powerful desire to work together, EOOS connects the diverse European organisations, networks, initiatives and projects dedicated to ocean observing.



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ABOUT EURO-ARGO ERIC



The international Argo programme was initiated in 1999 as a pilot project endorsed by the Climate Research Program of the World Meteorological Organization, GOOS, and the Intergovernmental Oceanographic Commission. The Argo network is a global array of around 4000 autonomous instruments, deployed over the world ocean, reporting subsurface essential ocean variables to a wide range of users via satellite transmission links to data centres.

The European contribution to the International Argo Programme (EURO-ARGO) is a distributed Research Infrastructure that organizes and federates the European contribution to the Argo international programme for in situ ocean observations, which amounts to 1/4th of the global drifting fleet. The Euro-Argo European Research Infrastructure Consortium (ERIC) is composed of a Central Infrastructure (the ERIC Office) and distributed national facilities over 12 European member countries plus one candidate.

The Euro-Argo European Research Infrastructure Consortium (ERIC) is composed of a Central Infrastructure (the ERIC Office) and distributed national facilities. The statutes of the Euro-Argo ERIC apply to the Central Infrastructure. The ERIC Office is responsible for the overall coordination of Euro-Argo. It also participates in the procurement and deployment of floats; it has expertise in all aspects of the programme; it acts as a resource centre for all participants and users. The ERIC Office is located in Brest, France, and is hosted by Ifremer. The [ERIC Office team](#) is headed by the Director General Programme Manager assisted by 7 persons.



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ABOUT EUROFLEETS+

EUROFLEETS+ was a Horizon 2020 project funded under the Infrastructures initiative which facilitated open free of charge access to an integrated and **advanced research vessel (RV) fleet**, designed to meet the evolving and challenging needs of the **marine science user community**. European and international researchers from academia and industry applied for several access programmes, through a single-entry system. EUROFLEETS+ prioritized support for research on **sustainable, clean and healthy oceans**. The project provided access to a unique fleet of **27 state-of-the-art research vessels, seven Remotely Operated Vehicles (ROVs) and five Autonomous Underwater Vehicles (AUVs)**. Through competitive Calls, **twenty eight scientific campaigns (269 days)** were funded in the **North Atlantic, Mediterranean, Black Sea, Baltic Sea and Pacific Southern Ocean** providing access to **315 researchers from 33 countries** and a variety of scientific disciplines. Scientific parties included **144 early career scientists and 9 early career Principle Investigators. Six floating universities, seven blue skills labs** and a number of **internships** were also implemented. The project, which finished in October 2023, plans to establish a L'association internationale sans but lucratif (AISBL) in 2024 and formally establish Eurofleets RI.



Project Name: An alliance of European marine research infrastructure to meet the evolving needs of the research and industrial communities [EUROFLEETS+]. **Programme:** Integrating and opening existing national and regional research infrastructures of European interest. **EU Financial Contribution:** € 9 999 360,58. **Duration:** 57 months. **Start Date:** 01 February 2019; **Completion Date:** 31 October 2023. EUROFLEETS+ received funding from the European Commission's Horizon 2020 Research and Innovation programme under grant agreement No 824077. **Project coordinator:** Marine Institute, Ireland.



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eurogoos.eu



ABOUT EuroGOOS

EuroGOOS is an association of national governmental agencies, research organisations, and private companies (48 members from 19 European countries), providing operational oceanographic services and carrying out marine research and technology development.

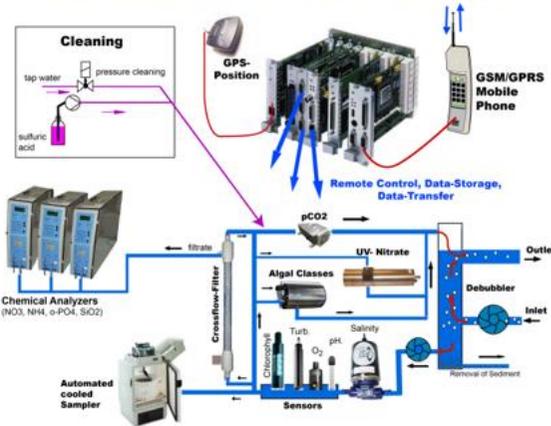
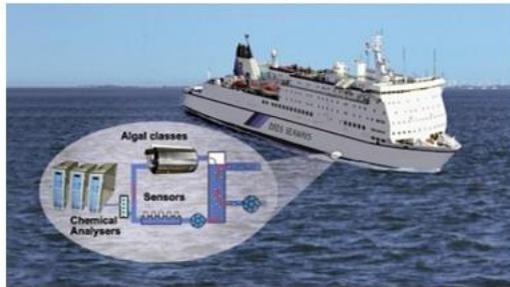
EuroGOOS's Mission is to develop and implement sustained and coordinated operational oceanography in Europe. EuroGOOS is achieving this through a broad network of organisations and initiatives operating at various levels.

Five Regional Systems unite observing and forecasting communities in the Arctic, Baltic, North-West Shelf, Ireland-Biscay-Iberia and Mediterranean regions. The expert Working Groups identify strategies, cooperate, co-produce and promote the operational oceanography value for society. The platform-based Task Teams promote scientific and technological synergies among European ocean observing infrastructures.

Collectively through EuroGOOS, its members and partners improve the overall European capacity and competitiveness in ocean observing sectors.



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ABOUT FERRYBOX

The *FerryBox*, developed by *Institute of Coastal Ocean Dynamics* is an automated measurement system for determining physical and biogeochemical variables in surface seawater. *FerryBoxes* are installed onboard of commercial vessels cruising along regularly scheduled routes (e.g., on ferries or cargo ships).

A *FerryBox* system consists of a water inlet from which seawater is pumped into the measuring circuit containing multiple sensors. This inlet may be positioned at the sea-chest or through the hull of the ship, using a valve especially designed for the *FerryBox* purposes. For correct seawater temperature measurements, an extra temperature sensor is installed close to the inlet or on the hull of the vessel. An optional debubbling unit removes air bubbles, which may enter the circuit during rough seas.



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ABOUT GROOM

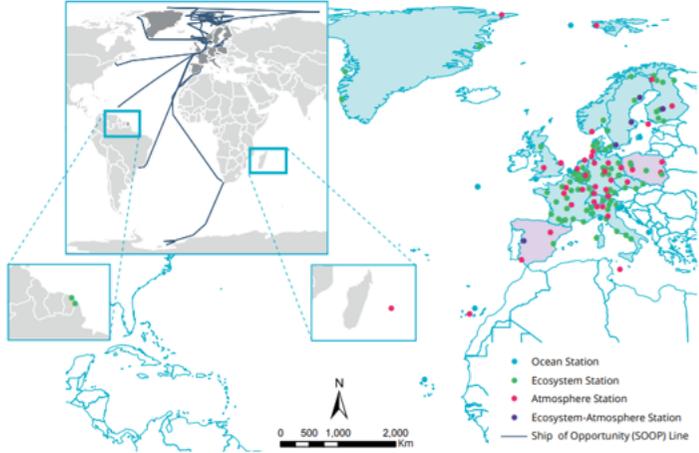
GROOM RI integrates national infrastructures for Marine Autonomous Systems (MAS) to provide access to platforms and services to the broadest range of scientific and industrial users, as well as other ocean observing RIs. It maintains a unique centralized provision of cyber-infrastructure, data and knowledge for the optimized use of MAS to study climate and marine environments, and to support operational services and the blue economy.

The GROOM II project, which will come to an end in September 2023 with plans to formally establish as an RI in the coming years.



Project Name: European research infrastructure opens new possibilities to observe the marine world [GROOM II]. **Programme:** Gliders for Research, Ocean Observations and Management: Infrastructure and Innovation. **EU Financial Contribution:** € 3 075 037,50. **Duration:** 42 months. **Start Date:** 1 October 2020; **Completion Date:** 31 March 2024. This project has received funding from the European Union's Horizon 2020 research and innovation programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No 951842. **Project coordinator:** ASSOCIATION POUR LA RECHERCHE ET LE DEVELOPPEMENT DES METHODES ET PROCESSUS INDUSTRIELS.

ICOS Station Network



ICOS Station Network. In the map, light blue indicates current ICOS countries and light violet indicates prospective countries which, in 2020, were soon expected to join ICOS. View the interactive station map at www.icos-cp.eu/station-map.

ABOUT ICOS ERIC

The level of greenhouse gases in the atmosphere rises constantly, heating up our planet. Observing the levels of greenhouse gas emissions is essential to predict climate change and mitigate its consequences.

The Integrated Carbon Observation System, ICOS provides standardised and open data from more than 170 measurement stations across 16 European countries. The stations observe greenhouse gas concentrations in the atmosphere as well as carbon fluxes between the atmosphere, the land surface and the oceans. Thus, ICOS is rooted in three domains: Atmosphere, Ecosystem and Ocean.

The ICOS community consists of more than 500 scientists in both its current Member and Observer countries and beyond. More than 80 renowned universities or institutes are a part of the ICOS community. The ICOS community has strong connections to colleagues and operators outside ICOS. ICOS-based knowledge supports policy- and decision-making to combat climate change and its impacts.

ICOS operations are coordinated by ICOS ERIC, which is a specific legal entity for European Research Infrastructures created by the European Commission. ICOS ERIC is one of the 21 currently existing ERICs and it's head office is located in Helsinki, Finland. ICOS ERIC consists of the Head Office, coordinating the research infrastructure's operations, and the Carbon Portal, collecting and distributing ICOS data and derived products, as well as of Director General, Research Infrastructure Committee, General Assembly, and Scientific and Ethical Advisory Boards. The current **Director General** of ICOS ERIC is **Dr Werner Kutsch**.



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ABOUT JERICORI

JERICORI-RI is an integrated pan-European multidisciplinary and multi-platform research infrastructure dedicated to a holistic appraisal of coastal marine system changes.

It is seamlessly bridging existing continental, atmospheric and open ocean RIs, thus filling a key gap in the ESFRI landscape. JERICORI-RI establishes the framework upon which coastal marine systems are observed, analysed, understood and forecasted.

JERICORI-RI enables open-access to state-of-the-art and innovative facilities, resources, FAIR data and fit-for-purpose services, fostering international science collaboration.



This project has received funding from the European Commission's Horizon 2020 Research and Innovation programme under grant agreements No 871153 and 951799. Project coordinator: IFREMER, France. The information and views of this website lie entirely with the authors. The European Commission is not responsible for any use that may be made of the information it contains.

ABOUT LifeWatch ERIC



The vision behind LifeWatch ERIC is to become the Research Infrastructure providing access to the world's biodiversity content, services and communities in one click.

LifeWatch ERIC aims to accelerate the research efforts of the scientific community by delivering a European state-of-the-art e-Science Research Infrastructure on biodiversity and ecosystem research: a Digital Twin which:

- provides access to, and support for, key scientific services by applying cutting-edge ICT technology,
- enables reproducible analytics,
- is co-designed and co-created with the user communities and
- is tuned with the needs for research that provides key insights for society, in particular science-based policy.

