ASSEMBLE

ASSOCIATION OF EUROPEAN MARINE BIOLOGICAL LABORATORIES EXPANDED

Acronym: ASSEMBLE Plus

Title: Association of European Marine Biological Laboratories Expanded

Grant Agreement: 730984

Deliverable [D4.3]

Framework agreement to ensure provision of funding sources and due mechanism to fund EMBRC+ into the next budget cycle/framework program

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GENERAL DATA

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Websites, patent filling, etc.	☐
Ethics	☐
Open Research Data Pilot (ORDP)	☐
Demonstrator	☐
Other	X

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Abstract

Sustainability of research infrastructures has gained a relevant position in the agenda of the European Commission. In this way, the Informal Competitiveness Council of July 2014 highlighted that long-term sustainability of RIs was a key element in the Juncker investment plan. This was illustrated by the Sustainability Survey consulted with the RI community in the framework of the update of the ESFRI Roadmap in March 2016. The outcomes form this consultation opened a policy debate to delineate the strategy and organizational/funding scaffold(s) accompanying RI operations. This resulted in a call for action published in the Commission Staff Working Document-Long-term sustainability of Research Infrastructures published in 2017.

The operability of the RIs should be directed to meet the great challenges of EU in Science and Innovation, fostering cohesive and competitive economic growth throughout all the Regions of Europe. Assemble plus has aligned with the main suggestions coming out from the survey and the policies delineated thereof.

Assemble plus through its different partners has participated in different fora, meetings, workshops and brokerage events discussing sustainability of Marine Biological Stations (MBSs). The analysis of the business model of the partner MBSs provided information to analyze the position of MBSs in the light of the evolution of funding streams, science funding policies and national RI roadmaps. Depending on a single source of funding will not be sustainable in the long run, especially true in the case of RIs that need stability for themselves and their users. A MBS considering itself a research infrastructure should have a mission built around offering services and know-how to users, at least in part. It follows that RI costs are charged to the users who need being subsidized to cover their access. The funding to provide such (trans)national access should come from different

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sources; private and public. On the other hand, RIs need to update/upgrade their installations, organise JRAs to develop key enabling technologies, and this will need of grants and/or financial instruments.

Main aspects addressed in this deliverable are centred around the following points:

.- Strengthening regional placement of MBSs

.- Growth of EMBRC: incorporation of new countries and strengthening national commitment towards EMBRC

.- Internationalisation

.- Contributing to European Strategic Priorities: Horizon Europe

.- Collaboration with other research infrastructures

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1. Introduction

In 2011 the journal Nature published a news article on the launching of the efforts to create a pan European research infrastructure of marine biological stations under the title: “Marine biology network launches into choppy waters” (Nosengo, 2011). It referred of course to EMBRC that had been incorporated into the ESFRI roadmap (the second one) in 2008 in the the cluster of Life Sciences. The subtitle of the article said like this: “Ambitious European project hopes to navigate uncertain funding future”. The paper form its title already reflected a certain disconnection with the nature of EMBRC as a research infrastructure (RI). In fact, as a RI EMBRC aimed at supporting research in the frontiers of knowledge well above the goals expected form an ephemeral networking activity. The article was published in a moment in which the creation of ERIC research infrastructures was at its beginnings (in fact the first ERIC status was awarded to SHARE in 2011, EMBRC becoming the 18th in 2018) and the way in which they were going to develop and the way the EU countries were going to react to them was unclear.

However, and even when it was not the focus of the paper, it was really choppy moments for marine stations worldwide. There were and there are problems of sustainability and access to funding streams for the activities of marine biological stations, some of them born in the 19th century and having survived well over the 100 years of live. In the year 2005 the European marine biology community was surprised to know that the Port Erin Marine Station, the marine biological station of the University of Liverpool in the Isle of Man, was being closed after more than 120 years of service to research, education and science outreach. In the year 2013 the most widely recognised marine station in the world, house to the research and training activities of more than 50 Nobel prize winners, Woods Hole Marine Biological Station in Massachusetts (USA), left behind a history of independent service to science since 1888 to become part of the University of Chicago. The driving force for this move was mainly economical. The Millport marine station (in the last years University Marine Biological Station Millport), heir of the first marine station opened in 1884 in the UK (The Ark), was closed as a research and education centre. In 2012, it was announced that it would be forced to close after the Higher Education Funding Council for England withdrew the grant of 400,000 pounds that it gave to the University of London to run the station. Millport closed as a research and higher education centre on 31 October 2013 and is now Millport Field Centre, run by the Field Studies Council. In France, the Michel-Pacha Institute for Marine Biology, attached to the Faculty of Science at the University of Lyon, conducted research in marine biology since its opening in 1900. In 2003 the control room of ANTARES, the first underwater neutrino telescope that was deployed in the

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Mediterranean Sea, took shelter in the first floor of the Michel-Pacha Institute linked to the CNRS. In 2008 following the reduction of state research funding and in the framework of the university autonomy policy, the University of Lyon stopped its research activity in the marine station and the Michel Pacha family claimed the building that was left in the hands of the University to conduct marine biology. The institute was closed. The university now, in collaboration with the University of Toulon, is involved in a project to reinitiate operations reinstalling an international marine biology program in the marine station. In summary, life in the 21st century has not been easy for many marine stations.

