EMSO-ERIC: The Organization of a New Marine Multidisciplinary Networking Infrastructure

European Ocean Observing System (EOOS)

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(EMSO ERIC DG)

Perspectives for enhancing co-ordination and support of Europe´s Ocean Observing System, Eurocean, 24th October 2017, Capri, Italia

EXPRESS

Typhoon Lan EMERGENCY: Thousands ordered to evacuate as Category 4 storm track to Japan

Typhoon Lan could cause destruction as it heads to Japan

TENS of thousands across Japan have been advised to evacuate as a powerful typhoon approaches the mainland.

EMSO ERIC Scope

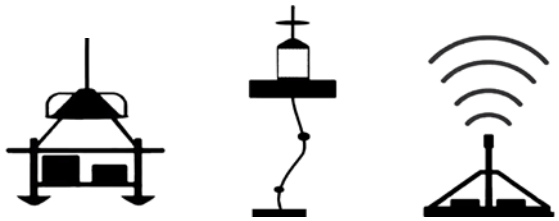
The EMSO ERIC, marine **Research Infrastructure (RI)** is serving **marine science researchers, marine technology** engineers, **policy makers, industry, and the public**. EMSO consists of ocean observation systems for sustained **monitoring of environmental processes** and their interactions. The variables address **natural hazards, climate change, and marine ecosystems.** EMSO observatory facilities have been deployed at key sites around Europe, from the North Atlantic, through the Mediterranean, to the Black Sea. **EMSO ERIC** provides power, communications, sensors, and data for continuous, high resolution, real-time and near-real-time, interactive ocean observations from polar to tropical environments, down to the abyss.

Research consortium:

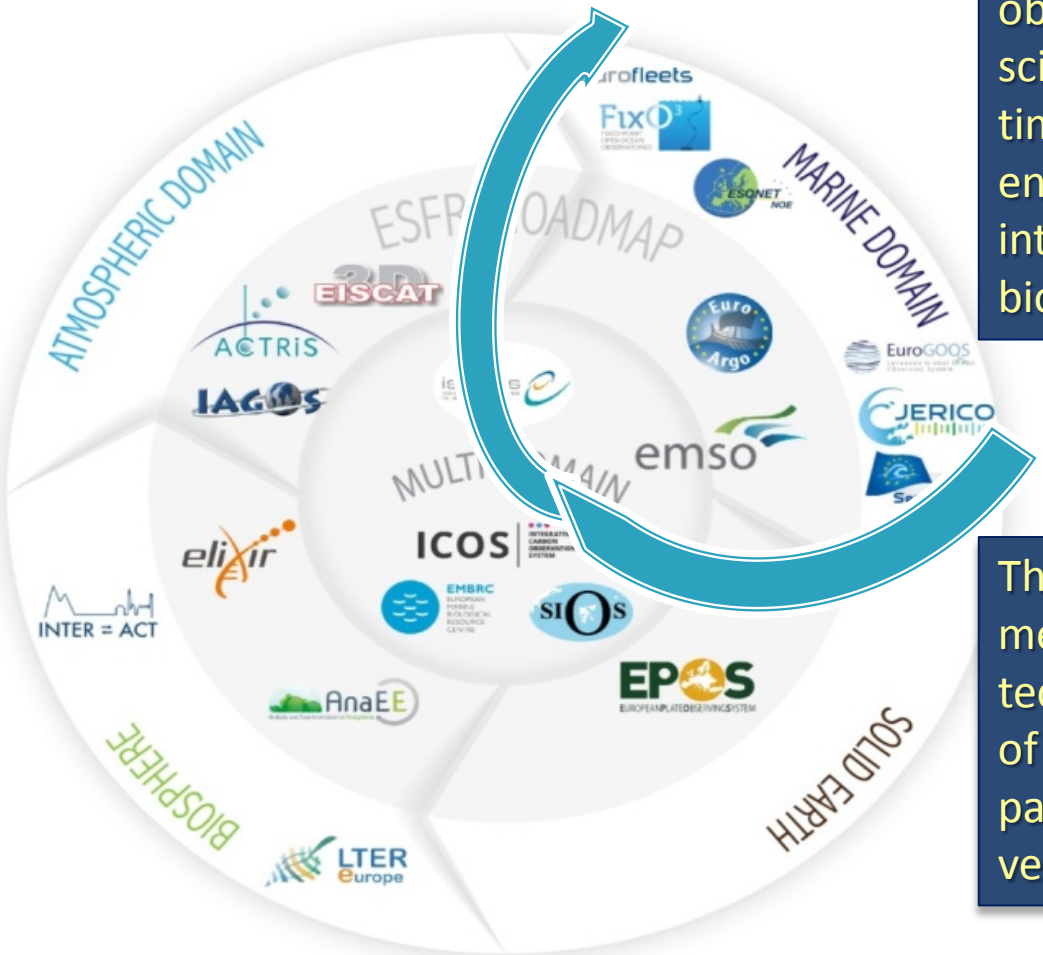
- France
- Greece
- Ireland
- Italy
- Portugal
- Romania
- Spain
- United Kingdom