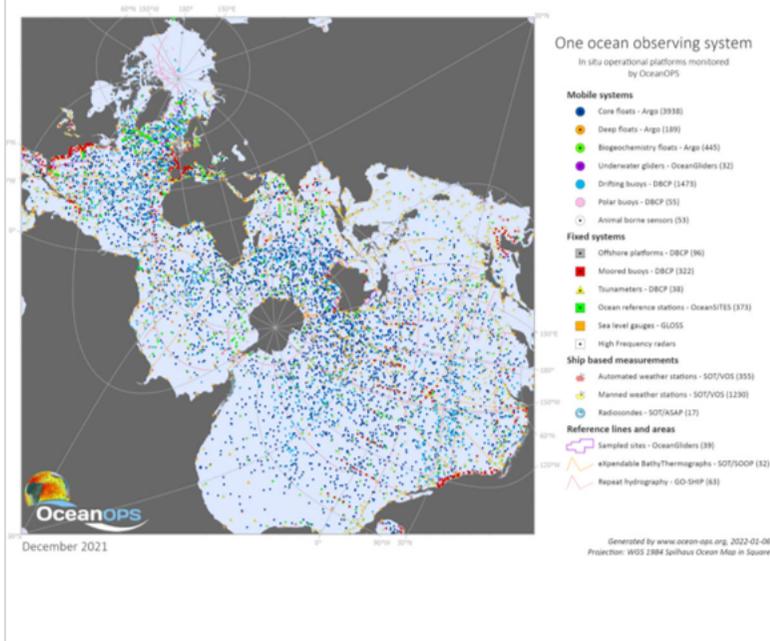
LifeWatch ERIC is a European Research Infrastructure Consortium providing e-Science research facilities to scientists investigating biodiversity and ecosystem functions and services in order to support society in addressing key planetary challenges. LifeWatch ERIC was established as a European Research Infrastructure Consortium by the European Commission in 2017.



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ABOUT OceanOps



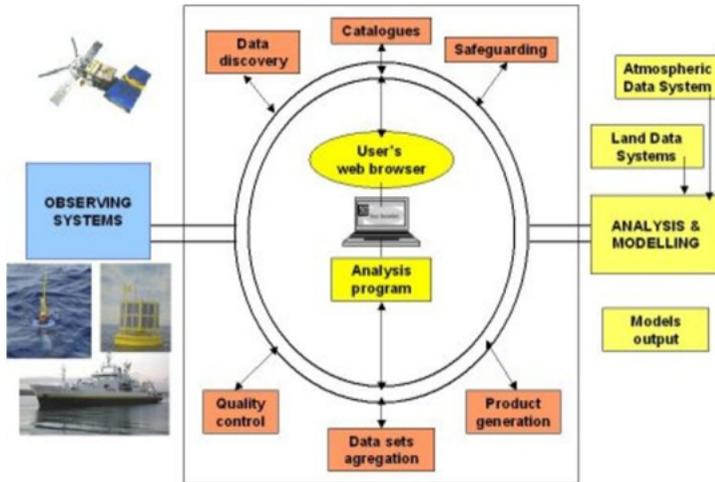
OceanOPS takes the pulse of the observing system and provides tools to assess its current and future state.

This means monitoring and reporting on the status of the global ocean observing system and networks, supporting efficient observing system operations and enabling the transmission and timely exchange of high quality metadata.

OceanOPS also assists free and unrestricted data delivery to users in operational services, climate and ocean health.

Currently, OceanOPS tracks over 100,000 observations coming from the global networks a day.

ABOUT SeaDataNet



SeaDataNet is a distributed Marine Data Infrastructure for the management of large and diverse sets of data deriving from in situ of the seas and oceans.

Professional data centres, active in data collection, constitute a Pan-European network providing on-line integrated databases of standardized quality.

The on-line access to in-situ data, meta-data and products is provided through a unique portal interconnecting the interoperable node platforms constituted by the SeaDataNet data centres.

The development and adoption of common communication standards and adapted technology ensure the platforms interoperability. The quality, compatibility and coherence of the data issuing from so many sources, is assured by the adoption of standardized methodologies for data checking, by dedicating part of the activities to training and preparation of synthesized regional and global statistical products from the most comprehensive in-situ data sets made available by the SeaDataNet partners.

Data, value added products and dictionaries serve wide uses: e.g. research, model initialisation, industrial projects, teaching, marine environmental assessment

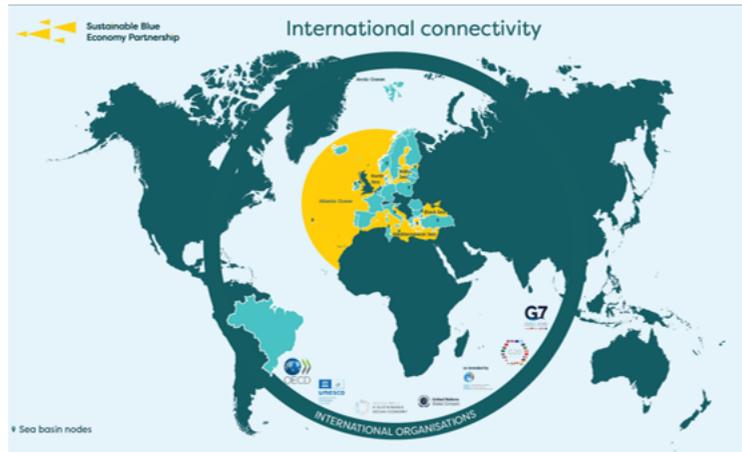
SeaDataNet - 026212 is an Integrated Infrastructure Initiative of the EU Sixth Framework Programme coordinated by IFREMER (Institut Français de Recherche pour l'Exploitation de la Mer) and bringing together 49 partners of major scientific marine research institutes. As a research infrastructure, SeaDataNet contributes to build research excellence in Europe.



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ABOUT Sustainable Blue Economy Partnership



The **Sustainable Blue Economy Partnership** – coined **The Blue Arm of the Green Deal** – leverages research and innovation (R&I) to boost the **green and digital transitions** of all economic activities related to the ocean, seas and coasts.

Together with the EU COM, hitherto 29 countries and 74 partners are strategically joining forces by aligning priorities and pooling about €450 Mio. in-cash and in-kind contributions over seven years that are jointly invested into transnational R&I projects and additional activities.

By fostering and building a connected community in a changing world, it supports the realisation and harmonisation of efforts in EU waters and beyond in support of **innovative, impactful and market-oriented economic developments**.

The geographical scope comprises the Atlantic and Arctic Ocean, Baltic Sea, Black Sea, Mediterranean Sea, and North Sea.



Project Name: A climate neutral, sustainable and productive blue economy Partnership. **Programme:** Fostering a sustainable blue economy.
EU Financial Contribution: € 113 398 798,75. **Duration:** 84 months **Start Date:** 1 September 2022 **Completion Date:** 31 August 2029



Co-funded by the European Union

Appendix 2 - Workshop Activity Descriptors



EuroGO-SHIP Research Infrastructure Workshop

Thursday, 27 June 2024

Institute for Marine Sciences (CNR-ISMAR), Venice, Italy

Activity 1 Descriptor

Activity 1 Research Infrastructure Speed Dating

Objective: This is an ice-breaker activity, to facilitate networking between participants and increase awareness of what the different RIs can offer

Expected Output: Participants are familiar with services and activities of RIs or RI projects and have made personal connections with workshop participants.

Facilitator: Catherine Halbert and Helpers

Description of Steps:

1. Catherine will introduce Activity 1
2. Fill in your name and a short introduction on the provided postcard (with your photo). This will be displayed later to facilitate networking. 5 min.
3. Turn to the person on your right. Ask questions about that person's current role, which infrastructure services (or other) they offer, and a 'fun fact/interesting fact' (optional!). Switch around so that the other person asks you questions. 5 minutes each.
4. Introduce your partner to the wider group (1 minute per person).
5. Your postcards will be collected.
6. Note: there will be a large poster displayed in a central area, of each RI

Sample Postcard:



Sample Poster:



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FACILITATING TRANSNATIONAL ACCESS TO RESEARCH INFRASTRUCTURES



ABOUT AQUARIUS

AQUARIUS is a €14.5M project funded under Horizon Europe's **Infrastructure Services call**. Coordinated by the Marine Institute, AQUARIUS will offer free access to state of the art research infrastructures across Europe to enable collaborative marine and fresh water research.

The 48-month project called Aquarius Research Infrastructure Services for the health and protection of our unique, ocean, seas and freshwater ecosystems (AQUARIUS) will provide a highly comprehensive suite of integrated research infrastructures appropriate to addressing significant challenges for the long-term sustainability of our oceans, seas and freshwater ecosystems.

For the first time, diverse research infrastructures will be combined in a single project to facilitate the work of researchers and key stakeholders focused on challenges and opportunities for both marine and freshwater systems. An impressive range of 57 research infrastructure services will be made available to include research vessels, mobile marine observation platforms, aircraft, drones, satellites, sensors, fixed freshwater and marine observatories and first class, experimental facilities and sophisticated data service infrastructures. Activity will include training for third level students, with all data collected within the project fed into central European Data Infrastructures to inform future policy and decision making at a European and National level.

Project Name: Aqua Research Infrastructure Services for the health and protection of our unique, ocean, seas and freshwater ecosystems. Programme: Daring, Inspiring and Interconnecting Research Infrastructures. EU Financial Contribution: € 14 499 999,00. Duration: 48 months Start Date: 1 March 2024. Completion Date: 29 February 2028.

EuroGO-SHIP Research Infrastructure Workshop
 Thursday, 27 June 2024
 Institute for Marine Sciences (CNR-ISMAR), Venice, Italy

Activity 2 Descriptor
Activity 2 EuroGO-SHIP Survey

Objective: To present the outcome of the completed EuroGO-SHIP survey, and to identify providers, collaborators, and interested users of defined services from EuroGO-SHIP and other RIs.

Expected output: A better understanding of RI gaps and needs that could be addressed, or services that could be provided by a EuroGO-SHIP RI.

Facilitators: Elaine McDonagh, Catherine Halbert, Deirdre Fitzhenry, Rapporteurs and Helpers.

Description of Steps:

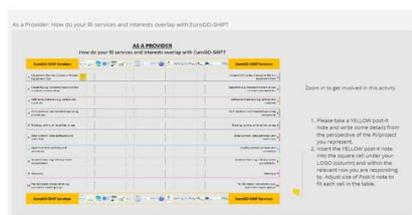
1. Catherine will introduce Activity 2. Elaine will present the results of the completed EuroGO-SHIP survey and ask for feedback.
2. In the steps below, the RI participant will provide information about the RI service provided, used/collaborated on, or that they may be interested in.
3. Each RI Participant will populate Grid 1 [tick with a marker which services are provided by their RI under a pre-defined list, and below their logo].
4. RI Participants populate Grid 2 [using YELLOW POST-ITS] if they are a current PROVIDER of RI Services under each of the categories.
5. RI Participants populate Grid 3 [using PINK POST-ITS] if they are a current USER or COLLABORATOR of RI Services under each of the categories.
6. RI Participants populate Grid 4 [using GREEN POST-ITS] if they are not a user, or provider, but are INTERESTED to know more.
7. Rapporteurs will capture the resulting information.