In this respect sustainability of RIs, both national and pan-European, gained a relevant position in the agenda of the European Commission after the publication of the second and third (2010) ESFRI roadmaps of research infrastructures. In this way, the Informal Competitiveness Council of July 2014 highlighted that long-term sustainability of RIs was a key element in the Juncker investment plan. This was illustrated by the Sustainability Survey consulted with the RI community in the framework of the update of the ESFRI Roadmap in March 2016. This consultation opened a policy debate whose outcomes to delineate the strategy and organizational/funding scaffold(s) accompanying RI operations were published in 2017 (Commission staff working document-Long-term sustainability of Research Infrastructures). The operability of the RIs should be directed to meet the great challenges of EU in Science and Innovation, fostering cohesive and competitive economic growth throughout all the Regions of Europe. Within the realm of the mission of marine biological stations as RISs Assamble plus has aligned with some of the main suggestions coming out from the survey and policy delineated thereof.

Assemble plus through its different partners and very importantly through EMBRC headquarters has participated in different fora, meetings, workshops and brokerage events discussing sustainability of Marine Biological Stations (MBSs) into the future. In this way, an analysis of the business model of the partner MBSs, as research infrastructures providing services, was carried out (Deliverable 4.2).This analysis provided information to analyze whether MBSs are sustainable given the evolution of funding streams, science funding policies and national RI roadmaps. Depending on a single source of funding will not be sustainable in the long run, especially true in the case of RIs that need stability for themselves and their users. A MBS, or EMBRC as an integration of national MBSs, is a RI; whose mission is built around **offering services and know-how to users**. It follows that RI costs are charged to the users who need being subsidized. The funding to provide such (trans)national access should come from different sources; private and public. On the other hand, RIs need to update/upgrade their installations, organise JRAs to develop key enabling technologies, and this will need of grants and/or financial instruments.

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Following the rationale mentioned above a business model (based on the EMBRC business model in the business plan of EMBRC published in 2017) can be pictured for the marine biological stations that provide research service (Figure 1). In principle, most marine biological stations are either regional or national infrastructures sustained by funding coming from national or regional administrations (or combinations of both), directly or through the Universities/Research organizations they belong to. Their activities, in research and technology transfer are mainly sustained by competitive research funding programs that can also come from Europe, the different countries or the regions were they are placed. As service providers MBSs receive users that receive funding from the same stakeholders, as long as they are made available. In some circumstances, these users come from industry and they have their own ways to cover their access expenses. The opportunities of a marine biological station to access these funding streams of course will be deeply dependent on their positioning at the different scales mentioned, their networks tec….

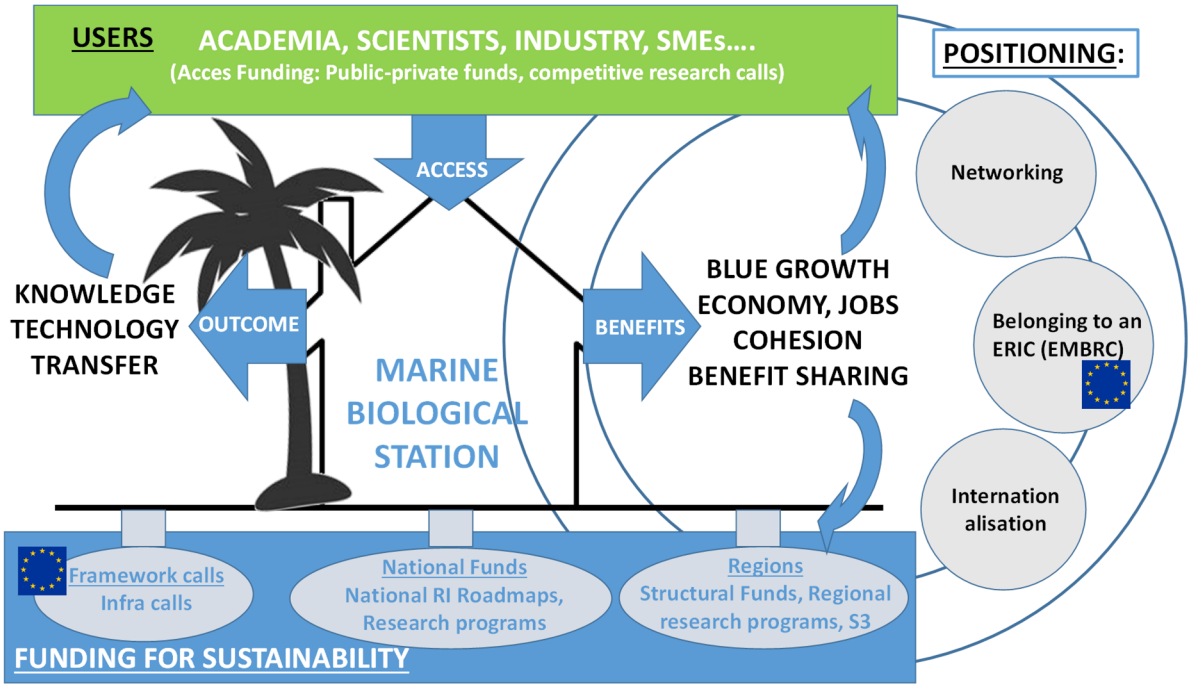

Figure 1. Simplified schematic diagram Business model of a MBSs providing research services.