Automated laboratories

Cabled **Stand-alone**

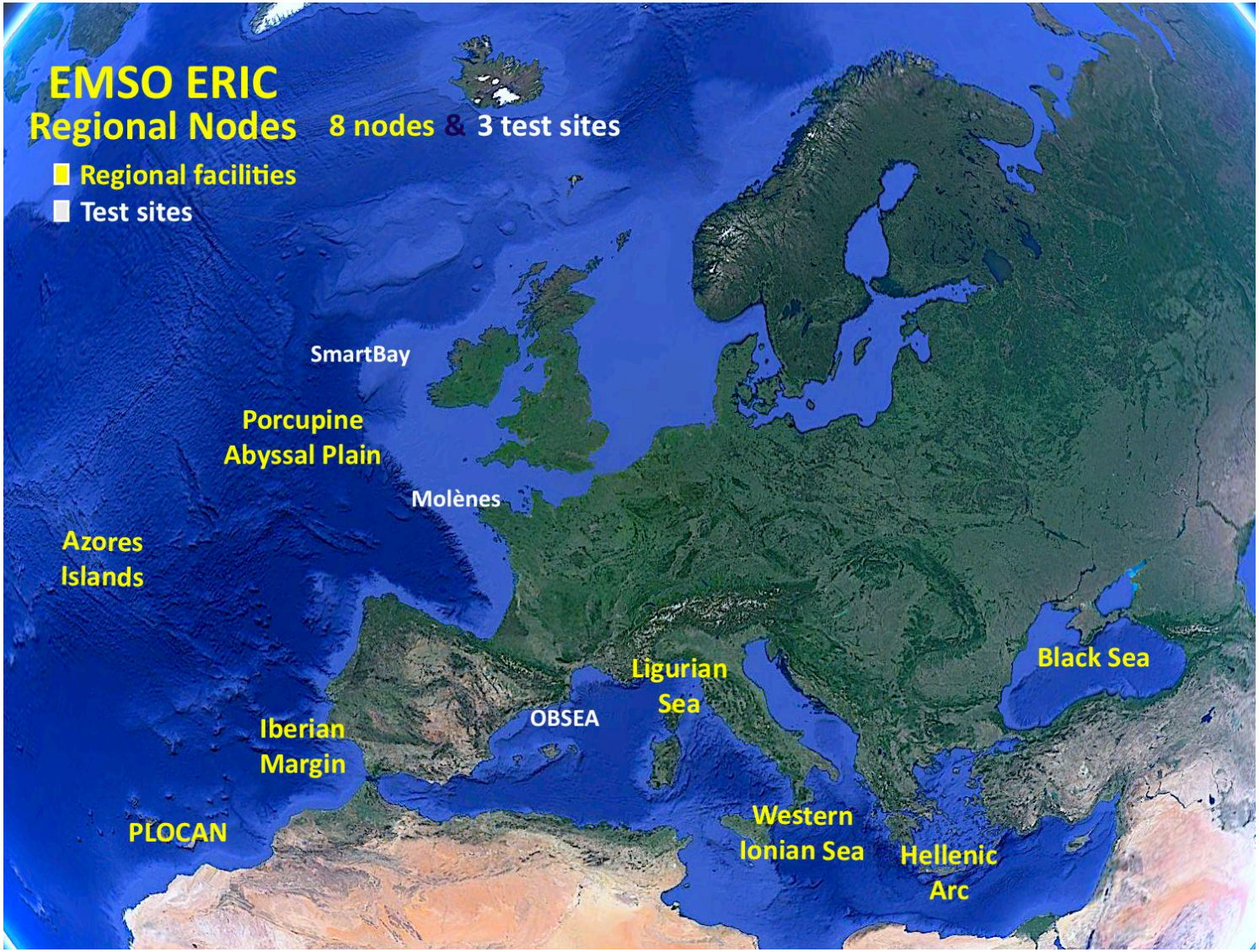


European Environment Research Infrastructures (RI



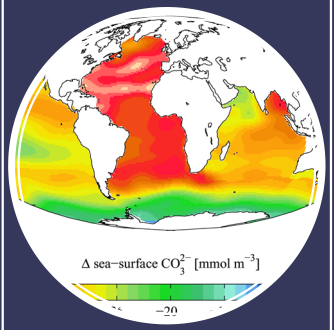
EMSO is a large-scale distributed European RI, strategically placed.
Consisting of seabed and water column observation nodes whose essential scientific objective is to observe in real time, and in the long term, environmental processes related to the interaction between the geosphere, the biosphere and the hydrosphere.

These infrastructures require, in the medium and long term, significant technological needs and commitments of their members that involve the participation of European oceanographic vessels


EMSO ERIC
Regional Nodes
8 nodes & 3 test sites
Regional facilities
Test sites
SmartBay
Porcupine
Abyssal Plain
Molènes
Azores
Islands
Ligurian
Sea
Black Sea
OBSEA
Iberian
Margin
PLOCAN
Western
Ionian Sea
Hellenic
Arc

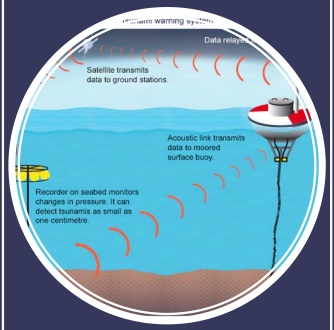
Research Infrastructure Challenges

To fulfil European societal scientific demands targeted in the EU´s H2020 Blue Growth Strategy

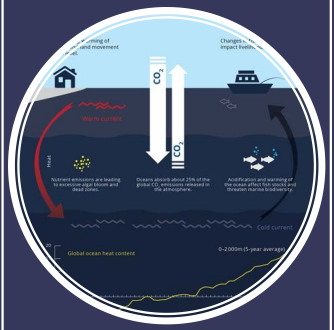


Global ocean warming and acidification

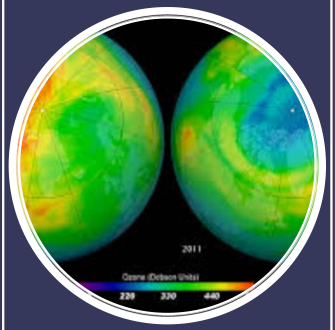
Impact and sustainability of Marine Resources exploitation



