EMSO ERIC SERVICES

As of November 2024

Observing the Ocean to Save the Earth

EMSO ERIC

European Multidisciplinary Seafloor and water-column Observatory
European Research Infrastructure Consortium

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1. INTRODUCTION

To address global ocean environmental challenges that affect the Earth system, a key aspect is the implementation of an integrated approach of ocean observation, meaning: i) integrating various observation systems as the European Ocean Observation System (EOO) is advocating for, and ii) integrating marine research fields in its observing strategy for an environmental approach.

The EMSO marine infrastructure is focusing on the observation of the open ocean, beyond the continent shelf to explore the seabed the water column and is operating in 14 fixed marine regions, which is making it unique.

EMSO ERIC is dedicated to observe the same points and areas on the long term as necessary to improve understanding impacts of the climate change and to disentangle the various variability signals acting from (sub-)mesoscale (eddies, fronts, meanders) to regional ones and from tens of days to decades. Thanks to the seabed part of its infrastructure it also operates observations for the study and monitoring of geophysics phenomenon such as earthquakes and the generated tsunamis in several areas.

The main initial challenge to address these questions, as an infrastructure distributed over eleven deep regional sites plus three shallow water test sites, stands firstly in the sustainability of the operation at all sites, under the umbrella of a community vision, i.e. with a common scientific and technological strategy. Indeed, because of the quantity and of the diversity in the 125 parameters acquired in our hostile (because deep, high pressure and corrosive) marine environment, the implementation phase of EMSO ERIC had to firstly address the pre-existing heterogeneity of the scientific and sampling strategy and of the consequent unharmonised operating of the measuring systems. This constitutes the basement of EMSO ERIC: the operation of measurement systems and platforms under the leadership of the associated indispensable scientific and technological expertise.

After these considerations, we can state the Primary services of EMSO, or the so-called Upstream Services of EMSO, necessary to develop and operate Downstream Services addressing the stakeholders' benefit:

- the Federated Observational Service for Data Generation with the 14 regional facilities
- the Support and expertise service
- the Service for fundraising and project management

The Upstream Services enable the Downstream Services that are accessible to the user community:

- the Physical Access Service: offering access to the hardware part of EMSO for any user
- the Service for the federation of harmonised Data flows to funnel the data from the various observatories towards the EU data aggregators (EMODNET, CMEMS, Blue Cloud)
- the Data access service, to discover and retrieve the data
- the Service for Data Storage and computational resources
- the EMSO Academy: a service for capacity building and training
- and the Public Engagement and Outreach Service

Each service is described here after along these two categories: Upstream and Downstream Services. They are not all necessarily running with the same readiness level of operations as some of them are

more recent. In the medium term, EMSO ERIC will develop thematic services aligned with EU priorities and institutional scientific priorities, of which one service that will contribute to the study of the impacts of climate change. As the community of EMSO ERIC identified the most urgent scientific questions and needs, efforts and actions will be oriented to support the achievement of new knowledge and to lay the groundwork for the expansion of the service portfolio. EMSO reference community converged round the following scientific objectives recognised as urgent:

- Understand the distribution and behavior of different invasive species in the European Seas, especially in the Mediterranean;
- Understand ecosystem characteristics in sites (e.g., the Black Sea);
- Understand the interaction between geosphere and hydrosphere in the context of the marine geo-hazards;
- Investigate the ocean noise on a broader frequency range to discriminate the sources and assess the impact of anthropic noise on marine life.

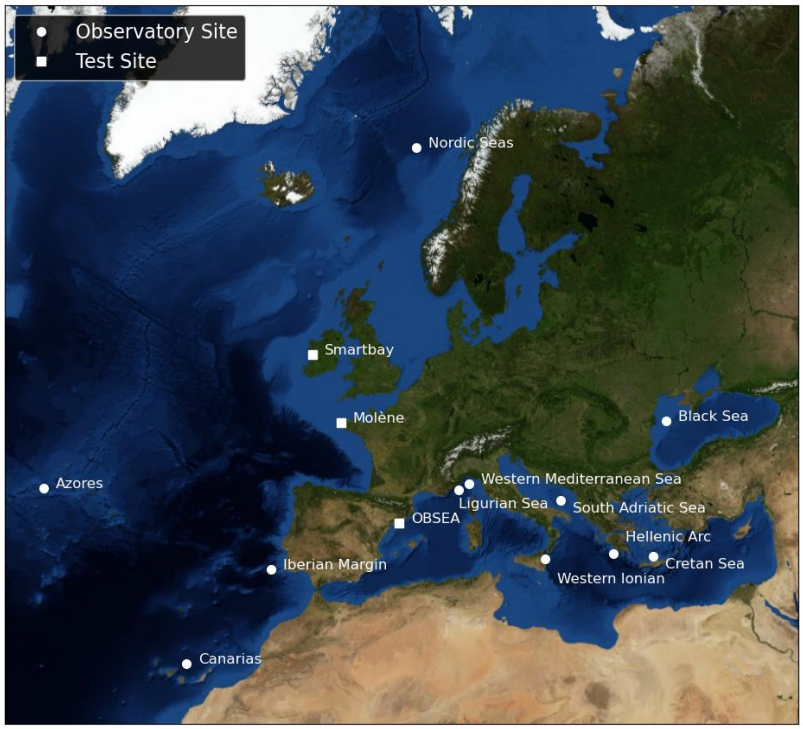
2. UPSTREAM SERVICES

The upstream services are the primary services of EMSO and constitute the backbone of the research infrastructure. They ensure the mission of EMSO and

2.1. FEDERATED OBSERVATIONAL SERVICE FOR DATA GENERATION

Federated Observational Service for Data Generation	**Contact:** EMSO Director General Ingrid Puillat Email: Ingrid.puillat@emso-eu.org
Type of resources: observing platforms (including data transmission) **Category**: Upstream **Targeted users**: Academy, private sector (SMEs, industry), citizens, policymakers, others **Current Status:** EMSO rely upon the operation of 11 observing Regional Facilities, including 19 deeps sites, and of 3 shallow water test sites for a total of 14 data acquisition platforms.	
Key features: - Acquisition of about 128 in situ observation marine variables by fixed platform in deep and open ocean of the European (See list of variables in Annex 1); - Accessible observations, data and information come from 19 deep sea sites, of which 5 in the Nordic Seas Regional Facility, 3 in the South Adriatic, 4 in the Ligurian, 4 in the Ionian basin, 1 in the Black Sea, 2 in the north-east Atlantic. - Four deep sea platforms are cabled to shore (Ligurian Ouest, Nice, Western Ionian Sea, Hellenic Arc)	
Short Description EMSO observation distribute infrastructure is composed of a platforms hosting large variety of sensors and auxiliary instruments that measure a wide range of observables. Aside from established sensors, EMSO is innovating regarding its sensing capabilities, notably introducing AI technologies for operational biology using images and sound.	

EMSO Ligurian Sea
EMSO Western Ionian Sea
EMSO Azores
EMSO Iberian Margin
Mòlene
EMSO Canarias
EMSO Hellenic Arc
EMSO Black Sea
EMSO South Adriatic Sea
EMSO Cretan Sea
EMSO Nordic Sea
EMSO Smart Bay
OBSEA
EMSO Mediterranean Sea

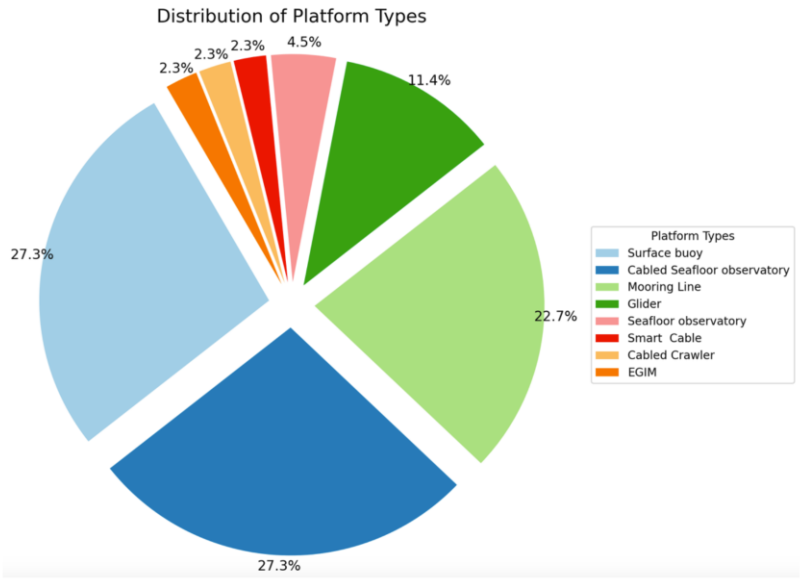


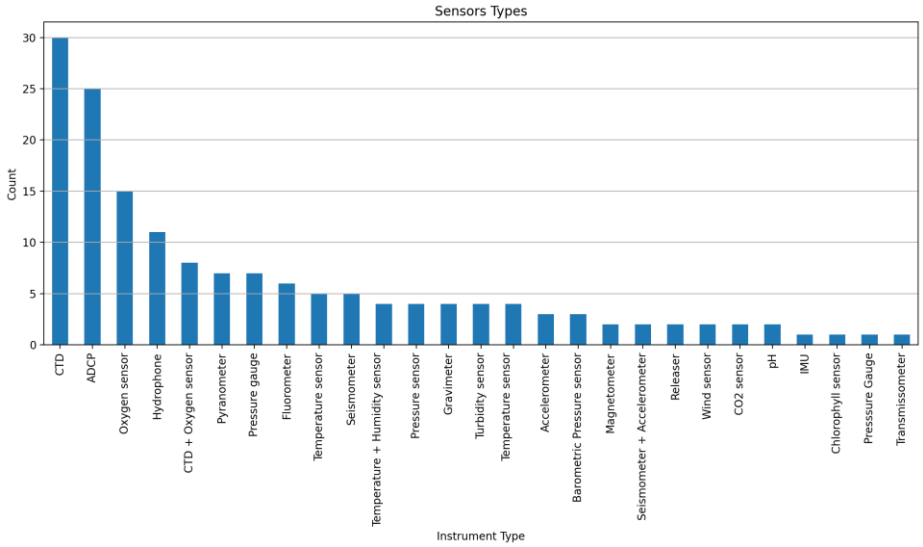
Sensors are usually mounted on platforms that provide power to the sensors, remote logging by the operator and data transmission. The platforms can have various features mostly depending on the site and on the target part of the ocean.
The main categories of platforms operating in EMSO measure the geosphere-hydrosphere interaction and consist of i) seafloor multiparameter monitoring stations and landers; ii) mooring lines, moored profilers for the water column monitoring; and surface buoys for the air-sea interaction and data transmission.
Innovative platforms recently introduced the Smart Cable and Cabled Crawler.