Main aspects developed towards scanning the funding landscape and the strategic positioning of marine biological stations collected in this document have been the following:

.- Strengthening regional placement of MBSs

.- Growth of EMBRC. Incorporation of new countries

.- Internationalisation

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.- Contributing to European Strategic Priorities: Horizon Europe

.- Collaboration with other research infrastructures

2. Regional placement

Within the first EMBRC science strategy 2018-2022, and as observed also in the SWOT analysis of MBSs in Task 4.2 of Assemble plus, regional implementation of the service provision scheme locally was envisaged as crucial. Marine Biological stations are located in peripheral maritime regions and in this way a memorandum of understanding was signed with the Conference of Peripheral Maritime Regions during the second preparatory phase of EMBRC (2015-2017).

Different marine stations have stablished links towards their regional administrations and stakeholders creating trust to achieve Regional Innovation Ecosystems in Marine Bioeconomy. During 2019 a paper was published as a contribution of project partners EMBRC-ERIC, University of the Basque Country and Sorbonne University to Open Access Government (Gras et al., Developing research in maritime regions through innovation ecosystems. OPEN ACCESS GOVERNMENT, 204: 342-343, 2019), on the need to create Regional Innovation Ecosystems for the Blue Bioeconomy and around regionally placed research infrastructures (Marine Biological Stations). In that respect, together with the regions of the Basque Country and Brittany Assemble plus participated in the Blue Bioeconomy Forum Final Stakeholder event in Brussels in June 2019 (https://webgate.ec.europa.eu/maritimeforum/en/node/4358), that resulted in the publication of the “Blue Bioeconomy Roadmap”, requested by the European Commission (DG-MARE) and the executive Assembly of SMEs (EASME). The Roadmap was published in December 2019, incorporating the ideas defended by EMBRC-ERIC around peripheral maritime regions and regional marine biological stations during these years. The contribution of Assemble plus members, Basque Government and Brittany Regional European office was acknowledged in the text.

The project Assemble plus got involved in the presentation of the Smart Specialisation for Sustainable Blue Economy process by DG-Mare (European Commission), participating in the Brokerage Event-Focus on Blue Biotechnology that took place in Barcelona (Spain), on the 9th May 2022. In May 2021 the Communication on Sustainable Blue Economy (SBE) was adopted as integral part of the European Green Deal. DG MARE identified Smart Specialisation Strategies (S3) as a key tool to implement the Communication. S3 represent a key opportunity to prioritize regional research and innovation investments in blue economy sectors but should also lead to promote interregional partnerships and blue economy value chains across borders. In this context, DG MARE in cooperation with DG REGIO, is setting up

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the S3 thematic platform for sustainable blue economy to support these partnerships and value chains, facilitating the cooperation among blue economy 4 helix stakeholders. This includes of course academia and science, therefore involving science service providers and research infrastructures. The transition towards a sustainable blue economy by creating the necessary innovation ecosystems in Member States and Regions needs implementation of the regional S3 strategies boosting the competitiveness of blue economy sectors. Assemble plus was informed about the opportunities offered by the I3 instrument and the importance to develop blue economy interregional value chains. Matchmaking activities have been supported in order to allow networking and exchange, promote synergies between stakeholders, exchange potential partnership ideas and share best practices and lesson learned.

As in this S3 platform context there are plenty of opportunities for regionally based MBSs and RIs clustered at the pan-European level, such as EMBRC, Elena Hatziyanni (DG MARE-Unit A3, Sea-basin Strategies, Maritime Regional Cooperation & Maritime Security, European Commission) was invited to present the objectives of this platform inside the workshop "Business models and Smart Sustainability of Marine Stations" of the Assemble Plus Conference, 23th of June 2022. EMBRC has been invited to present launch the discussion of stakeholders in Blue Biotechnology in the final launching brokerage event to take place in Crete on the 25th of October, with representation finally of Assemble plus members from Greece and Italy.

MBSs have a lot to gain from such a development by DG Mare and DG Regio, that could gather stakeholders collaborating across regions and marine basins concentrating funding possibilities made available through Regional Operational programs, National Programmes, Interregional Investment Instrument projects I3, Blue Invest, European Maritime, Fisheries and Aquaculture Funds, Horizon Europe, Interreg, LIFE, EU Missions (Restore the oceans and waters) and lighthouse topics.

3. Growth of EMBRC: incorporation of new countries and strengthen involvement of member countries

An important aspect observed in the Business model analysis in Task 4.2 of Assemble plus is the need for MBSs to strengthen networking and consider the integration into a structured and wide ecosystem. A goal of the Assemble plus project as a RI Horizon 2020 project was to attract new member countries into the ERIC research infrastructure EMBRC. In particular, MBSs in 7 countries not belonging to EMBRC were incorporated into this EMBRC project. One of the aims was to initiate conversations with them to see first whether there could be any appetite for joining this pam-European RI and them help them though the process. The goal

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was to explore their possibilities to work in the way delineated by EMBRC to offer research services in marine biology within the context and the procedures set up the Assemble plus project. These countries were Finland, Germany, Ireland, The Netherlands, Poland, Slovenia and Sweden.

Taking advantage of a workshop organized in Piran (Slovenia) during the first year of the project in which the results of the SWOT analyses of Assemble plus MBSs were presented (May 2018) first contacts were stablished with Slovenian government through MIU Marine Station in Piran to explore possibilities of Slovenia to be incorporated into EMBRC-ERIC. As the project has come to its end it can be announced that EMBRC has been ranked in the priority list of research infrastructures in Slovenia, pending decisions on the institutions that will participate. NIB Piran will take a leading operational role here, and it may well be a single sited node in Slovenia, taking into account the size of the country and the role of NIB in the marine biology carried out in the country.