Real-time observations and early warning systems for earthquakes & tsunamis



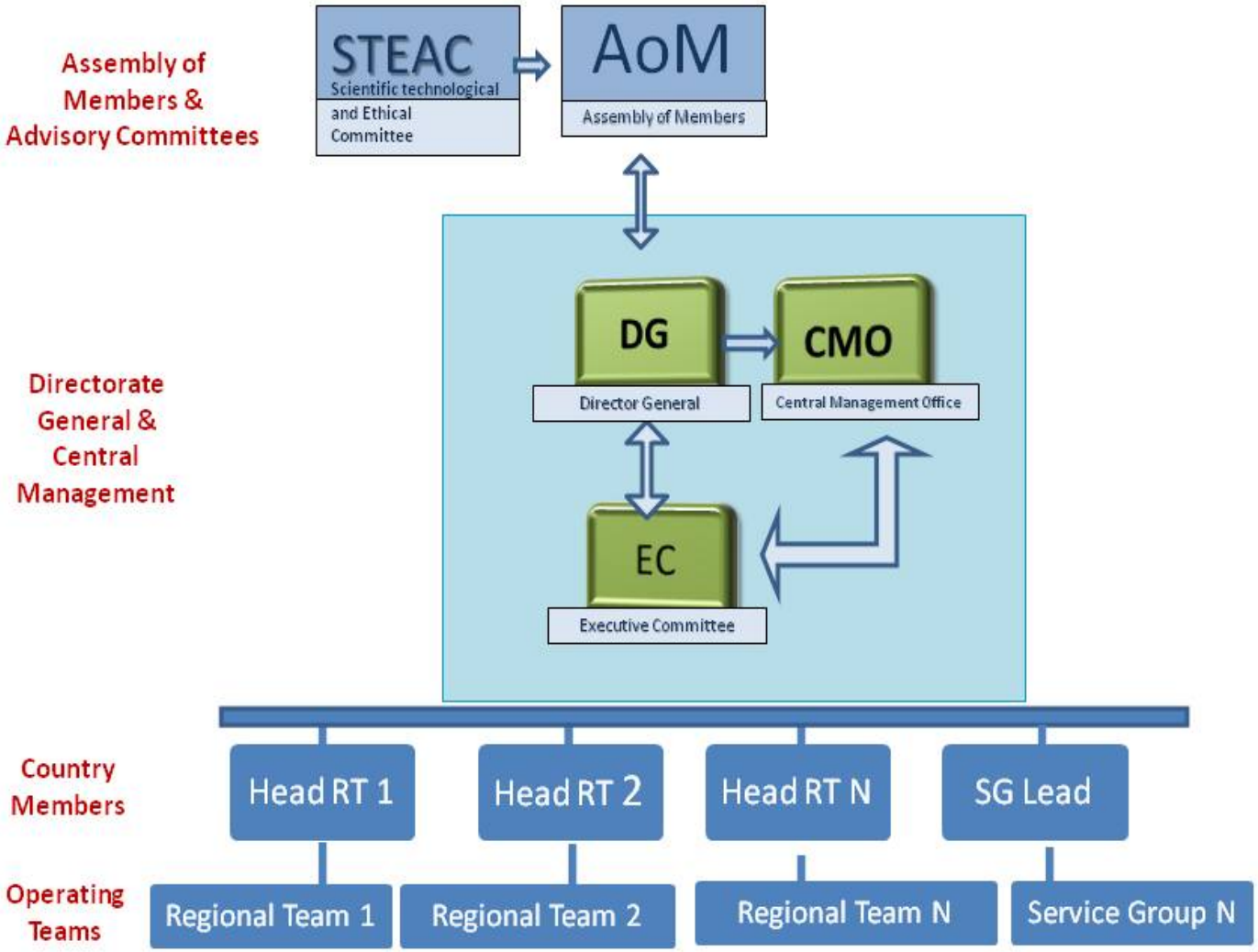
Marine Ecosystems and Climate Change mitigation