Sample Grids:

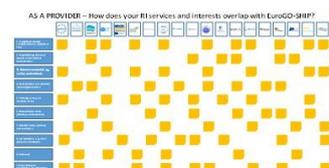
Design



Activity



Result [mock-up]



EuroGO-SHIP Research Infrastructure Workshop
Thursday, 27 June 2024
Institute for Marine Sciences (CNR-ISMAR), Venice, Italy

Activity 3 Descriptor
Activity 3 Global Challenge Scenarios and RI Solutions

Objective: To explore how RIs could be combined to tackle global challenges relevant to our ocean and waters.

Expected Output: Scenarios where combined RIs (must include EuroGO-SHIP) could collaborate for research and innovation. Identification of synergies on RI functions. Identification of any needs or gaps. Identification of potential funding sources. RI-based concepts to provide solutions for global challenges related to our ocean and waters.

Facilitators: Catherine Halbert, Deirdre Fitzhenry, Rapporteurs and Helpers.

Description of Steps:

1. Catherine will introduce Activity 3.
2. You will be divided into a Group according to the colour of the dot on your name badge (blue, yellow or red). Facilitators/Rapporteurs/Helpers will have green dots.
3. You will be allocated to one of below Global Challenge Scenarios related to managing natural resources (ocean and waters) that are aligned with Mission Ocean, and correlate with Horizon Strategy 2025-2027:

- **GROUP 1 BLUE:** Sustainable Fisheries Management
- **GROUP 2 YELLOW:** Pollution Reduction
- **GROUP 3 RED:** Climate Change Resilience

You will be provided with the following:

- a short description of the global challenge
- a full set of RI magnets and a magnetic board
- a one-page template to fill in



4. The idea behind this exercise is that you will work with your group members to explore how different RIs can be used synergistically to support the necessary research and innovation and provide potential solutions to the global challenge. You will select the ideal RIs and place those RI magnets on the board.
5. You will also fill in a one-page outline of the solution.
6. Each of the three Groups will then briefly present the outcome of their exercise to the wider group in a joint session.

EuroGO-SHIP Research Infrastructure Workshop

Thursday, 27 June 2024

Institute for Marine Sciences (CNR-ISMAR), Venice, Italy

Activity 4 EuroGO-SHIP Future

Activity 3 Global Challenge Scenarios and RI Solutions

Objective: *To plan the next steps for EuroGO-SHIP as a future RI*

Expected output: *Feedback and ideas on the future of EuroGO-SHIP as a new independent RI or a consolidated RI. Deeper understanding of pros and cons of both approaches (independent RI vs consolidated RI).*

Facilitators: *Elaine McDonagh and Catherine Halbert. Rapporteurs and Helpers.*

Description of Steps:

- Elaine will introduce the objective of this activity
- Catherine will explain the steps involved.
- You will be divided into a small Group and provided with a Flip Chart and Pens.
- Two Groups will explore how Euro GO-SHIP might proceed as a future **Independent RI** and Two Groups will explore how Euro GO-SHIP might proceed or as a future **Consolidated RI**.
- Each Group will present their feedback.





Appendix 3 – Pre-Workshop Webinar Slides

A presentation slide with a blue background showing an underwater view of the ocean floor. In the top left corner, there is the EuroGO-SHIP logo, which consists of a white compass rose with a ship silhouette inside, surrounded by a blue circle with yellow stars. To the right of the logo, the text 'EuroGO-SHIP' is written in white, with 'Enhancing ocean observations' in smaller white text below it. In the center of the slide, the title 'EuroGO-SHIP project' is written in large white font. Below the title, the subtitle 'Developing a concept for a research infrastructure to support European ship-based hydrography' is written in yellow font. At the bottom center, the dates 'December 2022 - November 2025' are written in white. At the bottom left, there is a small European Union flag icon followed by the text 'EuroGO-SHIP is co-funded by the European Union, Horizon Europe Funding Programme for research and innovation under grant agreement No. 101094690 and by UK Research and Innovation'. At the bottom right, the text 'Version 28 april, 2023' is written in white.



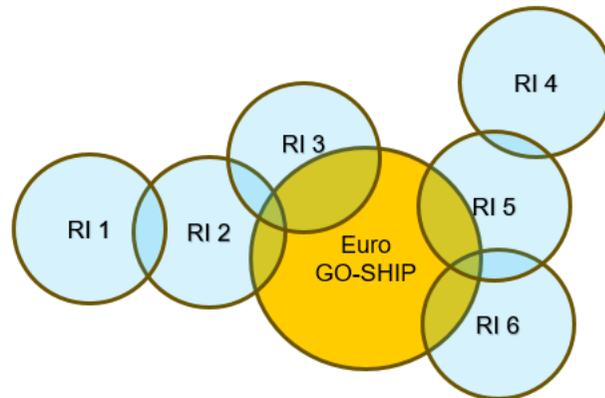
EuroGO-SHIP webinar for for Marine RIs

5th June 2024



- Objectives of the EuroGO-SHIP project

To define and make a plan to provide services to European hydrographers



- Objectives of the webinar

Introduce the project

- Objectives of the workshop

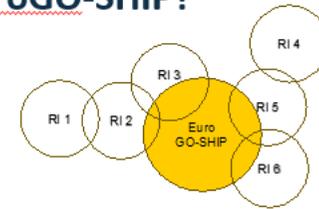
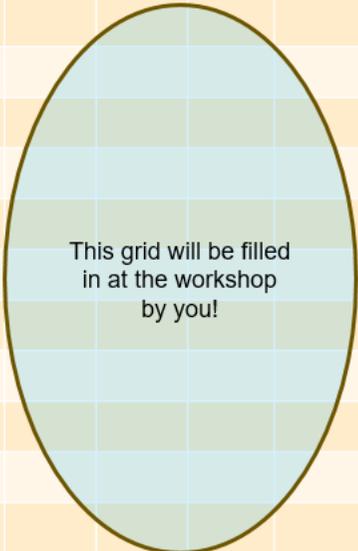
To map the EuroGO-SHIP project in the context of the existing marine RI landscape

Overlaps: provider? Partner? EOI?



How do your RI services and interests overlap with EuroGO-SHIP?

EuroGO-SHIP services	RI 1	RI 2	RI 3	RI 4
Equipment sharing: European Marine Equipment Pool				
Capability e.g. transient tracers or low nutrient concentration				
Reference materials e.g. carbon and nutrients				
Best practices and standard operating procedures				
Training: online, on land/lab, at sea				
Data curation: data pathways and meta data				
Quality control: primary and secondary				
Accreditation: e.g. lab or process accreditation				
Advocacy				
Pan-European cooperation eg parameter expert groups				



- Provider, partner, Expression of interest
- Parameter: temperature, salinity, oxygen, carbon system parameters, nutrients, transient tracers, velocity (ADCPs)
- Services are still being scoped
- Anything else??
- elmc@norceresearch.no



EuroGO-SHIP

A European project funded by Horizon Europe



Consortium & resources

- 14 Partners, 11 nations
- 36 months (Dec 2022 – Nov 2025)
- Funding: €3M
- EU and UKRI Funding





What is hydrography?



- Sensors and samplers deployed from a ship
- Full-depth observations
- Highest quality observations
- Broad range of observations



THE GLOBAL OCEAN SHIP-BASED HYDROGRAPHIC INVESTIGATIONS PROGRAM

5



Most European hydrography is not international GO-SHIP

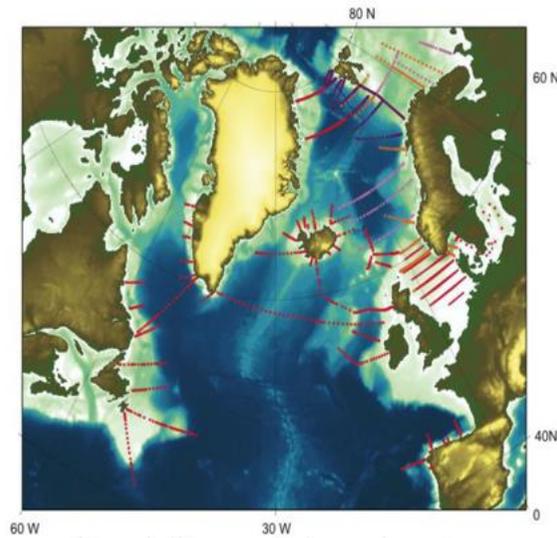
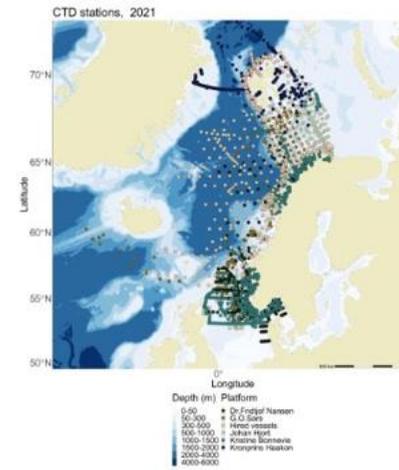


Figure 1. The repeat hydrography sections and stations of the ICES WGOH.



Also MONGOOS, Black Sea and MSFD and fisheries observations



The challenge

Providing infrastructure that supports all European ship-based hydrography



Current issues & challenges:

- Certified reference materials
- Data pathways
- Lack of agreed data and metadata formats for key data streams
- Diverse working practices
- Missed measurements
- Lack of national capacity for key measurements





Our ambition

Could challenges be addressed by a new research infrastructure?