Finland became engaged in high level negotiations for incorporation into EMBRC. In this way, and through University of Helsinki, University of Turku, Åbo Akademi University and the Finnish Environment Institute Finland is now waiting for approval of incorporation of EMBRC. The Finnish national marine research infrastructure FINMARI is already on the national infrastructure roadmap and joining EMBRC would just be an internationalisation step into its creation. This decision is expected by the end of 2022.

The case of success during the period of life of the Assemble plus project has been that of Sweden who was very deeply engaged in the first steps towards the creation of EMBRC during its first preparatory phase. Afterwards, EMBRC failed to be incorporated into the national roadmap of research infrastructures, so Sweden did not make it into the second preparatory phase and the signing of the first memorandum of understanding for the formation of EMBRC. During 2021 and through the engagement of the marine stations of the University of Gothenburg, Kristineberg and Tjarno (partners in Assemble 2022) Sweden finally obtained recognition at national level and the country joined EMBRC in 2022 becoming the 10th country to join. Many of EMBRC-SE's institutions (University of Gothenburg, Linneus University, Swedish University of Agricultural Sciences, Swedish Meteorological and Hydrological Institute, Stockholm University, Umeå University, Uppsala University) have a long history of collaboration with European marine stations, and prior to officially joining EMBRC had been actively working with EMBRC partners. These marine stations currently implement marine innovation programmes related, for example, to sea food production. With this move, EMBRC has ensured new expertises widening its service portfolio. In this sense, and very importantly, highlight that the incorporation of Sweden provides access to the unique environments, habitats and organisms of the Baltic Sea

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No advances have been made despite different attempts, including Assemble plus missions visiting the sites on place in Ireland (second general assembly of Assemble plus organised in Galway), Poland (4th general assembly of Assemble plus planned in Gdansk but substituted for an online assembly due to COVID), Germany or the Netherlands.

Outside the countries with partner marine stations in Assemble plus the Ukraine, before the war started, also showed interest in receiving information on EMBRC and eventually consider the possibility of joining. EMBRC headquarters participates in the project DOORS (Developing an Optimal and Open Research Support system to unlock the potential for blue growth in the Black Sea) whose general assembly took place in Bulgaria in June 2022. EMBRC participates in the promotion of stakeholder dialogue and co-design towards sustainable and effective support to the Black Sea research and innovation partnerships through the implementation of the Black Sea Research and Innovation Agenda (SRIA). General assembly in June allowed connections with Danubius and a great potential for what to do in the Black Sea region for involving all the ERICs with the eastern countries. Ukraine was largely discussed with deep interest in preparing for after the war situation.

The prospects of growth are good in EMBRC and new member countries are welcome if they provide extra services, research potential access to regional seas not covered to the infrastructure. This is important for operators in member countries as it helps them to show in front of their national funding bodies the relevance of belonging to a selected club attractive not only for users but also for other countries showing willingness to join. In this way, and as the Assemble plus project reaches its end in 2022, coincides with the end of the first 5 year budgetary cycle and country engagement with EMBRC. Countries have to confirm their engagement into the new budgetary cycle and operators in national nodes have been busy in securing this engagement and strengthening their nodes. In this way, different nodes like Norway, Italy and Spain have incorporated new operators. It can be confirmed that all countries with the exception of UK (for reasons partly linked to the situation generated by the Brexit) have agreed to continue into the next budgetary cycle.