List of sensors operating on EMSO platform

- Accelerometer - IMU
- Magnetometer
- Seismometer
- Gravimeter
- Pressure Gauge
- CTD - Conductivity + Temperature + Depth
- Temperature
- ADCP - Acoustic Doppler Current Profiler
- AWAC - Acoustic Wave and Current profiler
- Oxygen
- pH
- CO2
- Chlorophyll
- Fluorometer
- Turbidity
- Hydrophone
- Camera

- CytoSub
- Weather Station
- Wind
- Humidity
- Pyranometer
- Transmissometer



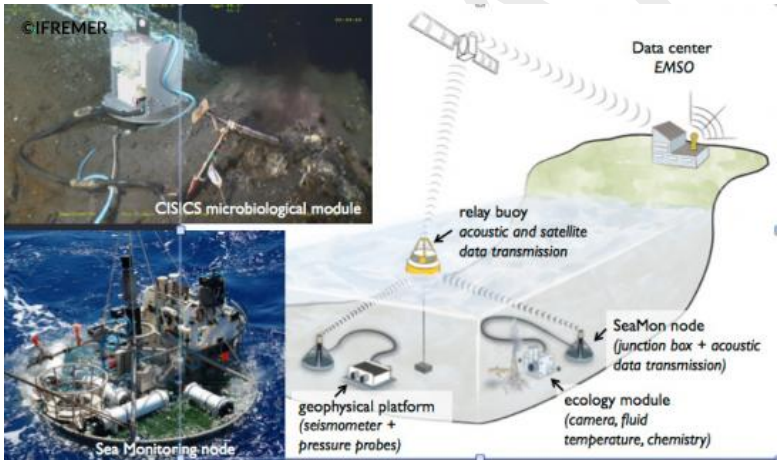


The distribution of sensors and platforms in the consortium is showed in the pie diagram.

Engaging initiatives and Impacts: Downstream services

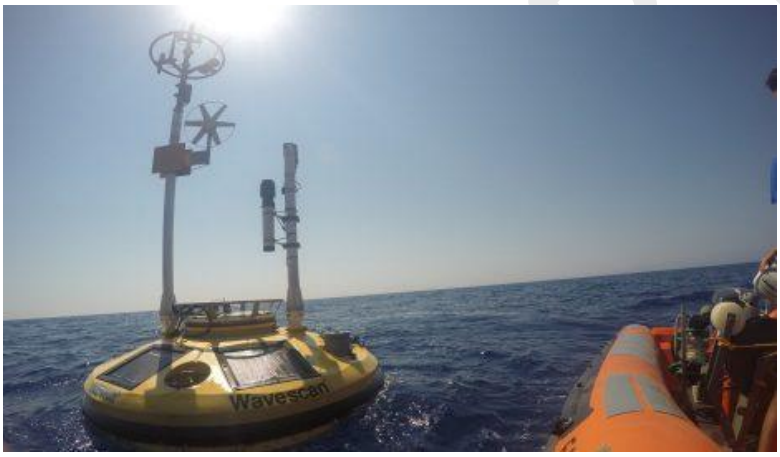
Next steps: revision of the design to progress on the regional scale variability of the marine environment.

2.2. REGIONAL FACILITIES: TYPES, DISTRIBUTION, AND CONTRIBUTION TO UPSTREAM SERVICES

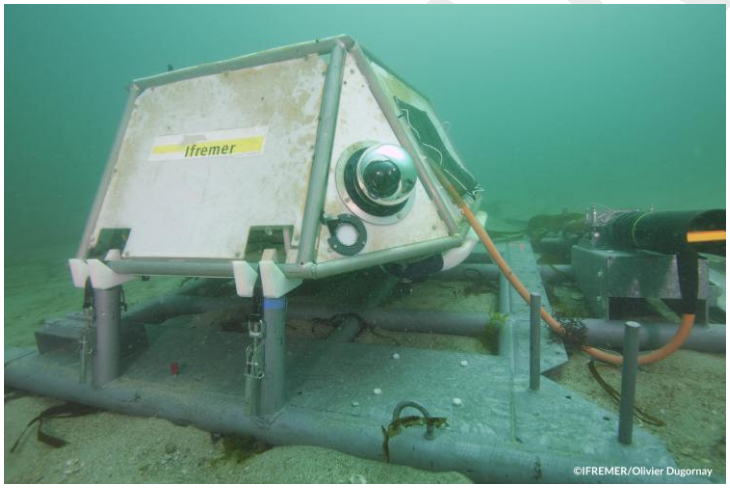
EMSO Azores	**Operated by:** Institut Français de Recherché Pour l'Exploitation de La Mer (Ifremer), Centre National de la Recherche Scientifique (CNRS), France
Resource Type	Seafloor observation platforms, autonomous
Location	Mid-Atlantic ridge near Azores, (200 NM distance from land, max water depth 1700 m)
Upstream Services	Operation of multiparameter measurements systems at seafloor and near-real time data communications to shore station
Short Description	 The current observatory setup has been operated since 2010. It is composed of two seafloor nodes with connected instruments for sea monitoring (SeaMon), and of a transmission buoy that communicates acoustically with the seafloor stations and relays data (detection of seismic events, pressure at seafloor, video snapshots of hydrothermal fauna, turbidity, fluid temperature and chemistry, system status) via satellite every six hours to the EMSO data centre hosted at Ifremer in Brest, France

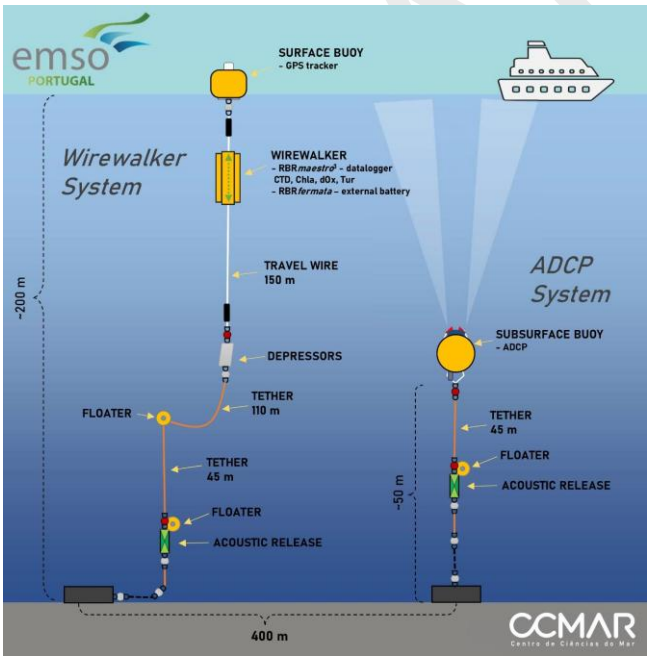
EMSO Black Sea	**Operated by**: Institutul National de Cercetare – Dezvoltare pentru Geologie si Geoecologie Marina (GeoEcoMar), Romania
Resource Type	Moored observation platforms, autonomous
Location	Black Sea (Three sites, distance from land: 97NM, Max water depth 95 m)
Upstream Services	Operation of multiparameter measurements systems along the water column.
Short Description	 The newly established Black Sea Security System – EUXINUS, the result of the MARINEGEOHAZARD project, is a cross-border Romanian–Bulgarian cooperation and was developed as a solution for long-term environmental monitoring and for the prevention/mitigation of the marine geohazards (e.g., earthquakes, active faults, and submarine landslide) which affect the entire Black Sea coastal area. The system, unique in the Black Sea area, can collect long-term real-time data for several key environmental parameters in the fields of the physical oceanography and geosciences (e.g., CTD, water current, water pressure, etc.). The system consists of three offshore moored platforms, each including underwater modules moored 160 km from the Romanian Black Sea coast at about 90 m water depth.

EMSO Canarias	**Operated by:** Plataforma Oceanica de Canarias (PLOCAN), Spain
Resource Type	Moored observation platforms and surface buoys, autonomous
Location	Atlantic Ocean nearby Canary Islands (distance from land 60.5 NM, max water depth: 3630 m)
Upstream Services	Operation of multiparameter measurements systems along the water column.
Short Description	 Surface buoy and mooring (ESTOC) are used for monitoring several meteorological and oceanographic parameters and investigate long-term changes of stratification and circulation on seasonal and inter-annual times scales of the subtropical Central-Eastern waters of the Atlantic Ocean. Disciplines: physical oceanography, biogeochemistry, underwater sound. It is part of PLOCAN, the Oceanic Platform of the Canary Islands.