EU Marine Research Infrastructure Landscape

End Users: Scientific, Ocean modelling, Satellite community
 Data handling: Copernicus Marine, EMODnet, SeaDataNet



Adapted image from the JERICO Report 'The joint European Research Infrastructure Network for Coastal Observatories: Achievements and Strategy for the Future' published in 2015



EuroGO-SHIP

Project objectives

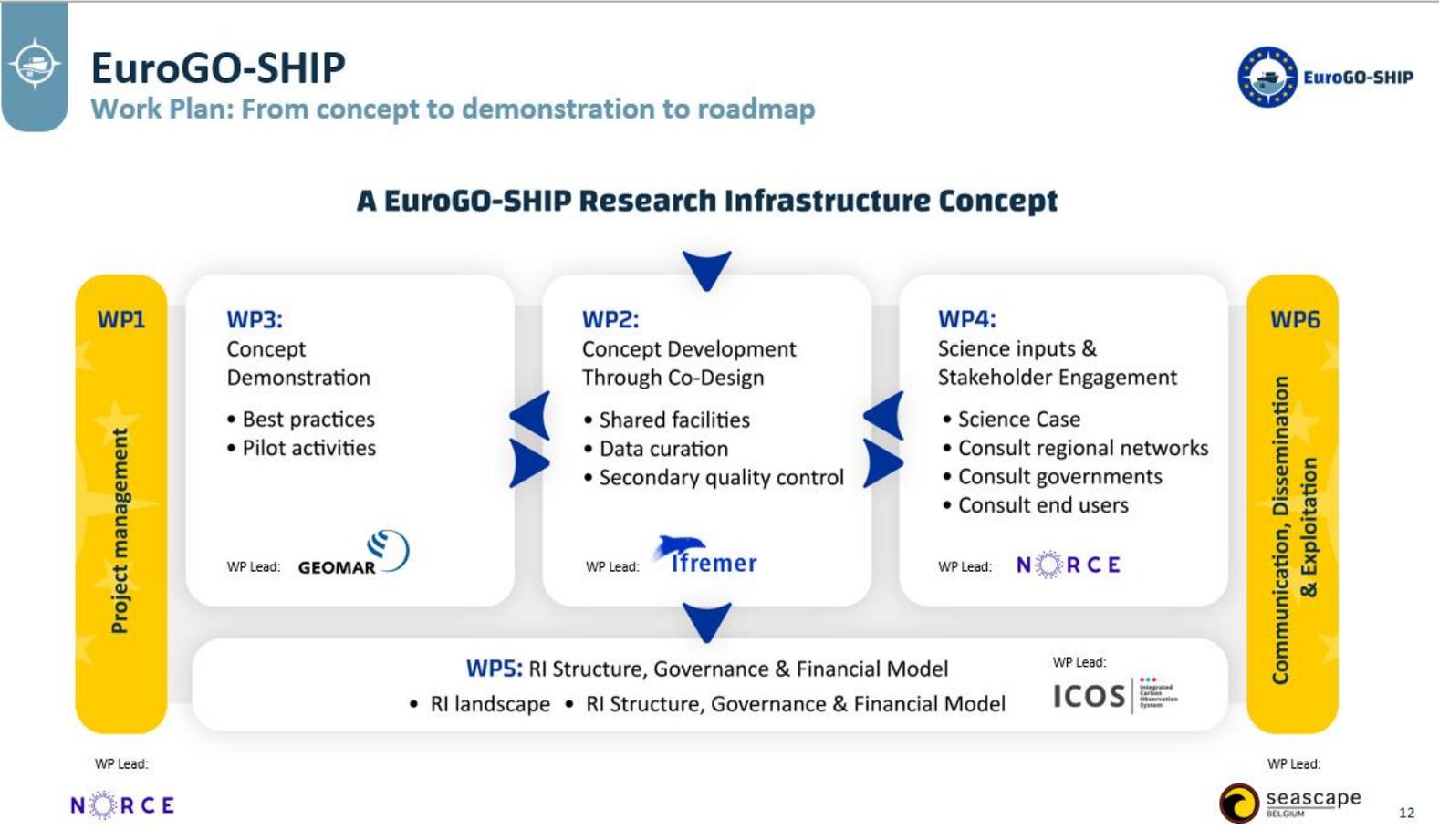


Shaping a new research infrastructure

EuroGO-SHIP seeks to support the European community conducting **ship-based hydrographic observations** at sea to provide higher quality and sustainable data flows to a broad range of end users more effectively, **from surface to bottom**. It will strengthen European capabilities towards world-class Oceanographic science.

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Concept development & demonstration

WP2 & WP3



Co-designing services

- **Shared facilities and services**
 - Certified Reference Materials
 - Capability eg transient tracers or low concentration nutrients
 - European Marine Equipment Pool
 - Best practices
 - Training
 - Primary quality control software
- **Data system**
 - Real-time data, FAIR
 - Data access and usability
- **Uncertainty**
 - GLODAP
 - Secondary quality control
 - Improves data usability



Piloting & testing best practices

- **Pilot Activities**
 - Cruises
 - Batch of carbon CRMs
 - Salinity best practice
 - Nutrient sample storage
 - training
- **Best practices**
 - Map end-to-end system of best practices including gaps and barriers to adoption
 - Planning,
 - Sampling
 - Analysis
 - Quality control
 - Data submission





Scoping needs and ambitions & laying out alternatives

WP4 & WP5



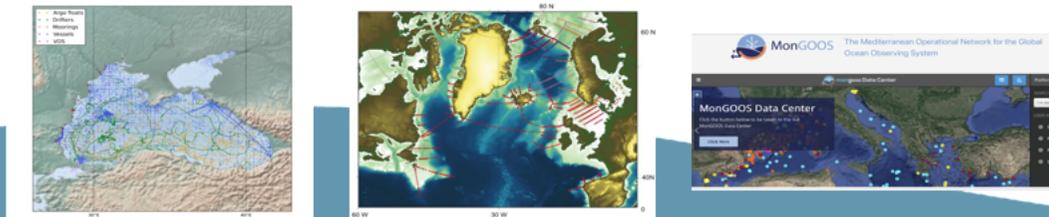
Engaging with key communities

- Modelling analysis to quantify impact of RI
- Regional networks (ICES, MonGOOS, Black Sea)
- Governments and funding agencies (EOOS, JPI Oceans, programme managers)
- End users: OceanPredict, satellite calibration & validation



Defining structure, governance & funding

- Map EuroGO-SHIP statement of requirement onto existing RI landscape
- Architecture, financing, governance
- Proposed structure, including a preferred option for way forward





Supporting coordination, outreach & legacy

WP1 & WP6



- Project Management



- Communications, Dissemination & Exploitation

Subscribe to the EuroGO-SHIP newsletter
to stay informed and engage in training, events & consultations!

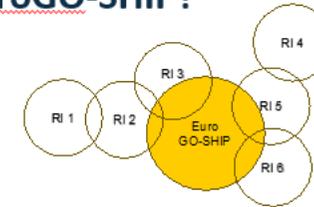
eurogo-ship.eu

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How do your RI services and interests overlap with EuroGO-SHIP?

EuroGO-SHIP services	RI 1	RI 2	RI 3	RI 4
Equipment sharing: European Marine Equipment Pool				
Capability e.g. transient tracers or low nutrient concentration				
Reference materials e.g. carbon and nutrients				
Best practices and standard operating procedures				
Training: online, on land/lab, at sea				
Data curation: data pathways and meta data				
Quality control: primary and secondary				
Accreditation: e.g. lab or process accreditation				
Advocacy				
Pan-European cooperation eg parameter expert groups				



- Provider, partner, Expression of interest
- Parameter: temperature, salinity, oxygen, carbon system parameters, nutrients, transient tracers, velocity (ADCPs)
- Services are still being scoped
- Anything else??
- Questions??
- elmc@norceresearch.no



Enhancing ocean observations



Stay up-to-date with the latest news [in](#)  

Visit eurogo-ship.eu | contact@eurogo-ship.eu

[EuroGO-SHIP](#) Project Coordinator: Elaine McDonagh | elmc@norceresearch.no



Appendix 4 – Detailed results from EuroGO-SHIP Survey

As a Provider How do your RI services and interests overlap with EuroGO-SHIP?

EuroGO-SHIP Services		AMRIT	AQUARIUS	Copernicus Marine Service	DANUBIUS-RI	EMBRC	EMODnet	EMSO ERIC	EOOS	Euro-Argo	EuroFleets	EuroGOOS	FerryBox	GROOM	ICOS ERIC	JERICO	JPI Oceans	LifeWatch	Ocean Best Practices System	OceanOps	SeaDataNet	Sustainable Blue Economy Partnership	EuroGO-SHIP Services			
1	Equipment Sharing: European Marine Equipment Pool	✓	✓		✓	✓		✓		✓	✓					✓		✓					(✓)	Equipment Sharing: European Marine Equipment Pool	1	
2	Capability e.g. transient tracers or low nutrient concentration				✓	✓		✓					✓	✓	✓										Capability e.g. transient tracers or low nutrient concentration	2
3	Reference materials e.g. carbon and nutrients				✓	✓									✓										Reference materials e.g. carbon and nutrients	3
4	Best practices and standard operating procedures	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓		✓	✓	✓					Best practices and standard operating procedures	4
5	Training: online, on land/lab, at sea	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓		✓	✓						Training: online, on land/lab, at sea	5
6	Data curation: data pathways and meta data	✓		✓			✓	✓		✓	✓		✓	✓	✓	✓		✓	✓	✓					Data curation: data pathways and meta data	6
7	Quality control: primary and secondary	✓	✓	✓		✓				✓	✓		✓	✓				✓							Quality control: primary and secondary	7
8	Accreditation: e.g. lab or process accreditation					✓								✓	✓										Accreditation: e.g. lab or process accreditation	8
9	Advocacy			✓		✓	✓		✓	✓		✓		✓			✓			✓		✓			Advocacy	9
10	Pan-European cooperation e.g. parameter expert groups	✓		✓		✓	✓		✓	✓		✓	✓	✓			✓	✓		✓					Pan-European cooperation e.g. parameter expert groups	10
EuroGO-SHIP Services		AMRIT	AQUARIUS	Copernicus Marine Service	DANUBIUS-RI	EMBRC	EMODnet	EMSO ERIC	EOOS	Euro-Argo	EuroFleets	EuroGOOS	FerryBox	GROOM	ICOS ERIC	JERICO	JPI Oceans	LifeWatch	Ocean Best Practices System	OceanOps	SeaDataNet	Sustainable Blue Economy Partnership	EuroGO-SHIP Services			



As a Partner

How do your RI services and interests overlap with EuroGO-SHIP?

EuroGO-SHIP Services		AMRIT	AQUARIUS	Copernicus Marine Service	Danubius-RI	EMBRC	EMODnet	EMSO ERIC	EOOS	Euro-Argo	EuroFleets	EuroGOOS	FerryBox	GROOM	ICOS ERIC	JERICO	JPI Oceans	LifeWatch	Ocean Best Practices System	OceanOps	SeaDataNet	Sustainable Blue Economy Partnership	EuroGO-SHIP Services		
1	Equipment Sharing: European Marine Equipment Pool		✓					✓		✓	✓		✓	✓		✓		✓						Equipment Sharing: European Marine Equipment Pool	1
2	Capability e.g. transient tracers or low nutrient concentration	✓				✓		✓								✓								Capability e.g. transient tracers or low nutrient concentration	2
3	Reference materials e.g. carbon and nutrients	✓				✓								✓			✓							Reference materials e.g. carbon and nutrients	3
4	Best practices and standard operating procedures		✓			✓	✓	✓		✓	✓		✓		✓	✓		✓	✓	✓				Best practices and standard operating procedures	4
5	Training: online, on land/lab, at sea		✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓		✓		Training: online, on land/lab, at sea	5
6	Data curation: data pathways and meta data		✓	✓	✓	✓	✓	✓		✓	✓		✓		✓		✓	✓	✓					Data curation: data pathways and meta data	6
7	Quality control: primary and secondary			✓			✓			✓			✓				✓	✓						Quality control: primary and secondary	7
8	Accreditation: e.g. lab or process accreditation					✓																		Accreditation: e.g. lab or process accreditation	8
9	Advocacy			✓		✓	✓		✓	✓		✓	✓				✓						✓	Advocacy	9
10	Pan-European cooperation e.g. parameter expert groups			✓	✓	✓	✓		✓	✓		✓	✓		✓	✓		✓		✓		✓		Pan-European cooperation e.g. parameter expert groups	10
EuroGO-SHIP Services		AMRIT	AQUARIUS	Copernicus Marine Service	Danubius-RI	EMBRC	EMODnet	EMSO ERIC	EOOS	Euro-Argo	EuroFleets	EuroGOOS	FerryBox	GROOM	ICOS ERIC	JERICO	JPI Oceans	LifeWatch	Ocean Best Practices System	OceanOps	SeaDataNet	Sustainable Blue Economy Partnership	EuroGO-SHIP Services		



As an Expression of Interest How do your RI services and interests overlap with EuroGO-SHIP?