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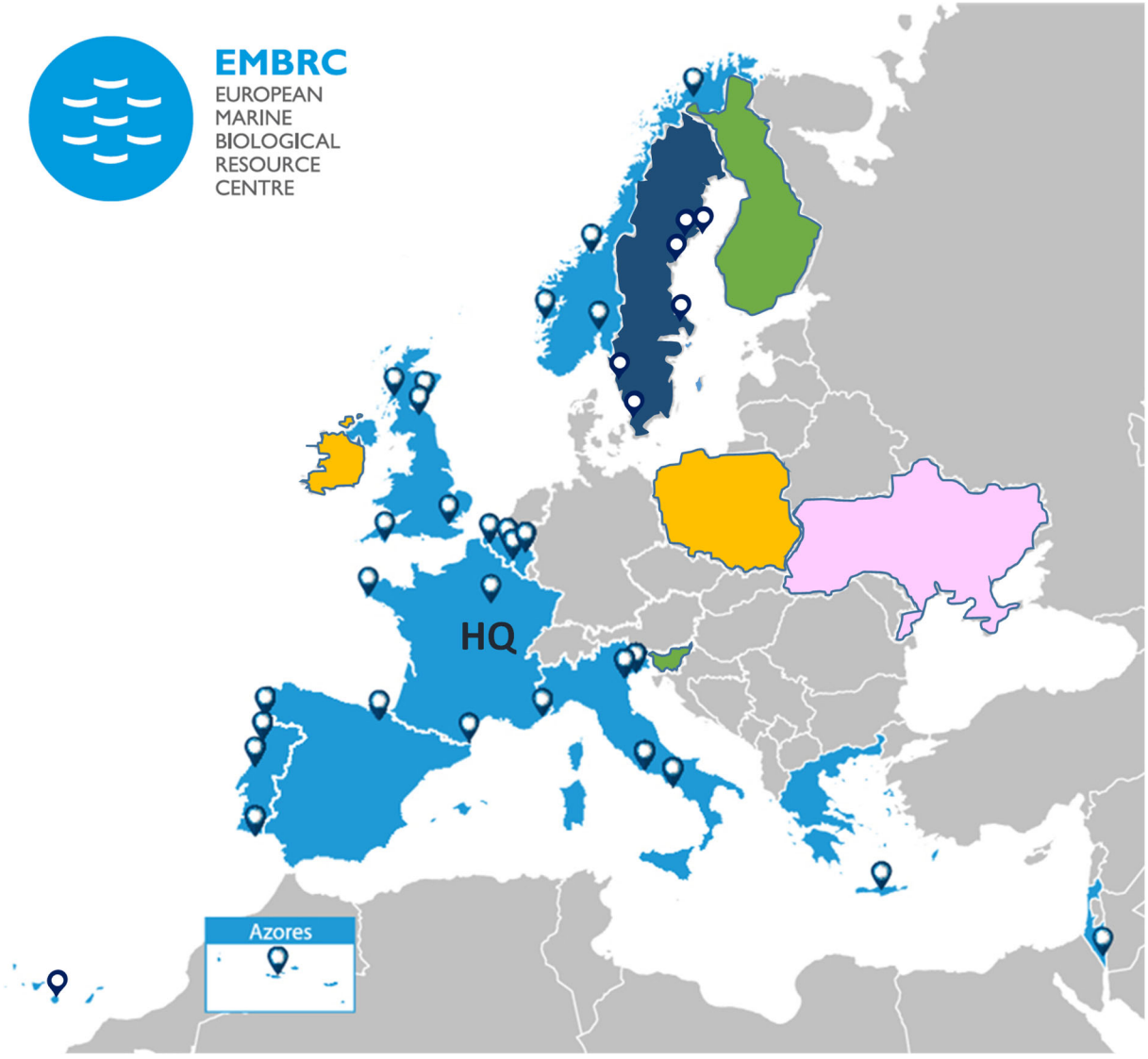

Figure 2: Map of EMBRC partner members (in blue) and operators. Sweeden as new signing country appears in dark blue. There are prospects for incorporation of Finland and Slovenia (green) in the near future, while attempts in Ireland and Poland (Orange) have failed. Ukraine (pink), showed willingness to participate in EMBRC in the future before the war started.

4. Contributing to European Strategic Priorities: Horizon Europe

Purely supporting fundamental research is no longer considered sufficient for the European research infrastructures. Under Horizon Europe, one of the strategic drivers is that of the Green Deal, for economic growth and sustainable development and resource exploitation. There is also a commitment to address Europe's biodiversity decline with the Biodiversity Strategy for

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2030. In accordance with these strategies, MBSs need to be able to convincingly demonstrate how they contribute to regional, national and Europe's societal challenges, in particular those related to Environment, Food, and Health. The Horizon Europe Missions are also of high importance. In particular, Mission Starfish (Restore our Ocean and Waters) needs to be taken into consideration.

Being able to demonstrate the contribution of MBS to national and European policies and priorities will also allow them strengthening the European Research Area as demonstrators and implementers of best practices in Open and FAIR Data, promoting international cooperation, improving access to excellence, and supporting research and innovation ecosystems to improve excellence and competitiveness. The culmination of these activities will ensure that MBSs will be a strategic partner for the delivery of marine related policies and solutions to the challenges society faces today.

MBSs will contribute to European strategic priorities very importantly by implementing research services that can be widely used by the scientific community. MBSs need to rethink the way services are organized and presented. Services need to evolve from a simple catalogue of equipment and facilities to more advanced and sophisticated services (problem solving driven) to be more intuitive and user friendly and better suited to be presented to the new Horizon Europe oriented projects. In this sense, MBSs in EMBRC are already participating in Horizon Europe projects with new sets of services provided: ISIDORe, CanServ, AgroServ, Imagine. EMBRC, about to initiate its second five-year period with its new Strategic plan 2023-2027 is working towards evolving services and a new portfolio of services.

ISIDORe (HORIZON-INFRA-2021-EMERGENCY-02): This consortium of RIs proposes to assemble the largest and most diverse research and service providing instrument to study infectious diseases in Europe, from structural biology to clinical trials. Giving scientists access to cutting edge services in an integrated way and with a common goal, will enable or accelerate the generation of new knowledge and tools to ultimately help control SARS CoV 2 and epidemic prone pathogens while avoiding fragmentation and duplication among European initiatives. EMBRC will provide access to: i) metabolically unique organisms and collections that have vast and undocumented molecular diversity, ii) screening approaches in environmental samples, water sediment, filter feeders used for human consumption, and iii) screening capabilities for developing and testing alternative vaccine adjuvants.

CanServ (HORIZON-INFRA-2021-SERV-01). Leader BBMRI-ERIC. The mission of the canSERVs project is to make cutting-edge and customised research services available to the cancer research community EU wide, enable innovative R&D projects and foster precision medicine for patients benefit across Europe. CanServ will connect, coordinate, and align existing oncology and complimentary RIs providing services in a synergistic way transnationally.

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AgroServ (HORIZON-INFRA-2021-SERV-01). Leader AnaEE-ERIC. AgroServ supports research and innovation by providing customised and integrated research infrastructure services in all fields related to this challenge, spanning from molecular to organism, to ecosystem, to communities and society. It takes place in line with the One-Health approach, with particular regard to threats and risks on agroecosystems and to enhance new agro-ecological practices and their socio-economic benefits.