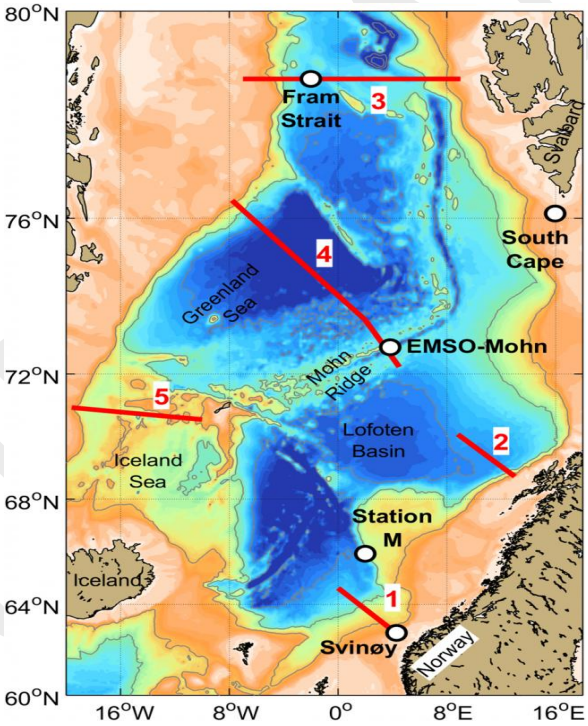
EMSO Cretan Sea	**Operated by:** Hellenic Centre for Marine Research (HCMR), Greece
Resource Type	Moored observation platforms and surface buoys, autonomous
Location	Mediterranean Sea, Hellenic Arc (distance from land 24 NM, max water depth 1400 m)
Upstream Services	Operation of multiparameter measurements systems along the water column, surface buys for air-sea interactions
Short Description	 The E1-M3A marine platform is a pioneer station, the first open-ocean buoy in the Mediterranean deployed in January 2000 and currently part of the POSEIDON network since 2007. The Poseidon system operates a network of fixed measuring floats, which are moored at various locations in the Aegean and Ionian seas delivering near-real-time observations on important marine and atmospheric parameters. The oceanographic buoys constitute the backbone of the POSEIDON system and they are linked to both global and regional networks such as the OceanSITES and M3A's respectively. In particular the POSEIDON E1 M3A buoy (WMO 61277) is the founder component of the Cretan Sea observatory complemented with several other platforms such as glider, FerryBox and a coastal buoy and is currently the most heavily equipped physical–biogeochemical observing site of the POSEIDON system.

EMSO Hellenic arc	**Operated by:** Hellenic Centre for Marine Research (HCMR) Greece
Resource Type **Location**	Moored observation platforms and surface buoys for near-real-time data transmission, seafloor platform, autonomous Mediterranean Sea, eastern Ionian and Aegean Seas (distance from land 12 NM, max water depth 1600 m)
Upstream Services	Multiparameter measurements systems along the water column for deep sea processes and at seabed for geohazards; surface buys for air-sea interactions and data transmission to land.
Short Description	 The platform consists of 6 oceanographic mooring sites, a sea bed monitoring system in the Aegean and Ionian Seas. Data of a variety water column and near seabed oceanographic parameters are delivered in near real time. An inductive mooring line provides salinity, temperature and pressure real-time data from surface to 1000 meters depth. The fixed seabed observatory is powered by an onshore optic-fibre cable capable of transferring power and large amounts of data in real time related to seismology, geodesy, sea level, fluid and gas vents, physical oceanography and biodiversity imaging at different scales.

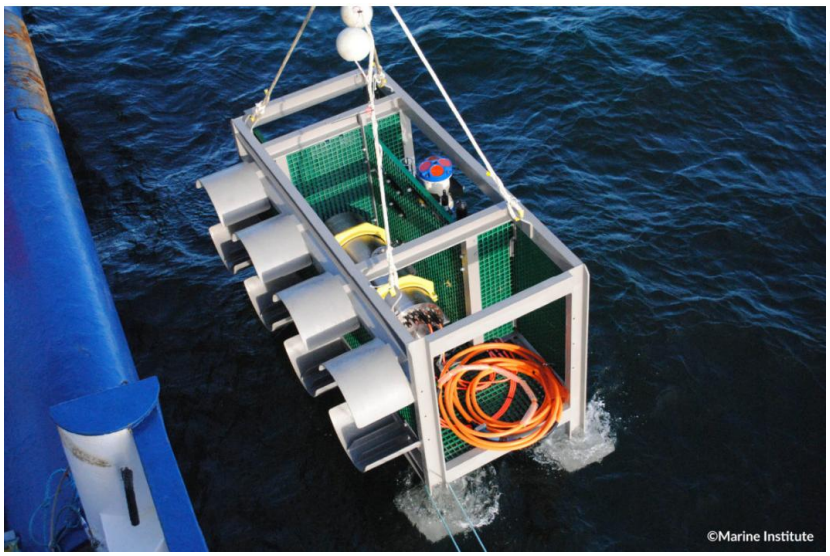
EMSO Molène	**Operated by:** Institut Français de Recherché Pour l'Exploitation de La Mer (Ifremer) France.
Resource Type **Location**	Shallow water test platform Atlantic Ocean, Celtic Sea, offshore Molène Island (distance from land 1,1 NM, max water depth 18 m)
Upstream Services	Cabled platform with hardware and software functions for device testing
Short Description	 Molène is an EMSO testing site dedicated to in-situ and long-term qualification of sensors and equipment. It consists of a removable instrumental module, that includes the electronic core of the platform, a "Node" and a "Junction Box". The Node inputs an optical signal and converts it into electrical. On the Node output, the Junction Box relays instructions, collects data, protects the equipment in case of electrical malfunction and provides failure warnings. The test site operates all year long and sensors are swapped from twice to four times a year. Technical laboratories are available on shore to test the equipment interfaces and drivers before deployment at sea. Marine sensor biofouling expertise and devices can be provided to the users. Technical assistance to adapt equipment to the platform and its deployment at sea will be provided by the Ifremer scientific and technical staff. Technical staff and divers perform marine operations.

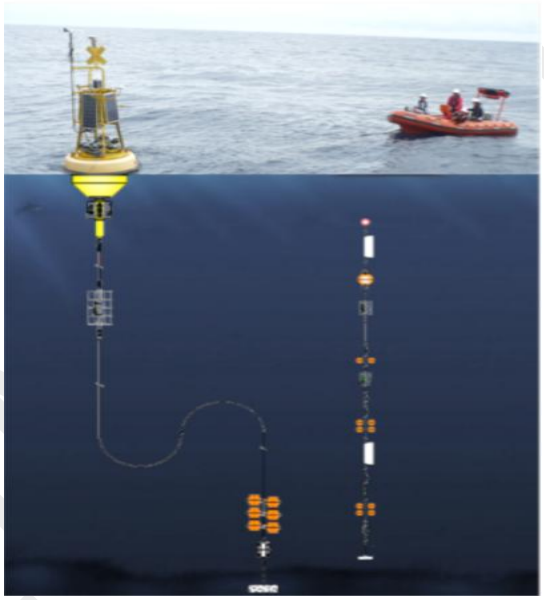
EMSO Iberian Margin	**Operated by:** Instituto Português do Mar e da Atmosfera (IPMA), Portugal
Resource Type	Moored observation platform
Location	North-Eastern Atlantic, South-Western Iberian Margin (distance from land 11 NM, max water depth: 1200 m
Upstream Services	Collection of EOVs time series at different depth ranges: conductivity, temperature, pressure, dissolved oxygen, turbidity, total chlorophyll-a, Coloured Dissolved Organic Matter (CDOM), Photosynthetically Active Radiation (PAR), current velocity and directions.
Short Description	 The Iberian Margin is currently composed of two sub-systems, deployed in the proximity of Cape St. Vincent, tailored to measure EOV's (CTD, dissolved oxygen, turbidity, total chlorophyll-a, CDOM, PAR, currents) at different depth ranges: - A wave powered water column vertical profiler (Wire-walker), delivering ~5 profiles/hour from the near surface to 150m depth, scalable to reach 500m depth, depending on travel wire; - A subsurface moored platform, currently planned to be deployed ~1100 m depth (pilot dataset from ~200m depth).

EMSO Ligurian Sea	**Operated by:** Centre National de la Recherche Scientifique (CNRS), Institut Français de Recherché Pour l'Exploitation de La Mer (Ifremer), France
Resource Type	Multisensor water column and seafloor platforms, 2 cabled and 1 stand-alone
Location	Mediterranean, Western Ligurian Sea (distance 22,6 MN, max depth 2500 m)
Upstream Services	Mooring and cables platforms collecting EOVs and geophysical data time series
Short Description	 The EMSO Ligurian Sea Regional Facility includes three sites: the Western Ligurian in the open sea, and Eastern Ligurian in the coastal waters off Nice and in the open sea. The Western Ligurian site hosts a cabled module (MII) and a mooring (Albatross). The continental slope off Nice hosts a coastal cabled observatory named Nice, to monitoring and study the sedimentary instability. Off Nice in the open sea, the Dyfamed deep standalone mooring includes sediment traps for measuring particle flux and other sensors for oceanographic measurements.

EMSO Nordic Sea	**Operated by:** University of Bergen, Institute of Marine Research, NORCE, Norwegian Polar Institute, University of Tromsø, and Norwegian Meteorological Institute, Norway.
Resource Type **Location**	Moored and sea-bed platforms also assisted by gliders Norwegian Sea, Greenland Sea, Iceland Sea, Fram Strait Distance from land (Distance 27-54 NM, max water depth 3050 m)
Upstream Services	Distributed facility collecting EOVs along the water column (temperature, salinity, pressure, velocity, dissolved oxygen, pCO2) sea-bed methane emission measurements (temperature, salinity, pH, CH4 and CO2) assisted by data satellite communications.
Short Description	 Credit: Ilker Fer, UiB EMSO Nordic Seas is a distributed facility and comprises multiple ocean glider sections, 4 oceanographic mooring sites, and one seabed-water-column-coupled observatory. Glider transects are in the Norwegian Sea, Fram Strait, the Greenland Sea and the Iceland Sea. Mooring sites are Svinøy (500 m water depth), Station M (2050 m w.d.), off South Cape of Svalbard (390 m w.d.), and the central Fram Strait (2655 m w.d.).The fixed-point seabed-water-column-coupled and wireless observatory is under development at the Mohn Ridge (3050 m w.d.) coupled with a seafloor node, and of a data transmission buoy that communicates acoustically with the seafloor station and relays data.