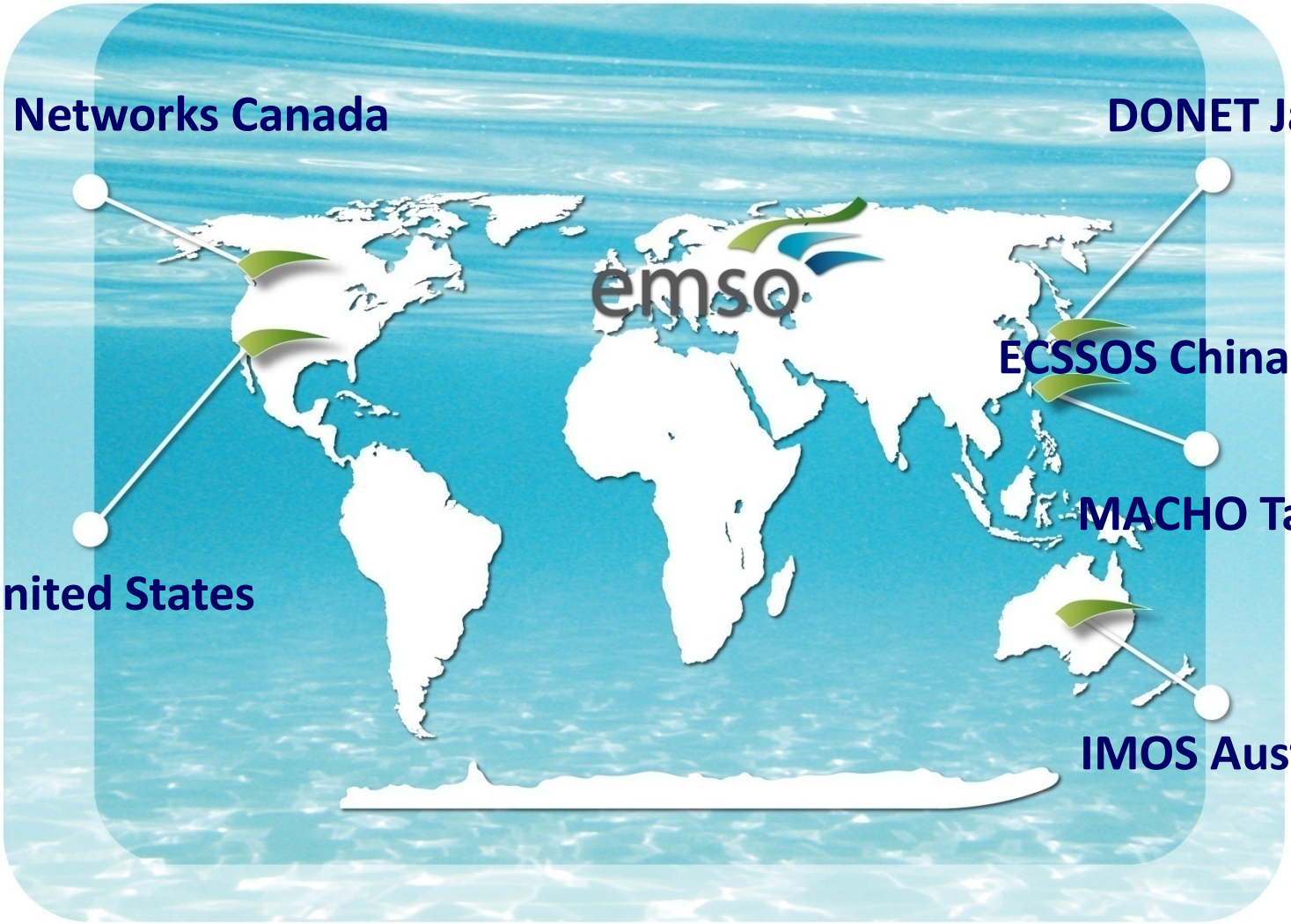
Earth interactions hydrosphere, biosphere, lithosphere, atmosphere

Access HIGH QUALITY MARINE ENVIRONMENTAL DATA

GOVERNANCE SCHEME



International Dimension



Relationship with other Research Infrastructures

Europe/Global

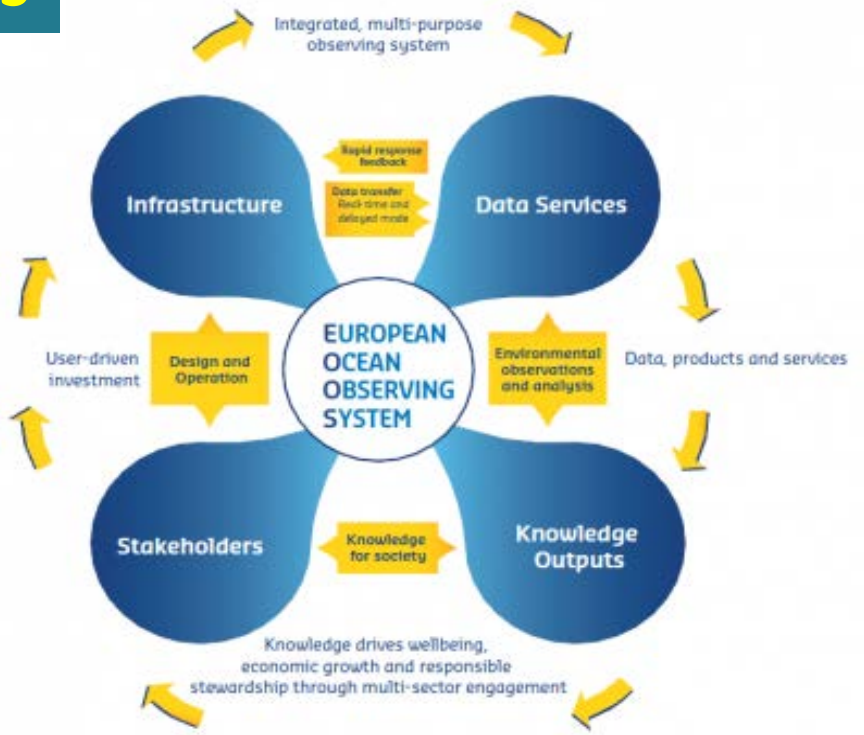
- Contacts and exchanges with sister research infrastructure initiatives (e.g. through COOP+):
  - ONC - Ocean Networks Canada (Canada)
  - OOI - Ocean Observatories Initiative (USA)
  - DONET - Dense Ocean floor Network for Earthquakes & Tsunamis (Japan)
  - IMOS - Integrated Marine Observing System (Australia)
  - ECSSOS - East China Sea Seafloor Observation System (China)
  - MACHO - MArine Cable Hosted Observatory (Taiwan)