Imagine (HORIZON-INFRA-2021-SERV-01). Leader EMBL. Next generation imaging technologies to probe structure and function of biological specimen across scales in their natural context. The consortium will develop novel imaging technologies that would empower research infrastructures to provide new services, bringing together structural and functional analysis of biological systems in their natural context.

MBSs need to explore further their data and bioinformatics capabilities. Here networking or belonging to a European RI could be vital as through pooling resources a centralised organisation can act as a central hub linking datasets, tools, capabilities, analytical platforms, and their ultimate deployment into societal challenges. Creating centralised services, connected into a "pipeline", could also create services that are greater than the sum of the parts. Setting up such services will require an increased level of cooperation amongst MBSs partners as well as agreeing on standard operating procedures, to ensure robust, reliable, and reproducible results. In this sense, EMBRC is already working on the very recently awarded Horizon Europe projects BlueRemediomics and MarcoBolo. In BlueRemediomics EMBRC works together with the EMBL and the Tara Oceans Foundation towards the development of a microbiome health index. In MarcoBolo, a project coordinated by EMBRC, the objective is to create more capacity and stakeholder interest in biodiversity data and monitoring. There will be no new data generation, but mining of existing data, creating indicators and exchange with policy makers, bridges with MBON programs and other EU funded projects. Another project has kicked off in September 2022 on the EOSC dimension with the CNRS as leader and EMBRC as partner among other 24. This RIA project is called FAIR-EASE "FAIR EArth Sciences & Environment services" and has the ambitious objective of overcoming the data fragmentation by developing and operating distributed and integrated services for the observation and modelling of the earth system, environment and biodiversity.

5. Internationalisation

MBSs alone or in association have the potential to link up with a number of organisations outside of Europe, representing European research capabilities, demonstration abilities, and ensuring European participation in global research. International engagement is important to

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increase the number of non-European researchers using our research facilities integrating European research capabilities beyond the continent.

With the UN Decade of the Ocean, MBSs must capitalise on the spotlight on the sea and use the Decade to forge collaborations internationally. EMBRC has become involved in three UN Decade Programmes: OBON (Ocean-Biomolecular-Observing-Network), Marine Life 2030, and Ocean Practices for the Decade. In the context of OBON, EMBRC was invited to submit EMO-BON for official endorsement as a UN Decade Project. These three programmes will constitute important opportunities to project the abilities of MBSs, and open opportunities to be involved with research globally, whilst also gaining visibility in the policy sphere.

> **EMO-BON**: European Marine Omics Biodiversity Observation Network is an EMBRC project launched in summer 2021 that aims to enhance the European contribution to global genomic observation efforts. As such, EMO BON will fill current gaps in biological observation, while offering insights into the genetic composition of marine biodiversity. Its primary aim is to ensure steady, continuous generation of 'baseline' data on biodiversity at 16 EMBRC sites following FAIR (Findable, Accessible, Interoperable, and Reusable) data principles. EMO BON will ultimately provide Europe with a means to monitor and understand its marine biodiversity. This in turn will facilitate the development of new products and services for society. This is an activity directly spinning-off from Assemble plus Joint Research Activity 1.

In terms of bilateral relations outside of Europe, South Africa and Australia have RI roadmaps similar to the ones produced in Europe. EMBRC has had discussions with the South African Environmental Observation Network (SAEON) and the University of Western Cape to collaborate towards shared protocols for genomic observation and integrated service pipelines for bioprospecting. The Australian Integrated Marine Observation System (IMOS) have also shown interest in the sharing of protocols and standards in genomic observation. In Japan, there has been interest in collaborating on marine model organisms from Shimoda Marine Station. In Latin America, there has been much enthusiasm about working together, and the member of the general assembly of EMBRC Inmaculada Figueroa leads the project RESINFRA-EU-LAC.

EMBRC has had contact with the Marine Biodiversity Observation Network (MBON, part of GEO BON). This group of marine biologists with a focus on biodiversity is dominated by American researchers so it provides opportunities to launch collaborative ties with the USA. EMBRC has also been contacted and the Partnership for Observation of the Global Ocean (POGO) which both work in the observation space, globally. The interest within these organisations is to collaborate on shared protocols, best practices, data and metadata

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standards and working to ensure that EMBRC research and observation can work as contributions to global One-health monitoring.

European RIs, have also a capacity to contribute to sharing benefits with countries at a more global "corporate" scale, for example in the context of the use of biological resources. International cooperation and multilateralism are currently being discussed within the Convention on Biological Diversity in the debate on benefit-sharing for the utilisation of Digital Sequence Information and in the High Seas future treaty. The scientific community is asked to give evidence on how capacity-building and international cooperation in research contribute effectively to the global benefit-sharing mechanism. RIs and EMBRC should be part in building a new paradigm that de-individualise the benefit-sharing for the utilization of biological resources in research whilst guaranteeing a fair and equitable contribution in the new international open science system. As a supplier of marine biological resources from dozens of countries, MBSs are well positioned to be part of these mechanisms, positioning EMBRC as a central and trusted partner in accessing biodiversity for research purposes from across the globe. In this context, EMBRC is implementing his best practices to comply with Access and Benefit Sharing. It is however important to be consistent with scientific practices emerging from the Open Science and FAIR movement. With the FAIR and CARE Strategy, EMBRC offers to adopt a more holistic approach to how EMBRC embeds the OpenScience requirements in its stewardship of biological resources and data. This strategy encompasses FAIRification of bioresources and data (including traceability issues to help comply with ABS), CARE principles to ensure compliance, fairness, benefit-sharing but also that any indigenous people rights are taken into account. The strategy covers sampling, collections, stewardship of bioresources and data, interoperability, transfer of material and data, and traceability and aims to create a solid and dynamic framework in EMBRC with joint objectives from the ERIC to its nodes and their operators, in a coordinated way. Adopting the rationale to launch the policy will secure the operational base of EMBRC and its standards and methods together with enhancing its positioning on Open Science.