EMSO OBSEA	**Operated by**: Universitat Politècnica de Catalunya (UPC)**,** Spain
Resource Type **Location**	Shallow water cabled platform Mediterranean Sea, Balearic Sea (Distance 2 NM, max water depth 20 m)
Upstream Services	Cabled platform with hardware and software functions for device testing
Short Description	 EMSO OBSEA (Expandable Seafloor Observatory) offers the possibility to deploy different types of measurement instruments, communication modules or scientific experiments, and allow real-time communication with the deployed devices. Devices can be deployed at 20 m depth or onboard a surface buoy.

EMSO SMARTBAY	**Operated by**: Marine Institute (MI), Ireland
Resource Type	Cabled seafloor platform
Location	Atlantic Ocean, Galway Bay (distance 1 NM, max water depth 25 m)
Upstream Services	Cabled multisensory platform collecting EOVs data time-series with real time data communication
Short Description	 EMSO SmartBay cabled seafloor platform facility is connected to a shore station via a 5km long subsea fibre optic power cable. This cable provides power to the facility and allows high speed communication with the various instruments and sensors deployed. The facility operates a core suite of sensors which measure several EOVs and other relevant environmental indicators. These instruments include CTD, Ph, dissolved oxygen, pco2, hydrophones, HD camera, flow cytometer and ADCP.

EMSO South Adriatic Sea	**Operated by:** Istituto Nazionale di Oceanografia e Geofisica Sperimentale (OGS), Consiglio Nazionale delle Ricerche-Istituto di Scienze Polari (CNR_ISP), Italy.
Resource Type **Location**	Moored platforms Mediterranean Sea, Southern Adriatic Pit (distance 60 NM, max water depth 1200 m)
Upstream Services	Moored systems collecting EOVs along the water column (temperature, salinity, pressure, velocity, dissolved oxygen, pCO2)
Short Description	 EMSO South Adriatic Sea facility consists of two sites: the South Adriatic Pit observatory (E2M3A) and the Shelf-slope observatory (BB and FF). E2M3A includes a surface buoy for real-time air-sea interaction and water column data and a secondary mooring for deeper measurements. The BB and FF moorings monitor physical and geochemical parameters. Long-term multidisciplinary monitoring to assess the Adriatic's response to climate forcing. Study dense water formation processes, water mass properties, biogeochemical cycles, and cascading in the southern Adriatic, understanding ecosystem function especially in relation to carbon sequestration dynamics and acidification processes in deep waters

EMSO Western Ionian Sea	**Operated by:** Istituto Nazionale di Geofisica e Vulcanologia (INGV), Istituto Nazionale di Fisica Nucleare (INFN), Consiglio Nazionale delle Ricerche – Istituto di Scienze Marine (CNR-ISMAR), Italy
Resource Type **Location**	Seafloor platforms Cabled to shore and water column standalone system, SMART Cable prototype Mediterranean, Western Ionian Sea (distance 13,5 NM, max depth 2100 m)
Upstream Services	Cabled platforms with real-time data transmission and moored autonomous systems collecting geophysical, oceanographic and acoustics data
Short Description	 EMSO Western Ionian Sea consists of seafloor multisensor platforms (OnDE, CALIPSO, DIONE), a SMART Cable, and an autonomous mooring line GALATEA. The seafloor platforms and the SMART cable are connected by a electro-optical cable to a shore station, which receives geophysical, oceanographic and acoustics data time-series (EOVs). The moored systems collect and locally stores EOVs (temperature, salinity, pressure, velocity, dissolved oxygen)

EMSO Western Mediterranean Sea	**Operated by**: Institute of Anthropic Impacts and Sustainability in the marine environment (CNR-IAS), Italy
Resource Type **Location**	Moored platform and spar buoy Mediterranean Sea, Western Ligurian Sea (distance from land 43 NM, max water depth: 1200 m
Upstream Services	Moored systems for the acquisition of EOVs (conductivity, temperature, pressure) along the water column and meteorological observables at sea-atmosphere transition.
Short Description	 EMSO Western Mediterranean Sea consists of a mooring line (W1M3A) operating in the area known as the "Cetacean's Sanctuary", and composed of two sub-systems: - a large spar buoy, nominally known as "ODAS Italia 1" to acquire EOV in the upper 40 m of water column and at the sea-atmosphere interface, also transmitting reduced data to shore through a satellite link; - a standard mooring line equipped with several CTDs deployed at different depths. This facility monitors the sea state by continuously acquiring meteorological, physical, bio-geochemical, wave and underwater sound measurements. The buoy can be imagined as a "miniature island" able to offer a substrate for the development of a rich biological community as many organisms settle and develop on the buoy, colonizing its entire underwater surface.

2.3. SUPPORT AND EXPERTISE SERVICE

Support and Expertise Service	**Operated by: EMSO ERIC Central Management Office** **Contact:** Industry and Innovation Officer Marco Galeotti **Email address**: marco.galeotti@emso-eu.org
Type of resource: Expertise **Category**: Upstream **Targeted users**: Academy, private sector (SMEs, industry), citizens, policy makers, others **Current Status**: Operational	
Key features: **-** Provides expertise organised in four service groups according to engineering and scientific fields - Promotes, initiates and implements long lasting collaborations beyond the EMSO community.	
Short Description EMSO ERIC supports its community developing and operating services by streamlining and integrating competencies, capacities and resources. EMSO ERIC Service Groups (SGs) design, plan and implement the services function to ensure excellence in research, promote and lead innovation, leveraging the resources of the Regional Facilities (RFs). - The Science SG and the Data Management SG jointly work to implement the recommendations and indications for data and metadata standardisation and to develop the most valuable tools devoted to data visualisation and basic processing by the users**;** - The Science and the Engineering and Logistics SGs integrate their respective competencies to develop new pieces of equipment and methodologies for generating new observations, while the Data Management develops the new data integration in the existing data portal. - The SG are engaged in several types of win-win partnerships and collaborations with various types of users.	
Engaging initiatives and Impacts - members of EMSO SG formalised their partnership in various International projects - members are collaborating with key private companies, as SMEs and industrials, to maintain and jointly design and implement the future EMSO infrastructure.	
Next steps - co-elaboration of specific strategic actions with the industry of the submarine cable and system providers - establishment of new NDA with key actors for joint technology developments	

2.4. SERVICE FOR FUNDRAISING AND PROJECT MANAGEMENT

Fundraising and Project Management	**Operated by: Central Management Office** **Contact:** Project Manager, Valentina Tegas **Email address**: valentina.tegas@emao-eu.org

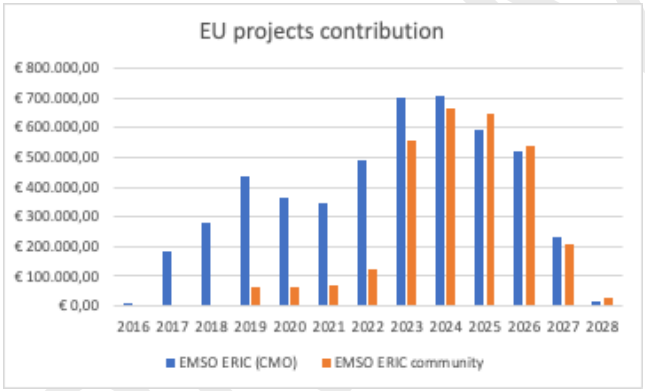
Type of resources: observing platforms (including data transmission)
Category: Upstream
Targeted users: Academy, private sector (SMEs, industry), citizens, policymakers, others
Current Status: Operational

Key features:

- Expertise in Horizon Europe and Horizon 2020 project development.
- 15 active projects with a cumulative budget of €5.62M.
- Facilitates synergy between marine and environmental RIs.
- Scouting and leveraging EU funds for research and innovation.

Short Description

In 2024 EMSO ERIC has a portfolio of 15 projects, of which 4 were funded under the Horizon 2020 Framework Programme and 11 under Horizon Europe.
The cumulative budget is equal to 5,620M€ of which 2,692M€ assigned to EMSO organizations participating in the projects as third parties/affiliated entities.
EMSO enlarged its research activities beyond the scope of the calls for proposals specifically devoted to Research Infrastructures (Pillar I- Horizon) by successfully participating in projects funded under Pillar II (Cluster 4 – HE and Blue Growth- H2020 Calls).



Engaging Initiatives and Impacts (complete list of the projects in Annex 2)

- End-to-end proposal development and submission.
- Internal coordination to enhance partnerships and project execution.
- Scouting for potential funding opportunities.
- Strengthens the research infrastructure and supports long-term scientific goals.

Next steps

To continue the positive trend of supporting EMSO community for:
- scouting, submitting, managing projects in the European Research and Innovation Programme and beyond
- strengthening the key role of the EMSO community in relation to the European Research and Innovation Programme (lobbying activity).
To enhance the visibility of EMSO ERIC in the European activities of the EMSO organisations (KPIs).