EuroGO-SHIP Services		AMRIT	AQUARIUS	Copernicus Marine Service	Danubius-RI	EMBRC	EMODnet	EMSO ERIC	EOOS	Euro-Argo	EuroFleets	EuroGOOS	FerryBox	GROOM	ICOS ERIC	JERICO	JPI Oceans	LifeWatch	Ocean Best Practices System	OceanOps	SeaDataNet	Sustainable Blue Economy Partnership	EuroGO-SHIP Services			
1	Equipment Sharing: European Marine Equipment Pool					✓					✓												✓	Equipment Sharing: European Marine Equipment Pool	1	
2	Capability e.g. transient tracers or low nutrient concentration												✓												Capability e.g. transient tracers or low nutrient concentration	2
3	Reference materials e.g. carbon and nutrients									✓			✓			✓	✓								Reference materials e.g. carbon and nutrients	3
4	Best practices and standard operating procedures			✓		✓			✓		✓	✓										✓			Best practices and standard operating procedures	4
5	Training: online, on land/lab, at sea			✓		✓			✓		✓	(✓)										✓			Training: online, on land/lab, at sea	5
6	Data curation: data pathways and meta data			✓					✓		✓										✓	✓			Data curation: data pathways and meta data	6
7	Quality control: primary and secondary			✓	✓			✓											✓	✓	✓				Quality control: primary and secondary	7
8	Accreditation: e.g. lab or process accreditation				✓	✓			✓	✓		(✓)	✓					✓	✓			(✓)			Accreditation: e.g. lab or process accreditation	8
9	Advocacy			✓	✓	✓			✓			✓	✓			✓	✓	✓			✓	✓	✓		Advocacy	9
10	Pan-European cooperation e.g. parameter expert groups			✓		✓		✓	✓			✓	✓				✓				✓		✓		Pan-European cooperation e.g. parameter expert groups	10
EuroGO-SHIP Services		AMRIT	AQUARIUS	Copernicus Marine Service	Danubius-RI	EMBRC	EMODnet	EMSO ERIC	EOOS	Euro-Argo	EuroFleets	EuroGOOS	FerryBox	GROOM	ICOS ERIC	JERICO	JPI Oceans	LifeWatch	Ocean Best Practices System	OceanOps	SeaDataNet	Sustainable Blue Economy Partnership	EuroGO-SHIP Services			



Research Infrastructure/Project Name: Advance Marine Research Infrastructures Together (AMRIT)

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool	AMRIT provides services to manage equipment in general in strong link with MFP.		
2.	Capability e.g. transient tracers or low nutrient concentration		AMRIT can help for the definition/management of metadata	
3.	Reference materials e.g. carbon and nutrients		As above	
4.	Best practices and standard operating procedures	AMRIT provides technical support to the implementation of best practices		
5.	Training: online, on land/lab, at sea	Training for the AMRIT tools should be part on any training regarding ocean observation, regardless the platform		
6.	Data curation: data pathways and meta data	This a the core activity of AMRIT from the metadata point of view.		
7.	Quality control: primary and secondary	As above. AMRIT services for metadata must benefit/improve all QC processes.		
8.	Accreditation: e.g. lab or process accreditation			
9.	Advocacy			
10.	Pan-European cooperation e.g. parameter expert groups	The definition of metadata comes largely from expert groups work, and AMRIT can strongly benefit from them, and provide input as well.		



Research Infrastructure/Project Name: AQUARIUS

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool	✓ Vessel profiles available online outlining capability of RVs to take relevant samples/data. Scientists can apply via TNA (for access to vessels and equipment)	✓ AQUARIUS Infrastructure database and infrastructure profiles can be shared	
2.	Capability e.g. transient tracers or low nutrient concentration			
3.	Reference materials e.g. carbon and nutrients			
4.	Best practices and standard operating procedures	✓ Best practices + SOPs can be shared on AQUARIUS Training Hub/online + with vessel crews/operators	✓ Best practice guidelines / SOPs can be shared on the AQUARIUS training hub	
5.	Training: online, on land/lab, at sea	✓ Training documents can be shared via the AQUARIUS training hub (in development)	✓ Training guidelines can be shared on the AQUARIUS training hub and among partners	
6.	Data curation: data pathways and meta data	Ensure data arising from all TNA projects reaches the correct/appropriate repositories + infrastructures operators are on-board + have the correct structures in place	✓ TNA projects can be requested to collect water samples during funded cruises and ensure all underway data & metadata is submitted to the appropriate data repositories.	
7.	Quality control: primary and secondary	✓ AQUARIUS Data Management Work Package will work with TA Principal Investigators and operators to ensure good quality data.		
8.	Accreditation: e.g. lab or process accreditation			
9.	Advocacy			
10.	Pan-European cooperation e.g. parameter expert groups			



Research Infrastructure/Project Name: Copernicus Marine Service

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool			
2.	Capability e.g. transient tracers or low nutrient concentration			
3.	Reference materials e.g. carbon and nutrients			
4.	Best practices and standard operating procedures	Yes, e.g. Ocean Prediction, data standards etc.		Yes
5.	Training: online, on land/lab, at sea	Yes, e.g. visualise, download and use of Copernicus Marine products and services, use for applications (MSFD, Transport etc.). 6 to 7 training events per year.	Yes, e.g. Explaining the value of ocean observations for predictions	Yes
6.	Data curation: data pathways and meta data	Yes, this is what is done for the data managed in Copernicus.	Yes, <i>In-situ</i> TAC to ensure higher uptake of hydrographic data from EU nations.	Yes
7.	Quality control: primary and secondary	Yes, secondary quality control for <i>In-situ</i> data (Thematic Assembly Centre) and QC for modelled data for reanalyses, analyses and forecasts. Quality Information Documents (QUID) available for all products. The Copernicus Marine Service <i>In-situ</i> TAC carries out QC using a common approach for all the different platforms feeding into the system	Yes, <i>In-situ</i> TAC to ensure hydrographic data ingested in Copernicus Marine are directly useable (fully processed including quality control steps) for model validation or data assimilation.	Yes
8.	Accreditation: e.g. lab or process accreditation	No		
9.	Advocacy	Advocacy to sustain the value chain from observation (satellite and <i>in-situ</i>) to modelling and services is part of Copernicus Marine activities.	Yes, e.g. connecting with the EC jointly and working together on the Ocean Observing system design – important issue that must be addressed to move toward a sustained monitoring and observing system in place in Europe.	Yes
10.	Pan-European cooperation e.g. parameter expert groups	Yes, cross cutting WGs e.g. BGC assimilation, to help further development and cooperation	Yes, WG to analyse together how to ingest data from the <i>In-situ</i> hydrography networks and vice versa where Copernicus Marine Service sits on some of the EuroGO-SHIP parameter WGs.	Yes

Research Infrastructure/Project Name: DANUBIUS-RI

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool	<p>✓ Disclaimer (DANUBIUS already designed services but they will be provided once ERIC (1.5 years from now) with the focus on river-sea continuum, for the ROFI (regions of freshwater influence). Capability to share equipment through Supersites and Observation Node (DANUBIUS components), e.g. Black Sea ISTROS vessel + equipment</p>		
2.	Capability e.g. transient tracers or low nutrient concentration	<p>✓ The DANUBIUS RI covers peculiar knowledge on transitional environments (river, delta, coastal areas), since not all "open sea" approaches are suitable for observing these areas. DANUBIUS is providing complementary capability (observation node --> EO/products, modelling node --> for coasts and transitional environment), points of synergies in the field campaigns.</p>		
3.	Reference materials e.g. carbon and nutrients	<p>✓ The DANUBIUS SRIA (science and Innovation Agenda) is available to identify relevant topics/questions on the river-sea continuum and find points of connection</p>		
4.	Best practices and standard operating procedures	<p>✓ The DANUBIUS commons (common methodologies, standard formats adoption of common procedures where missing, assuring interoperability) are focussed on aspects not touched by already available initiatives and peculiar for river-sea continuum. Complementarity. Good possible link with Ocean Best Practices</p>		
5.	Training: online, on land/lab, at sea	<p>✓ One of DANUBIUS components is the e-learning office (to share know how regarding observations, modelling, analysis and</p>		



		impact), ongoing work to produce training material, room for collaboration on themes connected with the ship-based observations		
6.	Data curation: data pathways and meta data		<p>✓ There is interest for identifying common data pathways and adopt (for specific data) standard metadata catalogues to increase data availability.</p> <p>For ocean parameters DANUBIUS aligns to existing initiative.</p> <p>For peculiar parameters (e.g. residence time) DANUBIUS can suggest approaches.</p>	
7.	Quality control: primary and secondary			<p>✓ Interest in being informed on quality control procedures already adopted, since this aspect is presently under construction for some data flows within the Data Centre of DANUBIUS-RI.</p>
8.	Accreditation: e.g. lab or process accreditation			<p>✓ For labs it will become possible only after becoming an ERIC (15 year-in operational phase)</p>
9.	Advocacy			<p>✓ Interest but possible only once ERIC</p>
10.	Pan-European cooperation e.g. parameter expert groups		<p>✓ Interest in involvement to share peculiarities on some parameters if measured in river-sea continuum (mainly all parameters of the list for carbon system - refer to ICOS work)</p>	



Research Infrastructure/Project Name: European Marine Biological Resource Centre (EMBRC)