Finally, call the attention on the participation of EMBRC through its HQ and the Portuguese partner CCMAR in the project RI-VIS where two regional communications guidelines documents prepared following international symposia conducted between Europe and Africa, and Europe and Latin America have been published on Zenodo:

.- Communication guidelines for European research infrastructures: engaging with stakeholders in Latin America

.- Communication guidelines for European research infrastructures: engaging with stakeholders in African countries

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These documents have been developed with the input of more than 20 regional stakeholders, predominantly researchers in academia, as well as policy and industry stakeholders. The guidelines were structured as step-by-step guides to developing a regional communications strategy with the aim to provide tips and guidelines to European research infrastructure stakeholders, particularly communications officers/managers. Both documents try to provide specific guidance on how best to develop context-appropriate, effective communication in each region. The general findings published here can be useful for the development of RI internationalisation strategies; as such, the documents may be useful to additional MBS stakeholders including MBS directors, access officers, and others.

6. Collaboration with other research infrastructures

MoUs with other scientific players and infrastructures. As a RI, EMBRC works to connect initiatives, projects, and communities across marine biological science, strengthening the community as a whole and creating new opportunities for excellent science. Given the rich diversity of marine life, marine biology has potential to advance many aspects of biology. In this respect, MBSs need to stablish relationships with other domains and disciplines of science.

An excellent example of this commitment is the MoU EMBRC signed with EMBL in 2021. Beyond facilitating joint activities between the European Molecular Biology Laboratory (EMBL) and EMBRC's partner scientists, the collaboration agreement will facilitate EMBL's access to marine biodiversity, sampling facilities and techniques, and experimental facilities for its field campaigns. EMBRC is supporting the new Planetary Biology traversal theme within the new five years research Programme of EMBL "Molecules to Ecosystems 2022-2026". An important part of this theme is EMBRC´s flagship project TREC (Traversing European Coastlines), a European-wide sampling expedition. This expedition will sample biodiversity, substrates, and soils from subtidal to in-land. EMBRC has helped EMBL plan their expedition and give them some insights to how marine stations work, what is feasible and what their expectations should be. As MBSs we will supporting their work, offering them access to services and supporting their field work. There is a full expectation that any service that EMBL scientists use will be treated in the context of transnational access schemes with the application of unit costs.

The organisations concerned in regard to EMBRC MBS are to visit the following places (46 STOPS in total and 9 SUPER STOPS) in 2023; Roscoff (Super STOP), Oostende, Kristineberg (Super Site), Bergen, Aberdeen, Bilbao (to be defined if it could be a Super STOP), Vigo, Porto (it could be an alternative super STOP to Bilbao) and the following ones in 2024; Banyuls, Villefranche, Naples (Super STOP), Messina, Lesina, Trieste. Additional (not EMBRC) Assemble plus sites to be visited are Galway and Sopot.

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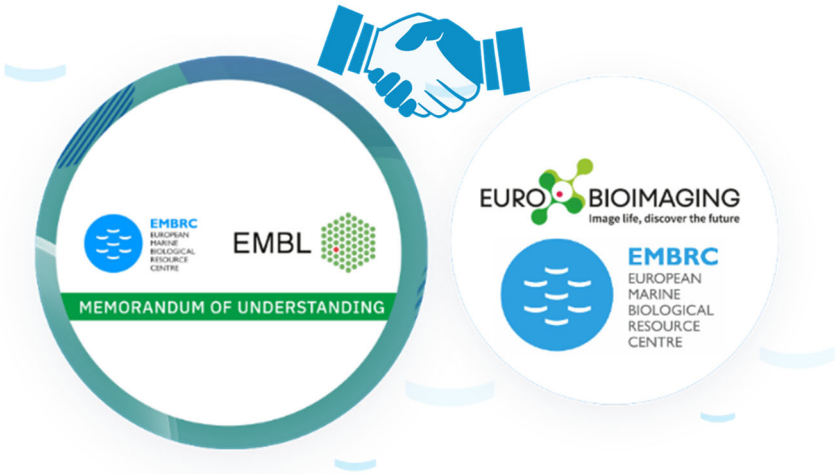
This will provide wonderful opportunities for collaborations between researchers in MBSs and EMBL, for plug in projects, to align sampling sites with existent Time Series, to set up new TREC time series, for training talks & workshops, for public engagement and for widening the service provision prospects of marine biological stations.

The EMBRC and Euro-BioImaging also signed a collaboration agreement on 14 May 2020 to enhance communication about their respective services, to promote the development of joint services, and to encourage best-practice sharing and staff exchanges. The collaboration agreement will focus on facilitating access to marine model organisms and encouraging the use of advanced microscopy techniques in their study. In 2022 there has been already a project awarded coming from this collaboration (EC call HORIZON-INFRA-2022-TECH-01-01: "R&D for the next generation of scientific instrumentation, tools and methods") entitled IMAGINE/IMAGINEXT: Next generation imaging technologies to probe structure and function of biological specimen across scales in their natural context, where different MBSs of Assemble plus are partners.