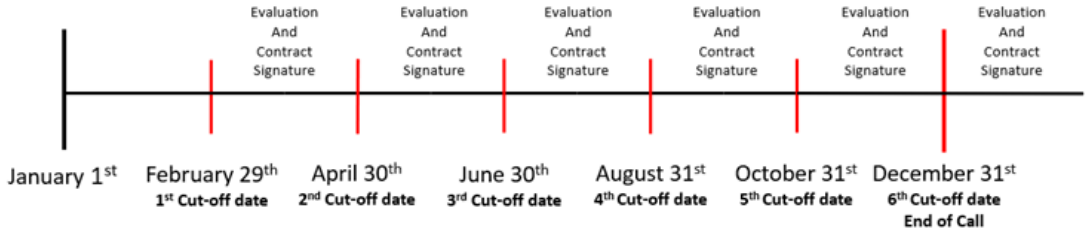
3. DOWNSTREAM SERVICES

3.1. PHYSICAL ACCESS SERVICE

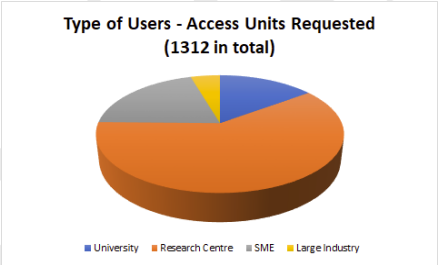
Physical Access Service	**Operated By: Central Management Office,** **Contact: Eng. and Logistics Officer,** Simó Cusí **Email address:** simo.cusi@emso-eu.org
Type: Hardware, software, HR, financial **Category**: Downstream **Targeted Users**: Research Community, Private Sector **Current Status**: Operational	
Key features - Access to multiple facilities under the same project. - High-quality, instrumented platforms for open-ocean activities. - Training and co-development opportunities with experienced engineers and scientists. - Tailored data collection services. - Funding available to facilitate user access. - Continuous availability with cut-offs for proposals evaluation every 2 months.	

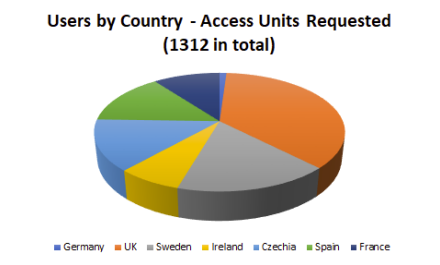
Short Description

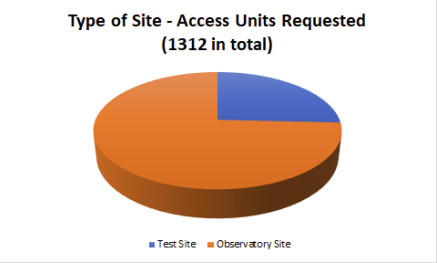
The service offers physical access to EMSO Regional Facilities: users can use the facilities to perform new monitoring experiments, test their own devices (e.g., sensors, systems), new technologies and software. The Physical Access is a unique opportunity for scientists and research engineers to avail of high-quality, interlinked instrumented platforms operating in open ocean for carrying out scientific and technological activities.



10 projects have been funded since the program was launched in April 2022







Engaging initiatives and Impacts

- Annual call for proposals with expert evaluation.
- Promotion phase includes limited operational funding.
- Enables cutting-edge research and innovation in marine science.

The EMSO website provides full information about:

- Application steps
- Application Rules (including eligibility)
- Description of the accessible Regional Facilities
- List of approved proposals
- Final Report of the completed projects

More details about the Physical Access Application procedure are available on https://emso.eu/physical-access/ and Annex 3 reports the full list of past and ongoing projects.

Next steps

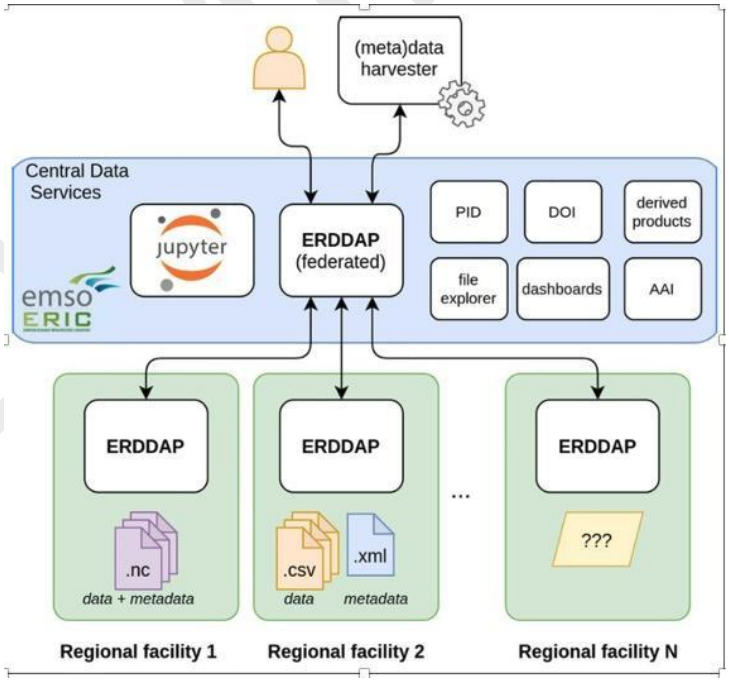
- Publication of the finalised Access Policy document
- Implement a web based platform to facilitate the application process and project follow-up

Increase service visibility by attending specialised events, to draw more users and increase service impact

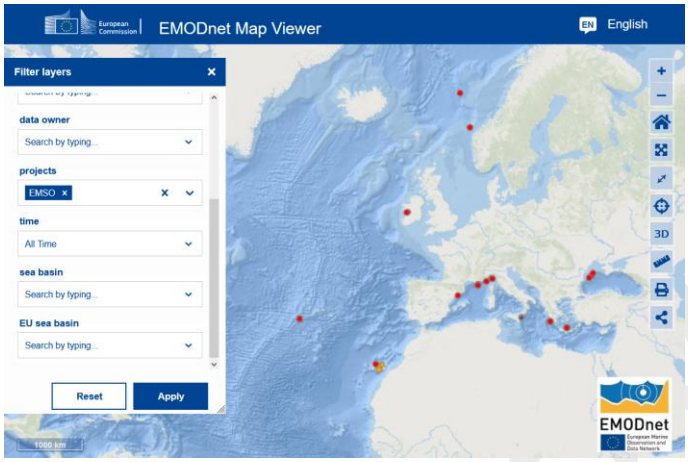
3.2. SERVICE FOR THE FEDERATION OF HARMONISED DATA FLOWS

3.2.1 ERDDAP Service

<table>
<tr><td>ERDDAP Service</td><td colspan="2">Operated by: Central Management Office
Contact: Data Management Officer, Aljaz Maslo
Email address: aljaz.maslo@emso-eu.org</td></tr>
<tr><td colspan="3">Type: Hardware, software, HR, financial
Category: Downstream
Targeted users: Research Community, Private Sector
Status: Operational</td></tr>
<tr><td colspan="3">Key features
- The federated ERDDAP infrastructure provides access to all data through a single-entry point
- Advanced tools for data analysis and visualisation.
- Flexible data download options supporting multiple formats, including CSV, NetCDF, and JSON.
- EMSO data are shared with the EMODnet platform through ERDDAP, ensuring broader accessibility and integration.</td></tr>
<tr><td>Short Description

As a distributed research infrastructure, EMSO ERIC's consortium members distribute and manage metadata and data according to their established workflows and EMSO ERIC specifications. Each member can maintain data traceability and exert control over it. Despite this decentralized system, it is also possible to access data from all institutions and observatories through a single web service, a federated ERRDAP, facilitating broad and unified access. The EMSO ERIC central management office operates the federated ERDDAP service.</td><td colspan="2"> 

EMSO ERIC data services diagram</td></tr>
</table>

Additionally, through ERDDAP, EMSO data are shared with the EMODnet platform, enhancing interoperability and accessibility for the wider marine research community.	 Screenshot of EMSO ERIC Data Available on EMODnet
Engaging Initiatives and Impacts - Supports FAIR (Findable, Accessible, Interoperable, Reusable) principles. - Facilitates collaboration, fosters FAIR data use, and advances ocean science innovation. - Provides federated ERDDAP services compliant with international standards.	
Next steps Finalize the integration of remaining EMSO regional facilities into the centralized ERDDAP, ensuring comprehensive data accessibility and collaboration.	

3.2.2 Service for metadata Harmonisation

Service for metadata Harmonisation	**Operated by: UPC** **Contact:** Enoc Martinez **Email address:** enoc.martinez@upc.edu

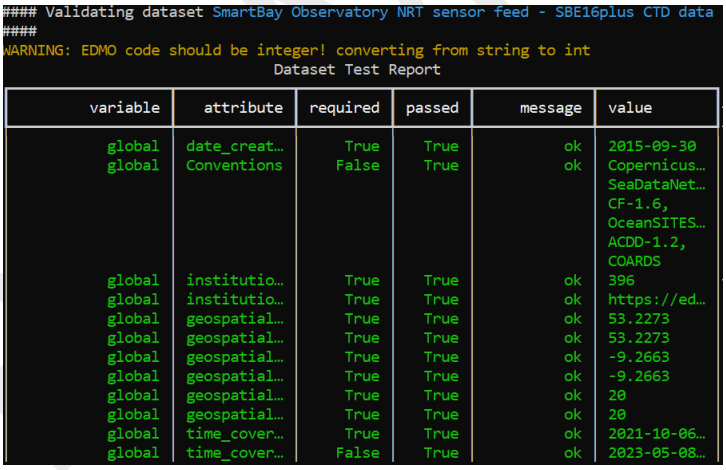
Type: Software
Category: Downstream
Targeted users: Research Community, Private Sector
Status: Operational

Key features

- **EMSO Metadata Specifications document**: harmonizes policies across facilities, building on frameworks like OceanSITES and SeaDataNet.
- **Metadata Report tool**: evaluates dataset alignment with EMSO Metadata Specifications, provides a harmonization score and improvement tips.
- **Dataset Generator**: This tool allows users to produce new datasets aligned with the EMSO's specifications