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool	Yes – but we provide access to the equipment onboard, or provide the vessel that can deploy the equipment		Yes – if there is a biological component
2.	Capability e.g. transient tracers or low nutrient concentration	Yes – we are developing service, for example on testing of food for trace plastic as well as marine noise experimental facility. We also run a heat-wave simulator	Potentially, but many of these are not deployable on a ship	
3.	Reference materials e.g. carbon and nutrients	Yes – mock communities for genomic observatories (created by us, not an official reference material provider)	Yes – they will be made available when we have published	
4.	Best practices and standard operating procedures	Yes – European Marine Omics Biodiversity Observation Network (EMO BON). Submitted to the Ocean Best Practices. We are also working extensively on these concepts in the OBON UN Decade programme	We encourage the use of our SOPs and protocols, they are open access. We are working on creating a mechanism for incorporating non-EMBRC partners in the observatory	Yes – we are hoping to develop imaging-based observation in our observatory in the next couple of year
5.	Training: online, on land/lab, at sea	Yes – catalogue of training courses for 84 countries and online (blended) training material	Yes – if there is a biological component	Yes – If there is a biological components
6.	Data curation: data pathways and meta data	No – we encourage and are building our data capabilities around existing e-infrastructure, such as ENA, OBIS and GBIF. Our data strategy is aligned with the UN Decade data strategy developed by IODE	Yes – we are exploring where to store large imaging datasets from observatories. We are encouraging the use of certain metadata standards, eg MxS and Darwin Core	
7.	Quality control: primary and secondary	Yes – on our genomics observatory data		
8.	Accreditation: e.g. lab or process accreditation	We are developing accreditation for our training programmes for our and other RI training programmes.	Yes, we would be interest in the context of training	Yes
9.	Advocacy	Yes – we have been extensively engaged in advocating for marine biology in general, use of marine model organisms and sustainable marine observation. Advocacy for the use of RIs	Yes	Yes
10.	Pan-European cooperation e.g. parameter expert groups	Yes – both between our partners, with ourselves and other partners, and amongst RIs and large research consortia.	Yes – linking all the pieces of the marine research and observation puzzle is crucial to avoid duplication and improving interoperability	Yes

Research Infrastructure/Project Name: EMODnet

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool			
2.	Capability e.g. transient tracers or low nutrient concentration			
3.	Reference materials e.g. carbon and nutrients			
4.	Best practices and standard operating procedures	✓ Best practices and reference on <i>in-situ</i> data and associated metadata, web services and ocean data and data products publishing (using open-source software and OGC standards, etc.)	✓ SAME as provider	EMODnet is interested continuing collaboration as best practices and reference in <i>in-situ</i> data and data products publishing
5.	Training: online, on land/lab, at sea	✓ Training of <i>in-situ</i> data flow and data products generation	✓ SAME as provider	EMODnet is interested in following and providing <i>in-situ</i> data flow and data products generation trainings.
6.	Data curation: data pathways and meta data	✓ EMODnet is not strictly a RI but an overarching public EU <i>in-situ</i> data and data products publishing service. Facilitating the access to <i>in-situ</i> data, and data products, being generated by providers and the RIs. Data coming from RI observations should be accessible in EMODnet in a standardised and interoperable format (FAIR).	✓ SAME as provider	✓ EMODNET should be involved in the data flow from all existing and new RIs to make <i>in-situ</i> data accessible in the EMODnet portal in a standard format –(FAIR DATA)
7.	Quality control: primary and secondary	EMODnet <i>in-situ</i> data and products have passed certified QC procedure and have quality flag on the metadata that can be used across the RIs	✓ SAME as provider	
8.	Accreditation: e.g. lab or process accreditation			
9.	Advocacy	✓ EMODnet is strongly engaged in the promotion of value of <i>in-situ</i> data and data products for their use by different range of stakeholders (policy makers, scientists, blue economy sector) and the Promotion of EU data and products services at global level (e.g. linking to the UN ocean decade)	✓ SAME as provider	
10.	Pan-European cooperation e.g. parameter expert groups	✓ EMODnet is a European network (>100 experts) of people working on <i>in-situ</i> data and data products generation and publishing for different parameters (physics, chemistry, biology, bathymetry, seabed habitats and human activities.)	✓ SAME as provider	✓ EMODNET data experts get in dialogue with RI experts on parameters to facilitate the standardization of data and metadata formats to make them FAIR and accessible to other EU and global marine data portals



Research Infrastructure/Project Name: EMSO ERIC

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool	✓ We are discussing about pooling EGIM sensor modules. It's obviously developed	✓ Equipment sharing - sensors	
2.	Capability e.g. transient tracers or low nutrient concentration	✓ Capability in ADCPs, bottom sensors, cabled systems, sismology and bottom P, time series analysis, oxygen, fluo, turbidity	✓	
3.	Reference materials e.g. carbon and nutrients			
4.	Best practices and standard operating procedures	✓ Best practices on ADCP deployment, cabled systems deployments, mooring systems, oxygen, fluo, turbidity, CTD, Video? And Acoustics? As partners	✓	
5.	Training: online, on land/lab, at sea	✓ Training in time series analysis, in ADCP deployment and data analysis	✓ Training in nutrients	
6.	Data curation: data pathways and meta data	✓	✓ Data curation to generate/update a sensor registration system that provide automate harmonised metadata	
7.	Quality control: primary and secondary			✓ To revise the definition of quality control when we have in mind the future use of data
8.	Accreditation: e.g. lab or process accreditation			
9.	Advocacy			
10.	Pan-European cooperation e.g. parameter expert groups	I don't know yet exactly		✓ Pan EU



Research Infrastructure/Project Name: EOOS

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool			
2.	Capability e.g. transient tracers or low nutrient concentration			
3.	Reference materials e.g. carbon and nutrients			
4.	Best practices and standard operating procedures			EOOS is supporting OBPS and is willing to follow further collaboration dedicated to BPs. EOOS is the place to federate RIs and EU entities to progress in the TOPIC
5.	Training: online, on land/lab, at sea	EOOS is already organizing with EuroGOOS some "training", let's say workshop e.g. EOOS Technological Forum; EOOS could engage more to organise such events	EOOS could help more to co-organise trainings and workshops on side of EuroGOOS Task Teams and Working Groups	EOOS can participate and help to federate, to make visible Trainings & Workshops with RIs and EU entities. Do not hesitate to get in touch
6.	Data curation: data pathways and meta data			EOOS must help to improve data quality provided by various RIs and projects. Through the GOOS operation committee EOOS can foster their process
7.	Quality control: primary and secondary			
8.	Accreditation: e.g. lab or process accreditation			There is quite a gap between accreditation of observations in marine science e.g. Minke should be included in many EU marine activities. EOOS can help
9.	Advocacy	EOOS is very well suited to help to federate advocacy. On-site of EuroGOOS, EOOS would be very happy to help	EOOS is the place to advocate for a RIs and EU entities dedicated to marine science, observation and blue economy	EOOS can play and already play a major role for advocacy. So be in touch with EOOS
10.	Pan-European cooperation e.g. parameter expert groups	EOOS is a smart means to contribute to pan-European cooperation. The EOOS operational committee is the place to meet ever RI and EU entity.	EOOS is the tool to consolidate Pan EU cooperation --> join the EOOS Operation Committee	EOOS major objectives: - Pan-European cooperation. Please involve us!



Research Infrastructure/Project Name: Euro-Argo ERIC

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool	✓ For Euro-Argo, equipment sharing has a special meaning, at the ERIC we have a central procurement activity i.e. we negotiate, prepare a tender, etc. on the various types of profilers that the members use, some members do not use this facility.	✓ At deployment phase of an Argo profiler, a reference cast is a real benefit. Hence your material sharing could be of benefit for the cruises of opportunity we use	
2.	Capability e.g. transient tracers or low nutrient concentration			
3.	Reference materials e.g. carbon and nutrients			✓ We'd like to get informed about the evolution of reference materials and procedures. E.g. about Chl-A: Argo measures fluorescence. How to relate Chl-A concentration to fluorescence with the best confidence
4.	Best practices and standard operating procedures	✓ This is a long lasting activity among the global (international) Argo community. However, Europe is at the forefront of this activity, for the 3 programmes (core, deep and BGC Argo).	✓ There are certainly best practices to share, on data collection, metadata, etc. We already share these in Infra-Tech projects (e.g. George, AMRIT...)	
5.	Training: online, on land/lab, at sea	✓ Online training material is a steadily available and updated. In person, we can only afford to organise it when there is a project (EU project) to provide it.	✓ There is a benefit to organise cross-network training sessions. Within an EU-Funded project?	
6.	Data curation: data pathways and meta data	✓ Ambition, the Argo programme has been conceived with open and free access to data, with both near real time and QCed by experts' data repository	✓ Yes, always up to collaborate on Fairness, EOSC, etc.	

		Global Data Assembly Centres (GDAC), duplicated at NOAA and Ifremer (Coriolis). Then in Copernicus <i>in-situ</i> , EMODnet, SeaDataNet		
7.	Quality control: primary and secondary	<p>✓ RTQC: real time quality control = Primary QC. Automatically performed at NRT diffusion on GDAC and on GTS: DMQC: delayed mode quality control = secondary QC. Experts put corrections (drift, offsets, etc.) by cross verification with climatology or co-location with observations of other networks</p>	<p>✓ Yes for data collaboration which could be planned somehow.</p>	
8.	Accreditation: e.g. lab or process accreditation			<p>✓ We're not there yet for the testing, deployment, RTQC, DMQC, although one day, Copernicus entrusted entities might ask for it. So keep us informed.</p>
9.	Advocacy	<p>✓ As much as we can, we give the message that a big part of our observations is an operational material, duty and that support by the research community is not enough, especially to reach the one Argo design with the Deep and BGC missions added to the Core initial mission (the one that is to be considered as full operational by now).</p>	<p>✓ Yes we can voice together about the organisational side of our data collection effort.</p>	
10.	Pan-European cooperation e.g. parameter expert groups	<p>✓ As much as we can we set up regional meetings about the marginal seas (Baltic, Black Sea, Mediterranean, Arctic) to face their objectives in DMQC (see point 7)</p>	<p>✓ Yes, we already share experts involved in Euro-Argo and EuroGO-SHIP. Let's continue and enhance this collaboration.</p>	



Research Infrastructure/Project Name: EuroGOOS

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool			
2.	Capability e.g. transient tracers or low nutrient concentration			
3.	Reference materials e.g. carbon and nutrients			
4.	Best practices and standard operating procedures			Facilitation of exchange with community members on SOPs, best practices. Own efforts are underway with some partners
5.	Training: online, on land/lab, at sea			EuroGOOS considered own training efforts in the past (which didn't happen). Interest in revisiting this topic.
6.	Data curation: data pathways and meta data			
7.	Quality control: primary and secondary			
8.	Accreditation: e.g. lab or process accreditation			Multiplicator - concrete work in the ROOS -- possible collaboration
9.	Advocacy	✓ EuroGOOS is happy to collaborate with RIs in different European projects already in the areas of networking, advocacy, etc., get in touch	✓ EuroGOOS core capacity is at the science/partner and policy interface / connecting community needs with stakeholders/policy makers.	✓ EuroGOOS in working towards the improvement and visibility of ocean observations in general. EuroGO-SHIP as part of this community fits perfectly there. Details to be discussed
10.	Pan-European cooperation e.g. parameter expert groups	✓ No concrete plans but through EuroGOOS' coordination group + task teams huge potential for future development	✓ EuroGOOS facilitates collaborations among its partners and beyond through its ROOSes, working groups and task teams (these are open to community members whether EuroGOOS members or not)	✓ EuroGOOS can provide a platform, and/or serve as multiplier into the community