EMBRC also became more involved with the EuroMarine network in 2021. EuroMarine is a member-based, interdisciplinary, collaborative network of European marine organisations and research institutes. In this context EMBRC and Euromarine launched a joint call for transnational access projects. Through this call, over €52,000 worth of EMBRC research services have been awarded to 11 successful applicants. The recipients are all early career researchers belonging to EuroMarine member organisations.

Each of the successful applicants was deemed to have submitted a proposal demonstrating intrinsic scientific value, novelty and relevance to the general scientific strategy of EuroMarine, as outlined in the EuroMarine Ocean Frontiers for Sustainable Development manifesto.

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EMBRC has also participated in the ERIC-Forum (formed in 2017) project that kicked off in 2019 to bring together the ERIC community with the aim of strengthening its coordination, advancing ERICs' operations, collectively responding to common challenges, and effectively interacting with the European Commission and key stakeholders. The Forum has also strategically contributed to the development of ERIC related policies, providing a common policy voice for ERIC infrastructures in Europe. The Forum has produced several policy briefs (eg. on funding models for access to research infrastructures), and position papers (eg, on Key Performance Indicators, Horizon Europe mission areas, EOSC and more) also serving as a foundation for the development of relevant guidance documents, trainings and best practices to support ERICs in the preparatory phase and established ERICs alike.

In some countries, trials have been made to mimic the ERIC-Forum strategy at the national level bringing together the national nodes of the different ERIC research infrastructures. That has been the case of the initiative in Spain. The Spanish operators of EMBRC launched a process to gather the national ERICS around a short of Spanish ERIC-Forum and the first activity took the shape of an online workshop that was organised on June 2021 under the umbrella of the Spanish Ministry of Research and Science.

7. Conclusions

MBSs are research infrastructure often offering basic research services for environmental monitoring and biodiversity conservation but also many times conducting research in the frontiers of science and participating in the major breakthroughs in biological research. Research in MBBs has tried since its beginning in the 19th century to answer the major challenges of our societies, and now some of such challenges can only be tackled through collaborative research and participation in regional, European and global research networks. Examples of such efforts are the struggle to understand and sustainably utilise the marine biodiversity and its genetic resources and the efforts to mitigate the deleterious effects of global change. The same can be said about the global need for new biobased products that could ensure food and health supply for our societies globally. Still, MBSs are placed in the periphery of major decision taking places outside the large scientific and industrial hubs in Europe.

MBSs, as research infrastructures are not mere research centres conducting their own research mission or that of their in-house researchers. They also offer state of the art services for users outside their organisations who through their research and development projects address the different issues towards a better and sustainable progress. This has to be done necessarily in close contact with local and regional stakeholders, helping to transfer the technologies developed in the marine laboratories into goods and services for local societies. In this context, the MBSs have to be aware of the regional smart specialisation strategies and

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work as catalysers in the creation of regional blue innovation ecosystems contributing to growth in a coordinated way. The S3 innovation platform for a Blue economy about to be launched by DG-Mare and DG-Regio is a good opportunity towards sustainability and transregional collaboration. MBSs and EMBRC collaborating with stakeholders across regions and marine basins should work towards concentrating funding possibilities made available through Regional Operational programs, National Programmes, Interregional Investment Instrument projects I3, Blue Invest, European Maritime, Fisheries and Aquaculture Funds, Horizon Europe, Interreg, LIFE and EU Missions and lighthouse topics

Best way for MBSs to be transregionally tuned is to participate in pan-european structures and EMBRC-ERIC is such stable structure above the ephemeral networking activities possible through other forms of organisations. In this way, the incorporation of Sweden to EMBRC by means of the marine stations of different Universities in the country during 2022 is the example showing the way forward for other countries that have initiated the process of joining, such as Finland and Slovenia. A strong EMBRC-ERIC has the possibility to put the Oceans and marine biological resources in the centre of discussions on funding allocation for scientific activities in Europe. For this purpose, EMBRC-ERIC needs to be strategically positioned and tuned with the activities of other sister research infrastructures such as Elixir, EU-Openscreen, Life-watch EMBL, Euro-Bioimaging etc in the intersection between life and health infrastructures and environmental ones. EMBRC (and its MBSs) need to take care on yet another aspect, and this her catalogue of services. Services have to be presented in a way in which they can be best visualised for users conducting research focused on the big societal challenges drawn Europe's societal challenges, in particular those related to Environment, Food, and Health. Among other things this will open opportunities to be integrated in most of the calls for projects launched at the European level to support the strengthen the European Science Area towards tackling the European societal challenges.

Internationally, and very clearly taken advantage of the UN decade for Ocean Research, MBSs need to be well interconnected globally. This is another service that EMBRC as a pan-european RI, with its own voice and prominence, can pay to MBSs. In this respect, EMBRC has already began to collaborate internationally with different stakeholders and organisations towards the sharing of protocols and data for augmented biodiversity observatories. This collaborations should surely fructify in the near future towards more substantial collaborations across continents and oceans in share research projects, development of international policies and shared activities and modes of action.

With these actions in mind we think that the prospect for MBSs into the future are bright and that they will not be any longer navigating choppy waters.

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