Short Description

EMSO developed a custom Metadata Specification document to ensure consistent metadata practices across research facilities. EMSO builds on established standards like OceanSITES and SeaDataNet, with specifications designed for both human and machine readability. EMSO also created a tool to assess the alignment of datasets with its Metadata Specifications. This tool ensures a high level of harmonization across all EMSO datasets.



```
#### Validating dataset SmartBay Observatory NRT sensor feed - SBE16plus CTD data
####
WARNING: EDMO code should be integer! converting from string to int
                        Dataset Test Report
```

variable	attribute	required	passed	message	value
global	date_creat…	True	True	ok	2015-09-30
global	Conventions	False	True	ok	Copernicus… SeaDataNet… CF-1.6, OceanSITES… ACDD-1.2, COARDS
global	institutio…	True	True	ok	396
global	institutio…	True	True	ok	https://ed…
global	geospatial…	True	True	ok	53.2273
global	geospatial…	True	True	ok	53.2273
global	geospatial…	True	True	ok	-9.2663
global	geospatial…	True	True	ok	-9.2663
global	geospatial…	True	True	ok	20
global	geospatial…	True	True	ok	20
global	time_cover…	True	True	ok	2021-10-06…
global	time_cover…	False	True	ok	2023-05-08…

Screenshot of an example of the results produced by the Metadata Report tool

Engaging Initiatives and Impacts

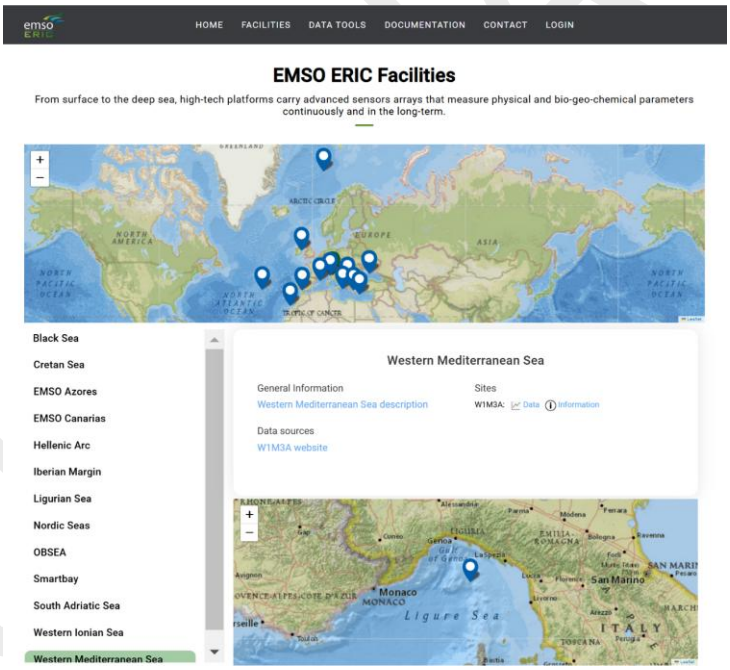
- Encourages FAIR principles by ensuring metadata is findable and interoperable.
- Provides human- and machine-readable metadata specifications for accessibility.
- Supports data managers with tools to improve metadata quality and harmonization.
- Drives innovation by making metadata management more efficient and automated.

Next steps

Harmonize other types of data: pictures, acoustic data, seismic data.

3.2.3 Data access service

<table>
<tr><td>Data Access Service</td><td>Operated by: Central Management Office
Contact: Data Management Officer, Aljaz Maslo
Email address: Aljaz.Maslo@emso-eu.org</td></tr>
<tr><td colspan="2">Type: Software
Category: Downstream
Targeted users: Research Community, Private Sector
Current Status: Operational</td></tr>
<tr><td colspan="2">Key features
- Data Portal: Description of regional facilities and long-term access to EMSO data.
- Visualisation Tools: Comprehensive tools for data analysis and visualisation.</td></tr>
<tr><td>Short Description

Data Portal provides a description of the different observatories, pointers to existing data and meta-data sources. Additionally, its plotting functionalities enable comprehensive data analysis and interactive visualisation for a deeper exploration of EMSO ERIC datasets.</td><td> 

Screenshot of the EMSO Data Portal</td></tr>
<tr><td colspan="2">Engaging initiatives and Impacts
- Promotes open science through accessible ocean data.
- Empowers multidisciplinary research using standardized, interoperable datasets.
- Engages the public through user-friendly tools.</td></tr>
<tr><td colspan="2">Next steps
Continue enhancing plotting and data analysis tools to better meet user needs and improve overall usability.</td></tr>
</table>

3.2.4 Service for Data Storage and computational resources

<table>
<tr><td>NEREIDE Data Center</td><td>Operated by: Central Management Office
Contact: Data Management Officer, Aljaz Maslo
Email address: Aljaz.Maslo@emso-eu.org</td></tr>
<tr><td colspan="2">Type: Hardware/Software
Category: Downstream
Targeted users: Research Community, Academia
Current Status: Partially Operational</td></tr>
<tr><td colspan="2">Key features
- 3.6 PB of raw storage, 2600 CPU cores,
- Scalable and secure ICT (Information and Communication Technology) for multidisciplinary research.</td></tr>
<tr><td>Short Description
The NEw REsearch Infrastructure Datacenter for EMSO (NEREIDE) in the Western Ionian Sea EMSO site, located at Portopalo di Capopassero (SR), Italy. As a European research infrastructure funded by PON InSEA, NEREIDE provides an advanced platform for archiving, processing, and sharing scientific data from marine observatories. It also supports the development of cutting-edge services and fosters multidisciplinary scientific and technological research in the deep marine environment.</td><td> 
NEREIDE servers</td></tr>
<tr><td colspan="2">Engaging Initiatives and Impacts (Partially Operational)
Enhanced Data Services:
○ NEREIDE provides resources to process, store, and analyze large datasets.
○ Support for developing advanced simulation models and visualization tools (e.g. digital twins, AR, XR, VR models).
Collaboration Platforms:
○ Tools to foster interdisciplinary collaborations within the EMSO and broader scientific community.
○ Integration with initiatives like Blue-Cloud and the Digital Twin of the Ocean (DTO).
Training and Development:
○ Resources for skill development, including datasets and computational infrastructure for training.
Advanced Computational Support:
○ Resources for intensive data processing and analysis, supporting FAIR data principles.
Integration with Global Systems:
○ A backend for Blue-Cloud Virtual Labs and support for the DTO through data and computational power.</td></tr>
</table>

Next steps
Expand the user base by enhancing accessibility, usability, and fostering stronger community engagement.

3.3. THE EMSO ACADEMY: A SERVICE FOR CAPACITY BUILDING AND TRAINING

EMSO Academy	**Operated by: Central Management Office** **Contact:** Communication Officer, Sara Pero **Email address:** sara.pero@emso-eu.org
Type: HR **Category**: Downstream **Targeted users:** Research Community, Private Sector **Current Status**: Partially Operational	
Key features The EMSO ERIC website (emso.eu) offers a variety of training and tutorial resources to assist users in accessing and utilising data effectively. These resources include: ● **API Tutorial**: A guide on programmatic access to EMSO ERIC's (meta)data via their Application Programming Interface (API). ● Video Tutorials: Visual demonstrations covering various data tools and access methods. These materials are designed to help users navigate the EMSO ERIC Data Portal and make the most of the available data. Regional Facilities' engineers and scientists can also provide training and co-development to users interested in learning specialised techniques/methodologies and developing new products, taking advantage of years of experience gathered at EMSO Facilities' labs. In addition, the EMSO Academy offers internships to train young researchers on research and management topics of EMSO activities.	
Short Description The EMSO Academy is designed to offer a variety of training programs, webinars and workshops to enhance knowledge and skills in ocean science, technology and communication.	emso ACADEMY
Engaging initiatives and Impacts - Internships - Training courses at the EMSO Time series conference https://tsc2021.emso.eu/ - International collaboration though exchange of personnel	
Next steps - The EMSO ERIC's exchange of personnel will be open in early 2025 to enable staff mobility among its Regional Facilities. This pilot initiative aims to promote the exchange of skills, techniques, and innovative methodologies to drive advancements in ocean science. - The EMSO Academy is now in the process to be fully operational to offer a wide range	

of training programs, summer schools, webinars and workshops tailored to the needs of researchers, students, and industry professionals on the following essential topics:

- Ocean Instrumentation and Technology
- Data Science and Analysis
- Marine Ecosystem Monitoring and Modelling
- Policy, Communication, and Management

3.4. PUBLIC ENGAGEMENT AND OUTREACH SERVICE

<table>
<tr><td>Public Engagement and Outreach Service</td><td>Operated by: Central Management Office
Contact: Communication Officer, Sara Pero
Email address: sara.pero@emso-eu.org</td></tr>
<tr><td colspan="2">Type: Communication
Category: Downstream
Targeted users: Academy, private sector (SMEs, industry), citizens, policy makers, others
Current Status: Partially Operational</td></tr>
<tr><td colspan="2">Key features: EMSO leverages several channels, from website to social media platforms, Zenodo and Newsletter to share updates, research highlights, and multimedia content with a wider audience.
Through participation in the main events in marine domain and booth organization, EMSO aims also to increase public awareness of ocean science and inspire future generations of scientists by developing promotional material and organizing interactive sessions.</td></tr>
<tr><td>Short Description

Broadly communicating research findings and engaging with the public through participation in events</td><td> 
</td></tr>
<tr><td colspan="2">Engaging initiatives and Impacts Enhance public understanding, inform decision-making, strengthen communities, improve organizational performance</td></tr>
<tr><td colspan="2">Next steps Realization of User success stories, communication campaigns and Virtual Tour of the Regional Facilities</td></tr>
</table>