Research Infrastructure/Project Name: EuroFleets

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool	✓ Spare capacity on RVs - opportunity for data/sample collection. EuroFleets equipment pool database can be shared	✓ EuroFleets database of vessels/marine equipment can be shared	✓ Existing Eurofleets database of LEXIs can be shared for ease of scheduling + deployment. Cruise schedule published online for opportunity to take samples / spare berth capacity
2.	Capability e.g. transient tracers or low nutrient concentration			
3.	Reference materials e.g. carbon and nutrients			
4.	Best practices and standard operating procedures	✓ Sharing of best practice and processes with the RV community	✓ Sharing of best practices with RV community	✓ Sharing of best practices in Hydrography with the RV community
5.	Training: online, on land/lab, at sea	✓ On-board training of ship's crews by experts in hydrographic community	✓ On-board training of ship's crews and technicians by experts from the hydrographic community	✓ Potential to organise training cruises and specifically @ hydrography
6.	Data curation: data pathways and meta data	✓ Real time data provision from RVs + streamlining of the data pathways	✓ Real time data provision from RVs & streamlining of the data pathways	✓ Training of vessel crews/operators and ensuring data is submitted to the relevant repositories
7.	Quality control: primary and secondary	✓ Training of vessel crews to ensure understanding of the importance of the quality of the data		
8.	Accreditation: e.g. lab or process accreditation			
9.	Advocacy			
10.	Pan-European cooperation e.g. parameter expert groups			



Research Infrastructure/Project Name: FerryBox

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool		✓ We could consider sharing equipment. However this will be difficult with ships of opportunities I believe.	
2.	Capability e.g. transient tracers or low nutrient concentration	✓ We work with autonomous nutrient measurements (e.g. Systea Analyzers), which can measure low nutrient SW, with some limitations		✓ We would be interested in collaboration for low nutrient (and high nutrient) concentration measurements or transient tracers. Some efforts now are spent in microplastic sampling as well as algae species sampling.
3.	Reference materials e.g. carbon and nutrients			✓ Reference materials are extremely important for our sample collection for checks/QC of our underway measurements
4.	Best practices and standard operating procedures	✓ We have best practices in FerryBox community for ocean observation available online and through FerryBox EuroGOOS Task Team activities and within JERICIO RI	✓ We could develop best practices for the parameters we have not addressed yet together with EuroGO-SHIP.	
5.	Training: online, on land/lab, at sea	✓ We have provided training for FerryBox activities through different EU/national projects, but a more systematic effort may be beneficial for our community	✓ We could partner for training for some of overlapping parameters (e.g. Nutrient sampling for QC of FerryBox data)	
6.	Data curation: data pathways and meta data	✓ We have established data and metadata pathways within FerryBox Task Team	✓ We could share knowledge on data curation if this make sense.	
7.	Quality control: primary and secondary	✓ We have established near real time QC procedures, as well as some delayed QC procedures for hydrographic as well as some biogeochemical datasets (parameter)	✓ We could develop cross-validation experiments to use for QC.	
8.	Accreditation: e.g. lab or process accreditation			✓ We do not work on accreditation actively, but this may be of interest for some member of our community
9.	Advocacy		✓ We could establish connection between different FerryBox Task Teams partners and EuroGO-SHIP.	✓ Advocacy would be something we could work together with EuroGO-SHIP
10.	Pan-European cooperation e.g. parameter expert groups	✓ We have a number of EU members represented in the FerryBox EuroGOOS Task Team and we represent most of the coastal regions in Europe. Our community is also expanding with new members and we are involved in EU RIs (JERICIO) and ERICS (ICOS)	✓ We could find expert groups, which could help develop cooperations.	✓ There are opportunities for Pan-EU cooperation between our communities



Research Infrastructure/Project Name: Gliders for Research, Ocean Observations and Management: Infrastructure and Innovation (GROOM II).

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool		GROOM partners have intercalibration needs, and make important use of large CTD (SB911), Rosettes, ... and could share them. They could also provide 'mini' sensors as well that are often intercalibrated during hydrographic cruises by being installed on the Rosettes (or the full glider)	
2.	Capability e.g. transient tracers or low nutrient concentration	Some sensors for non-standards parameters (metals, Radiotracers, ...) are being currently developed for MAS and could be shared as in 1.		
3.	Reference materials e.g. carbon and nutrients		Support by MAS to reference carbon measurements done by R/Vs	
4.	Best practices and standard operating procedures	The MAS community in GROOM RI and more widely has developed a wealthy approach for a large number of best practices that are relevant also for GO-SHIP Hydrography.		
5.	Training: online, on land/lab, at sea		Training courses for MAS are rather specific to the platform. However, they can be run on R/V cruises or during cruises (eg the 2022 EUROFLEETS+ Floating University managed by UGOT).	
6.	Data curation: data pathways and meta data	This service no longer makes sense today if it is carried out in a disconnected way between acquisition platforms. In addition, MAS data management systematically calls on reference data from R/V based hydrology.		
7.	Quality control: primary and secondary	As above.		
8.	Accreditation: e.g. lab or process accreditation	as above. As discussed online, as far as metrology is concerned, it doesn't make sense if not cross-platform. For other accreditation, it is likely to be similar (I don't have a specific example by the way)		
9.	Advocacy	Advocacy for MAS is always done as a component of the multi-platform approach, highlighting the high degree of complementarity of R/V and MAS hydrology in term of spatial/temporal scales, and also logistics (MAS rely a lot on R/V for deployment/recovery)		
10.	Pan-European cooperation e.g. parameter expert groups	Yes, as discussed online, in most cases, there are no reason to have platform specific expert groups.		



Research Infrastructure/Project Name: ICOS ERIC

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool			
2.	Capability e.g. transient tracers or low nutrient concentration	✓ To be determined		
3.	Reference materials e.g. carbon and nutrients	✓ Provider of calibration phases but only for stations that are in the ICOS network (i.e. in countries that are members of ICOS ERIC)		
4.	Best practices and standard operating procedures	✓ Best practices (=protocols) applied in ICOS stations (also partnership with NOAA).	✓ Partnership with NOAA to develop standards	
5.	Training: online, on land/lab, at sea	✓ Summer schools (open) + trainings for stations in the ICOS network		
6.	Data curation: data pathways and meta data	✓ Data life cycle full implemented in ICOS (raw data ... carbon ICOS portal)		
7.	Quality control: primary and secondary	✓ QA/QC full implemented in ICOS		
8.	Accreditation: e.g. lab or process accreditation	✓ Labelling process for stations in the ICOS network		
9.	Advocacy	ICOS as observer in international fora (GEO, UNFCCC, ...) + strong presence in WMO (cf. G3W)		
10.	Pan-European cooperation e.g. parameter expert groups		✓	



Research Infrastructure/Project Name: JERICO

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool	✓ For fourteen years many technological developments were performed. Some of these developments will be part of the tech services dedicated to "equipment sharing". And the instrumentation are needed ships to be used (PAGURE) or deployed.	✓ Already consolidated as a service that could be provided but this service should be consolidated in the future.	
2.	Capability e.g. transient tracers or low nutrient concentration		✓ Should be consolidated in the future when ESFRI roadmap will be on track.	
3.	Reference materials e.g. carbon and nutrients			✓ Reference materials are recurring issue for JERICO - so far no efforts, but definitely a need and willingness to participate --> link to MINKE?
4.	Best practices and standard operating procedures	✓ JERICO, since 2010, is a major Best Practices provider. These BP are (should be) available in OBPS.	✓ To be consolidated in the future, very large topic for coastal observation.	
5.	Training: online, on land/lab, at sea	✓ Training: a major activity of JERICO during the past projects. And will be a pillar in some planned services. Mainly for instrumentation usage...from the sensors to the platforms	✓ Already provided thanks to the past projects.... But will need to be consolidated in the future/ for equipment sharing, training is needed!	
6.	Data curation: data pathways and meta data	✓ Data curation: as a provider thanks to the national coastal RIs that are already in place. In progress at the EU level for JERICO	✓ Data curation: a major topic for JERICO! Need to be consolidated as EU coastal data provider.	
7.	Quality control: primary and secondary		✓ Quality control as well a pillar concerning data to be provided by JERICO Already a topic thanks to coastal national RIs in the 9 nations part of JERICO.	
8.	Accreditation: e.g. lab or process accreditation			
9.	Advocacy			✓ Need to advocate for coastal observations and their sustainability for the JERICO community. Joining with other ocean observation RIs in this effort is in mutual interest
10.	Pan-European cooperation e.g. parameter expert groups		✓ A very important topic! RIs need to federate! Expertise needs to be shared!	



Research Infrastructure/Project Name: JPI Oceans*

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool		<p>European Marinas Network (Scoping Action):</p> <ul style="list-style-type: none"> - Aims to explore potential of marinas as infrastructures for <u>ocean observation</u>, ocean research and citizen science. - Explore Marinas to be used to <u>improve observation data quality, coherency and coverage</u>. - Possible outcomes (to be explored): a) Establish a coordinated network of marinas across Europe engaged in <u>environmental monitoring and data collection</u>. b) Develop standardised, user-friendly <u>sensor packages and data collection protocols for marinas</u> to adopt (salinity, temperature, turbidity, and sea-level sensors). c) Create a <u>centralised, open-access data repository for the environmental data</u> collected by the marina network. <p>Participating countries: DE, lead IT and GR</p>	<p>Close cooperation with the Advance Marine Research Infrastructures Together (AMRIT) initiative is advisable.</p> <p>AMRIT key objectives:</p> <ul style="list-style-type: none"> • Ensuring the seamless operation of marine observation platforms. • Facilitating the full nominal use of sensors and expediting their evolution. • Leveraging the complementarity of various observation platforms. • Ensuring the overall coherence of the ocean data value chain; landscape analysis. • Contribution to EOOS; Develops the technical support centre TSC.
2.	Capability e.g. transient tracers or low nutrient concentration			
3.	Reference materials e.g. carbon and nutrients		<p>✓ Ocean Carbon Capacities (Knowledge Hub)</p> <p>Key areas are the supply of reference materials, the undersampling of surface CO2 concentrations in crucial Ocean</p>	<p>✓ Synergies and cooperation are foreseeable.</p>

			<p>areas, and the need for regular audits. Concrete:</p> <p>a) DIC reference for EU (autonomy) b) New observation systems on RVs--> new data into SOCAT c) Evolution of surface ocean CO₂ observations in EU</p> <p>6 participating countries: BE,DE, NO,IR, PL, GR/LEAD NO, DE+GR</p>	
4.	Best practices and standard operating procedures			Follow-up on lessons-learned and results of the H2020 MINKE project - Metrology for Integrated Marine Management and Knowledge-Transfer Network
5.	Training: online, on land/lab, at sea			
6.	Data curation: data pathways and meta data			
7.	Quality control: primary and secondary			
8.	Accreditation: e.g. lab or process accreditation			
9.	Advocacy	✓ As intergovernmental platform for ministries of its member countries, JPI Oceans offers a direct conduit from science to policy.	✓ JPI Oceans chairs the EOOS resource forum, and in this capacity (plus AMRIT) may be a valuable partner.	✓ Hence, I am expressing the interest to connect.
10.	Pan-European cooperation e.g. parameter expert groups	✓ Pan-EU cooperation is in the core business of the JPI Oceans.	As legal entity JPI Oceans is engaging in strategic projects and initiatives and regularly hosts expert group meetings for its Joint Actions .	✓ Hence, I am expressing the interest to connect.