4. ANNEXES

4.1. ANNEX 1 - LIST OF THE ACQUIRED EMSO VARIABLES

- 'Acceptable proportion of acoustic signal returns {percent good} from the water body by moored acoustic doppler current profiler (ADCP) beam 1'
- 'Acceptable proportion of acoustic signal returns {percent good} from the water body by moored acoustic doppler current profiler (ADCP) beam 2'
- 'Acceptable proportion of acoustic signal returns {percent good} from the water body by moored acoustic doppler current profiler (ADCP) beam 3'
- 'Acceptable proportion of acoustic signal returns {percent good} from the water body by moored acoustic doppler current profiler (ADCP) beam 4'
- 'Attenuation (red light wavelength) per unit length of the water body by 25cm path length red light transmissometer'
- 'Bin number'
- 'Concentration of chlorophyll-a {chl-a CAS 479-61-8} per unit volume of the water body [particulate >unknown phase] by in-situ chlorophyll fluorometer'
- 'Concentration of chlorophyll-a {chl-a CAS 479-61-8} per unit volume of the water body [particulate >unknown phase] by in-situ chlorophyll fluorometer and manufacturer''s calibration applied'
- 'Concentration of coloured dissolved organic matter {CDOM Gelbstoff} per unit volume of the water body [dissolved plus reactive particulate phase] by fluorometry'
- 'Concentration of nitrate {NO3- CAS 14797-55-8} per unit volume of the water body [dissolved plus reactive particulate phase] by in-situ UV absorption spectrometer and calibration against independent measurements'
- 'Concentration of nitrate+nitrite {NO3+NO2} per unit volume of the water body [dissolved plus reactive particulate phase] by in-situ nutrient analysis system'
- 'Concentration of oxygen {O2 CAS 7782-44-7} per unit mass of the water body [dissolved plus reactive particulate phase]'
- 'Concentration of oxygen {O2 CAS 7782-44-7} per unit volume of the water body [dissolved plus reactive particulate phase]'
- 'Concentration of oxygen {O2 CAS 7782-44-7} per unit volume of the water body [dissolved plus reactive particulate phase] by in-situ oxygen optode'
- 'Concentration of total iron {total_Fe CAS 7439-89-6} per unit volume of the water body [dissolved plus reactive particulate phase]'
- 'Correlation magnitude of acoustic signal returns from the water body by moored acoustic doppler current profiler (ADCP) beam 1'

- 'Correlation magnitude of acoustic signal returns from the water body by moored acoustic doppler current profiler (ADCP) beam 2'
- 'Correlation magnitude of acoustic signal returns from the water body by moored acoustic doppler current profiler (ADCP) beam 3'
- 'Correlation magnitude of acoustic signal returns from the water body by moored acoustic doppler current profiler (ADCP) beam 4'
- 'Depth (spatial coordinate) maximum relative to water surface in the water body'
- 'Depth (spatial coordinate) minimum relative to water surface in the water body'
- 'Depth (spatial coordinate) of ADCP bin relative to water surface {bin depth} in the water body'
- 'Depth (spatial coordinate) relative to bed surface in the bed'
- 'Depth (spatial coordinate) relative to water surface in the water body'
- 'Direction (from) at spectral maximum of waves on the water body by acoustic doppler wave array'
- 'Direction (from) mean of waves {mean wave direction} on the water body by acoustic doppler wave array'
- 'Direction (from) mean of waves {mean wave direction} on the water body by computation from 1st order Fourier coefficients of directional distribution of energy, A1 and B1'
- 'Direction (from) of wind (gust) relative to True North {wind direction} in the atmosphere'
- 'Direction (from) of wind relative to True North {wind direction} in the atmosphere'
- 'Direction (from) of wind relative to True North {wind direction} in the atmosphere by in-situ anemometer'
- 'Direction (towards) of water current (Eulerian measurement) in the water body by in-situ current meter and correction to true North'
- 'Direction (towards) of water current (Eulerian measurement) in the water body by moored acoustic doppler current profiler (ADCP) and correction to true North'
- 'Direction (towards) of water current in the water body'
- 'Downwelling vector irradiance as energy of electromagnetic radiation (longwave) in the atmosphere'
- 'Downwelling vector irradiance as energy of electromagnetic radiation (solar (300-3000nm) wavelengths) in the atmosphere by pyranometer'
- 'Downwelling vector irradiance as energy of electromagnetic radiation (solar wavelengths) in the atmosphere by pyranometer'
- 'Eastward velocity of water current (Eulerian measurement) in the water body by moored acoustic doppler current profiler (ADCP)'
- 'Eastward velocity of water current in the water body'

- 'Echo intensity of acoustic signal returns from the water body by moored acoustic doppler current profiler (ADCP) beam 1'
- 'Echo intensity of acoustic signal returns from the water body by moored acoustic doppler current profiler (ADCP) beam 2'
- 'Echo intensity of acoustic signal returns from the water body by moored acoustic doppler current profiler (ADCP) beam 3'
- 'Echo intensity of acoustic signal returns from the water body by moored acoustic doppler current profiler (ADCP) beam 4'
- 'Elapsed time relative to 1950-01-01T00:00:00Z'
- 'Elapsed time relative to 1970-01-01T00:00:00Z'
- 'Electrical conductivity of the water body'
- 'Electrical conductivity of the water body by CTD'
- 'Electrical conductivity of the water body by in-situ conductivity cell'
- 'Error velocity of water current in the water body by moored acoustic doppler current profiler (ADCP)'
- 'Fugacity of carbon dioxide (at 100% humidity) {fCO2 CAS 124-38-9} in the water body'
- 'Gas tension of water {total dissolved air pressure} in the water body'
- 'Julian Date (chronological)'
- 'Latitude north'
- 'Longitude east'
- 'Northward velocity of water current (Eulerian measurement) in the water body by moored acoustic doppler current profiler (ADCP)'
- 'Northward velocity of water current in the water body'
- 'Orientation (horizontal relative to magnetic north) of measurement platform {heading} by compass'
- 'Orientation (horizontal relative to true north) of measurement device {heading}'
- 'Orientation (pitch) of measurement platform by inclinometer'
- 'Orientation (roll angle) of measurement platform by inclinometer'
- 'Partial pressure of carbon dioxide {CO2 CAS 124-38-9} {pCO2} in the water body'
- 'Partial pressure of carbon dioxide {CO2 CAS 124-38-9} {pCO2} in the water body by equilibration with air, drying and infra-red gas analysis'

- 'Partial pressure of carbon dioxide {CO2 CAS 124-38-9} {pCO2} in the water body by spectrophotometric absorbance at two different wavelengths of CO2-equilibrated fixed alkalinity dye solution'
- 'Period at second spectral moment of waves on the water body'
- 'Period at spectral maximum of waves {peak period Tp} on the water body'
- 'Period at spectral maximum of waves {peak period Tp} on the water body by acoustic doppler wave array'
- 'Period mean of waves on the water body by acoustic doppler wave array'
- 'Potential temperature of the water body by computation using UNESCO 1983 algorithm'
- 'Practical salinity of the water body'
- 'Practical salinity of the water body by CTD and computation using UNESCO 1983 algorithm'
- 'Practical salinity of the water body by computation using UNESCO 1983 algorithm'
- 'Practical salinity of the water body by conductivity cell and computation using UNESCO 1983 algorithm'
- 'Precipitation rate (liquid water equivalent) in the atmosphere by in-situ rain gauge'
- 'Pressure (in measurement loop for equilibrated marine sample)'
- 'Pressure (measured variable) exerted by the atmosphere'
- 'Pressure (measured variable) exerted by the atmosphere by barometer and expressed at measurement altitude'
- 'Pressure (measured variable) exerted by the atmosphere by unknown instrument and correction to sea level'
- 'Pressure (measured variable) exerted by the water body by semi-fixed in-situ pressure sensor and corrected to read zero at sea level'
- 'Pressure (measured variable) exerted by the water body by semi-fixed moored SBE MicroCAT'
- 'Pressure (measured variable) exerted by the water body by semi-fixed moored in-situ pressure sensor and interpolation between instruments with sensors'
- 'Pressure (measured variable) exerted by the water body plus atmosphere by fixed in-situ pressure sensor'
- 'Pressure (spatial coordinate) exerted by the water body by profiling pressure sensor and correction to read zero at sea level'
- 'Relative humidity of the atmosphere'
- 'Relative humidity of the atmosphere by humidity sensor'
- 'Salinity of the water body'

- 'Saturation of oxygen {O2 CAS 7782-44-7} in the water body [dissolved plus reactive particulate phase]'
- 'Saturation of oxygen {O2 CAS 7782-44-7} in the water body [dissolved plus reactive particulate phase] by in-situ Beckmann probe and computation from concentration using Benson and Krause algorithm'
- 'Saturation of oxygen {O2 CAS 7782-44-7} in the water body [dissolved plus reactive particulate phase] by in-situ oxygen optode and computation from concentration'
- 'Sea-floor depth (below instantaneous sea level) {bathymetric depth} in the water body'
- 'Sequence number'
- 'Serial number of instrument'
- 'Sigma-T of the water body by computation from salinity and temperature using UNESCO algorithm'
- 'Sigma-theta of the water body by computation from salinity and potential temperature using UNESCO algorithm'
- 'Signal return amplitude from the water body by moored acoustic doppler current profiler (ADCP)'
- 'Signal return amplitude from the water body by moored acoustic doppler current profiler (ADCP) beam 2'
- 'Signal return amplitude from the water body by moored acoustic doppler current profiler (ADCP) beam 3'
- 'Sound pressure level of ambient noise (1000Hz-centred one-third-octave frequency band, time interval specified elsewhere) relative to 1 micropascal in the water body'
- 'Sound pressure level of ambient noise (125Hz-centred one-third-octave frequency band, time interval specified elsewhere) relative to 1 micropascal in the water body'
- 'Sound pressure level of ambient noise (2000Hz-centred one-third-octave frequency band, time interval specified elsewhere) relative to 1 micropascal in the water body'
- 'Sound pressure level of ambient noise (63Hz-centred one-third-octave frequency band, time interval specified elsewhere) relative to 1 micropascal in the water body'
- 'Sound pressure level of ambient noise in the water body'
- 'Sound velocity in the water body'
- 'Sound velocity in the water body by CTD and computation from temperature and salinity by unspecified algorithm'
- 'Spectral significant wave height of waves {Hm0} on the water body'
- 'Spectral significant wave height of waves {Hm0} on the water body by acoustic doppler wave array'
- 'Speed of water current (Eulerian measurement) in the water body'
- 'Speed of water current (Eulerian measurement) in the water body by in-situ current meter'

- 'Speed of wind (gust) {wind speed} in the atmosphere'
- 'Speed of wind {wind speed} in the atmosphere'
- 'Speed of wind {wind speed} in the atmosphere by in-situ anemometer'
- 'Subsample identifier'
- 'Temperature of oxygen determination by optode'
- 'Temperature of the atmosphere'
- 'Temperature of the atmosphere by thermometer'
- 'Temperature of the water body'
- 'Temperature of the water body by CTD or STD'
- 'Temperature of the water body by in-situ thermistor on acoustic doppler current profiler (ADCP) transducer'
- 'Turbidity of water in the water body'
- 'Turbidity of water in the water body by SeaPoint turbidity meter and laboratory calibration against formazin'
- 'Unidirectivity index of waves on the water body by acoustic doppler wave array and computation using protocol of Barstow et al. (1991)'
- 'Upward velocity of water current in the water body'
- 'Upward velocity of water current in the water body by moored acoustic doppler current profiler (ADCP)'
- 'Wave height maximum of waves on the water body by acoustic doppler wave array'
- 'Wave height mean of waves (highest one tenth) on the water body by acoustic doppler wave array'
- 'Wave height mean of waves (highest one third) on the water body by acoustic doppler wave array'
- 'Zero-crossing period of waves {Tz} on the water body by acoustic doppler wave array'
- 'Zero-crossing wave height maximum of waves {Hmax} on the water body'
- 'pH (unspecified scale) of the water body'
- 'pH (unspecified scale) of the water body by pH electrode'

4.2. ANNEX 2 - PHYSICAL ACCESS

The information and reports about ongoing and past projects are published on the EMSO website https://emso.eu/physical-access/

Funded Projects

PROJECT NAME	INFORMATIONS
FOOD Future Ocean Observation Drifter	**User:** CLS – Collecte Localisation Satellites (France) **Host Facility:** OBSEA (Spain) **Keywords:** wooden drifter, prototype, plastic reduction, testing, telemetry, sensors **Access Units granted:** 60.0 **Funding granted:** 5000 €
SGB Seagrass Blue	**User:** Seagrass Blue, Eauligo SARL (France) **Host Facility:** OBSEA (Spain) **Keywords:** carbon removal, seagrass, biodiversity, floating farm pods, marine bee AUVs **Access Units granted:** 75.0 **Funding granted:** 15000 €
LOCOLAND Low cost landers for complementary sustained near-bed monitoring at EMSO deep sites	**User:** Spanish institute of Oceanography CSIC-IEO (Spain) **Host Facility:** Iberian Margin (Portugal) **Keywords:** low cost, landers, LanderPick, SSBL system, precise positioning **Access Units granted:** 186.5 **Funding granted:** 10700€

AQUA-GAPS/MONET Levels and air-sea exchange of persistent organic pollutants in the marginal sea of Europe: contribution to the global monitoring effort	**User:** Masaryk University (Czechia) **Host Facility:** Cretan Sea (Greece) **Keywords:** persistent organic pollutants, contaminants, air-sea exchange fluxes, seasonal variations **Access Units granted:** 182.0 **Funding granted:** 1200 €
SEALS Submarine noise-Evaluation & Analytics using Low-cost Sustainable-sensing	**User:** National Oceanography Centre (United Kingdom) **Host Facility:** Western Ionian Sea (Italy) **Keywords:** distributed fiber optical sensors, DFOS, big data streams, algorithms, noise **Access Units granted:** 49.0 **Funding granted:** 10745 €
CTDEmEx	**User:** Marine Institute (Ireland) **Host Facility:** Cretan Sea (Greece) **Keywords:** conductivity, temperature, salinity, CTD, performance assessment, inter-comparison **Access Units granted:** 93.0 **Funding granted:** 10222 €
CUPIDO CalcUlating the strength of the Plastic pump In counteracting the Deep export of Oceanic carbon	**User:** British Antarctic Survey (United Kingdom) **Host Facility:** Southern Adriatic Sea (Italy) **Keywords:** microplastics, seasonal variation, zooplankton, deep ocean layer, plastic pump, carbon pump **Access Units granted:** 241.4 **Funding granted:** 9000 €

SEASNAKE Sea trials for biofouling of a dynamic umbilical	**User:** Research Institutes of Sweden (Sweden) **Host Facility:** Western Mediterranean Sea (Italy) **Keywords:** materials, corrosion, biofouling, umbilical cable, long-term exposition, antifouling painting **Access Units granted:** 222.0 **Funding granted:** 11000 €
Calibration-free pH Sensors	**User:** ANB Sensors Ltd. (United Kingdom) **Host Facility:** OBSEA (Spain) **Keywords:** pH sensor, validation, biofouling, user experience, long-term deployment **Access Units granted:** 189.0 **Funding granted:** 10800 €
TRIPLE-VTESTS	**User:** University of Bremen/Marum (Germany) **Host Facility:** OBSEA (Spain) **Keywords:** autonomous underwater vehicle, USBL, Doppler velocity log, artificial intelligence **Access Units granted:** 14.0 **Funding granted:** 11000 €

4.3. ANNEX 3 - EUROPEAN PROJECTS

Status	Programme	CALL	Acronym	Start date	End date	Duration (months)	COORDINATOR	EMSO 3LinkedParties/AffiliatedEntities	BUDGET (Single entity)	BUDGET (cumulative EMSO ERIC+3LP/AE)	NOTES
On Going	H2020	BG-08-2018-2019 All Atlantic Ocean Research Alliance Flagship	AtlantECO	01/09/20	31/08/25	48	SZN	Y		€ 54.812,50	
								EMSO ERIC	*€ 17.000,00*		
								PLOCAN	*€ 37.812,50*		
	H2020	BG-11-2020	DOORS	01/06/21	31/05/25	48	GeoEcomaR	N	€ 140.000,00	NA	
	HE	HORIZON-INFRA-2021-DEV-01-03	eRImote	01/06/22	30/11/24	30	SYNCHROTRON DES	N	€ 160.875,00	NA	
	HE	HORIZON-INFRA-2021-SERV-01-06	iMagine	01/09/22	31/08/25	36	STICHTING EGI	Y		€ 427.556,25	
								EMSO ERIC	*€ 46.875,00*		
								IFREMER	*€ 103.750,00*		
								MI	*€ 122.806,25*		
								UPC	*€ 154.125,00*		
	HE	HORIZON-INFRA-2021-SERV-01-07	GeoInquire	01/10/22	30/09/26	48	GFZ	Y		€ 563.026,25	
								EMSO ERIC	*€ 290.250,00*		
								HCMR	*€ 68.250,00*		
								MI	*€ 18.750,00*		
								UPC	*€ 142.026,25*		
								PLOCAN	*€ 43.750,00*		
	H2020	INFRAIA-02-2020	MINKE	01/04/21	31/03/25	48	CSIC	N	€ 186.750,00	NA	
	HE	HORIZON-INFRA-2022-TECH-01-01	ANERIS	01/01/23	31/12/26	48	CSIC	Y		1.135.625,00 €	
								EMSO ERIC	*€ 190.000,00*		
								MI	*€ 493.750,00*		
								UPC	*€ 451.875,00*		
	HE	HORIZON-INFRA-2022-TECH-01-01	GEORGE	01/01/23	30/06/27	54	ICOS ERIC	Y		912.812,50 €	
								EMSO ERIC	*€ 525.625,00*		
								UPC	*€ 160.313,00*		
								INGV	*€ 33.750,00*		
								MI	*€ 54.375,00*		
								PLOCAN	*€ 138.750,00*		
	HE	HORIZON-CL4-2022-RESILIENCE-01-02	TRIDENT	01/01/23	31/12/27	60	INESC TEC	N	€ 306.525,00	NA	
	HE	HORIZON-INFRA-2022-EOSC-01-03	Blue-Cloud 2026	01/01/23	30/06/26	42	TRUST-IT	N	€ 127.438,00	NA	
	HE	Other Actions INFRA	ERIC FORUM 2	01/09/23	31/08/27	48	BBMRI	N	€ 136.250,00	NA	
	HE	HORIZON-INFRA-2023-DEV-01-05	ENVRINNOV	01/01/24	31/12/27	36	THE CYPRUS INSTIT	N	€ 295.000,00	NA	
	HE	HORIZON-INFRA-2023-DEV-01-04	AMRIT	01/03/24	29/02/28	48	ARMINES-ASSOCIATION POUR LA RECHERCHE ET LE DEVELOPPEMENT DES METHODES ET PROCESSUS INDUSTRIELS	Y		€ 923.424,42	
								EMSO ERIC	€ 255.312,50		
								CNR	€ 49.903,13		
								CNRS	€ 263.011,26		
								OGS	€ 147.478,13		
								PLOCAN	€ 99.583,33		
								UiB	€ 108.136,07		
	HE	HORIZON-INFRA-2023-SERV-01-01	AQUARIUS	01/03/24	29/02/28	48	MI	N	€ 100.000,00	NA	
	H2020	INFRAEOSC-03-2020	EOSC FUTURE	01/12/21	31/03/24	28	ATHENA	N	€ 149.975,00		