Research Infrastructure/Project Name: LifeWatch

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool	Not ship based equipment. However can provide services related to HPC resources, virtual machines. This is usually funded through projects and maintained through projects. Structural funds are also used. Open software is available for use.	Share HPC, data and software in projects/initiatives/with organisations	n/a
2.	Capability e.g. transient tracers or low nutrient concentration	n/a	n/a	n/a
3.	Reference materials e.g. carbon and nutrients	n/a	n/a	n/a
4.	Best practices and standard operating procedures	Best Practices for providing and using resources (data) and software linking layer from the countries platforms/labs that integrates the data and provides added value (e.g. LifeBlock, a system that federates data from multiple sources and the user can discover the data they need for their project). Develop pipelines "end-to-end" system. Federate data from countries, and international sources. Users: multiple levels of the biological organisation and ecosystem components.	Exchange BP knowledge with other RIs on How to develop research products	n/a
5.	Training: online, on land/lab, at sea	Existing training courses include for example How to use the resources in LifeWatch such as Invasive species, data management. These courses are provided on demand and select training annually for the community (196 services are provided by LifeWatch).	Exchange training knowledge with other RIs on How to use research products	n/a
6.	Data curation: data pathways and meta data	Multiple services are provided e.g. Metadata catalogue, ecoportal (semantics repository)	Sharing experience gained by the development of services dedicated on Data Management	n/a



7.	Quality control: primary and secondary	Webservices: Open software is available for use and HPC available to run the software	Exchange experiences on relevant RI Webservices on quality control	n/a
8.	Accreditation: e.g. lab or process accreditation	n/a	n/a	Considered very important to ensure high levels of quality. The ISO accreditation process is painfully long. Implementation and maintenance is very costly. Would like to find out if there are any options to help the RIs achieve accreditation at a lower costs. LifeWatch follows FAIR data policy management practices.
9.	Advocacy	n/a	n/a	Advocate for RIs where you can trust the quality of the data and research produced. Large number of scientific community are unaware about what the RIs do. Researchers often work in isolation or in small projects and do not realise what support RI services are available to them. co-design / co-developing with the research community is important to build trust. KPI of Lifebloc (based on blockchain technology) registers how much the datasets are searched/used each year.
10.	Pan-European cooperation e.g. parameter expert groups	WGs on specific themes; thematic services so information is readily available to the community	Willing to join a European RI expert group that is relevant to LifeWatch e.g. water column biology	n/a



Research Infrastructure/Project Name: Ocean Best Practices

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool			
2.	Capability e.g. transient tracers or low nutrient concentration			
3.	Reference materials e.g. carbon and nutrients			
4.	Best practices and standard operating procedures	<p>✓ 1) OBPS can provide access to qualified practices/methods (endorsement process).</p> <p>2) OBPS will help depositing practices in a repository and provide a way to have them submitted for endorsement</p>	<p>✓ OBPS can provide access to qualified practices/methods (endorsement process)</p> <p>BP can be sorted with different levels of maturity</p> <p>OBPS through IEEE can work towards standardization (harmonization) for the most mature BP</p> <p>An OP AISBL (non-profit association) has been created for listening these BP approaches, more to come</p>	
5.	Training: online, on land/lab, at sea	<p>✓ 1) OBPS is able to provide trainings presently developed within the Blue Cloud 26 EU project.</p> <p>2) Webinars are available.</p> <p>3) Courses shaped by OTGA (VLIZ) will be offered</p>	<p>✓ development of webinars and training courses</p> <p>Access to VLab (virtual lab) for eventual training within Blue Cloud 26</p>	
6.	Data curation: data pathways and meta data	<p>✓ 1) Curation is underway at OBPS for defining metadata.</p>	<p>✓ Metadata describing the OBP</p> <p>Curation of deposited BP</p>	

		2) An OPFN (Ocean Practice Federated Network) will allow for sharing the BP. Connection with IODE/ODIS underway		
7.	Quality control: primary and secondary			<ul style="list-style-type: none"> ✓ 1) Interest in quality control of practices and methods 2) Needs of experts for proceeding to the endorsement of BP 3) Input of the OBP maturity levels
8.	Accreditation: e.g. lab or process accreditation			<ul style="list-style-type: none"> ✓ 1) an OP (Ocean Practice) AISBL (non-profit association, Belgian law) is under creation (IMR, IEEE Frame, RBINS). 2) Members will be Institutes 3) The OP AISBC needs to be granted access to EU projects as a partner
9.	Advocacy			
10.	Pan-European cooperation e.g. parameter expert groups			



Research Infrastructure/Project Name: OceanOPS

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool			
2.	Capability e.g. transient tracers or low nutrient concentration			
3.	Reference materials e.g. carbon and nutrients			
4.	Best practices and standard operating procedures	<ul style="list-style-type: none"> ✓ Set and disseminate the standards and best practices of metadata harmonisation across the OCG networks. 	<ul style="list-style-type: none"> ✓ Co-author of several reports on best practices and standard operating procedures. Help OCG network in setting up best practices and standard operating procedure which are GOOS compliant. 	
5.	Training: online, on land/lab, at sea		<ul style="list-style-type: none"> ✓ Involvement of OceanOPS in in-person training workshops organised by UN (e.g. DBCP training workshop in Tunis)/ organise online training with partners (e.g. ODV data collection for BGC-ARGO) 	<ul style="list-style-type: none"> ✓ Training EuroGO-SHIP on metadata management and reporting with OceanOPS website
6.	Data curation: data pathways and meta data	<ul style="list-style-type: none"> ✓ Lead metadata standardisation and integration across the global ocean observing network. Web service for machine-to-machine metadata exchanges and access. 	<ul style="list-style-type: none"> ✓ Collaboration with EuroGOOS Task Team (TT) for metadata curation delivery of WMO ID metadata sharing (e.g. FP TT, High Frequency Radar TT, Tide Gauge TT) 	<ul style="list-style-type: none"> ✓ Encourage the community to share all their metadata with OceanOPS ✓ Engage the community to benefit from OceanOPS metadata expertise. Training with planning tool and support to operation (Ship of opportunity).



7.	Quality control: primary and secondary			<ul style="list-style-type: none"> ✓ Assist certain OCG networks in the improvement of their QC. Set-up operational data systems ✓ Monitor QC performance to trigger EuroGOSHIP improvements in that domain
8.	Accreditation: e.g. lab or process accreditation			
9.	Advocacy	<ul style="list-style-type: none"> ✓ Promote standards and best practices on instruments (installation, deployment, recovery, metadata, EEZ, etc.). Develop agreements with EuroGO-SHIP and GO-SHIP program and end users. Enhance communication to foster community understanding of engagements. Report to the stakeholders, IOC and WMO member states. Report 'system' level metrics (report card, bulletin). 		<ul style="list-style-type: none"> ✓ Better advocate for the GOOS at EU level and globally (e.g. G7 - FSOI). Better advocate for the GOOS with other international agencies (FAO, UNEP, ...). Pilot supporting third party projects to help augment networks and member states implementation
10.	Pan-European cooperation e.g. parameter expert groups	<ul style="list-style-type: none"> ✓ Encourage and support the planning of observing network implementation to enable (pan-European) synergies and opportunities. 	✓	<ul style="list-style-type: none"> ✓ Develop Pan-European partnerships & pilot projects to facilitate deployment / recovery of instruments, including with the civil society and industries (e.g. CMA-CGM, Vendee Gbse)



Research Infrastructure/Project Name: SeaDataNet

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool			
2.	Capability e.g. transient tracers or low nutrient concentration			
3.	Reference materials e.g. carbon and nutrients			
4.	Best practices and standard operating procedures			✓ Re. Data Management
5.	Training: online, on land/lab, at sea			✓ Re. Data Management
6.	Data curation: data pathways and meta data			✓ Obviously :-)
7.	Quality control: primary and secondary			✓ Yes
8.	Accreditation: e.g. lab or process accreditation			(✓)NODCs are strongly "suggested" to be certified --> experience
9.	Advocacy			✓ Yes
10.	Pan-European cooperation e.g. parameter expert groups			



Research Infrastructure/Project Name: Sustainable Blue Economy Partnership

EUROGO-SHIP SERVICES		HOW DO YOUR RI SERVICES OR INTERESTS OVERLAP WITH EUROGO-SHIP?		
		AS A PROVIDER	AS A PARTNER	AS AN EXPRESSION OF INTEREST
1.	Equipment Sharing: European Marine Equipment Pool		✓	<p>✓ Additional activities of the Partnership include: Preparing international calls for access to research infrastructures (shared by RPOs), and harmonizing marine monitoring e.g. relevant to MSFD, WFD, MSP. Carried out by agencies and RPOs + PARTNERS). Synergies can be explored to act as partner or provider.</p>
2.	Capability e.g. transient tracers or low nutrient concentration			
3.	Reference materials e.g. carbon and nutrients			
4.	Best practices and standard operating procedures			
5.	Training: online, on land/lab, at sea			<p>Among its <i>Additional Activities</i>, the Partnership develops in 2025/2026 the outline of an early-career scientist network to be implemented in its 3rd cycle. This offers the opportunity of funding alignment for students and early career professionals through dedicated capacity building. The SBEP could be also seen as Partner or Provider.</p> <p>Training actions might also be envisaged in the framework of the call for access to RIs.</p>
6.	Data curation: data pathways and meta data			

7.	Quality control: primary and secondary			
8.	Accreditation: e.g. lab or process accreditation			
9.	Advocacy			<p>✓ The Sustainable Blue Economy Partnership gathers 29 MS/AC/TCs (ministries, funding agencies, RPOs), plus the EU COM.</p> <p>It aligns R&I strategies of its member states at, regional, national and global scale (e.g. IOC, OSPAR, Helcom, UNEP-MAP, Black Sea Commission, G7 FSOI).</p> <p>With its architecture and various exchange fora, the Partnership provides for an excellent platform of science-policy advocacy.</p>
10.	Pan-European cooperation e.g. parameter expert groups		<p>✓ Among the Additional Activities, the Partnership supports the EOOS development, e.g. through a knowledge hub (Planning in 2025/2026, implementation after 2026).</p>	<p>✓ The Partnership is developing future strategies in its fields this may be relevant to the project.</p> <p>In general, the Partnership offers open co-creation engagement with potentially 29MS/AC/TCs and their 74 partners.</p> <p>Activities of SBEP are oriented toward regional, national and international partners.</p> <p>Engagement is advisable.</p>