- Cooperation and co-investment with industry (e.g., oil & gas, renewable energy, deep-sea mining, fisheries)

Cooperation to Global Observing Systems

Global Observing System: COPERNICUS

EMSO ERIC will contribute in-situ observations for the Global Monitoring for Environment and Security Initiative, COPERNICUS, and is aligned with the challenges and key priorities of Horizon 2020 and, in particular, with the Marine Strategy Framework Directive (MSFD, www.msfd.eu)



Biosphere, Atmosphere and hydrosphere Interactions

European Ocean Observing System: EOOS

Marine domain

in-situ spatial and temporal integration with the satellite observations, considering existing ERICs infrastructures, such as EUROARGO, ICOS and EMSO

Coordinated efficiency efforts:

- **Innovation Technology**
- **Data Storage & Exchange (EOSC)**
- **Multidisciplinary observations**
- **Maintenance & new equipment deployments**
- **Training & Communications**

Multi-domain

ENVRIplus cluster opportunities for collaboration

- Biodiversity
- Carbon dioxide in atmosphere
- Carbon dioxide absorption at Oceans

Proposal for a central RI Innovation-Readiness & Industry Liaison Hub

EMSO ERIC proposed initiatives for 3rd BEERI (Board of European Environmental Research Infrastructures)

Constitute, and appropriately fund, an ENVRIplus Innovation Industry Liaison Task Force of 5-6 RI innovation specialists with business-science backgrounds and proven track records in commercialization and technology transfer promotion

Establish an Innovation Services Unit or Hub, together with selected communications and innovation staff in each RI, for facilitating, promoting, training and advising on innovation/commercialization/technology transfer matters

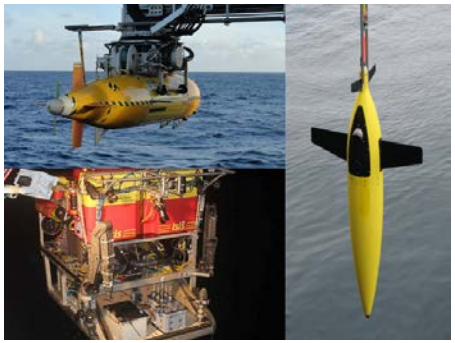
Explore the possibility with the newly constituted ERIC FORUM to coordinate preparation of a unitary proposal in response to H2020 Work Programme 2018-2020 calls such as the upcoming INFRAINNOV call to establish a Network of RI Industry Liaison Officers (RTD)

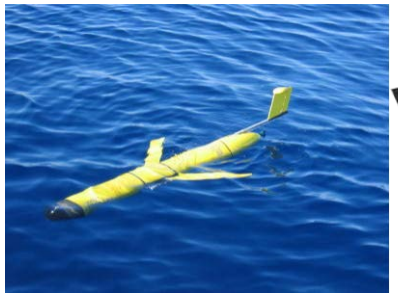
Explore opportunities , with the help of the Commission, for structured RI collaboration on select industry partnering themes with the EU's #1 innovation delivery arm, the European Institute of Innovation and Technology (EIT) and specifically with EIT's Climate and InnoEnergy Knowledge Innovation Centres (KICs).

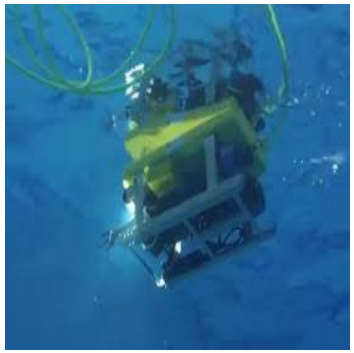
ACCESS TO RESEARCH VESSELS

Aiming to implement physical access to oceanographic vessels

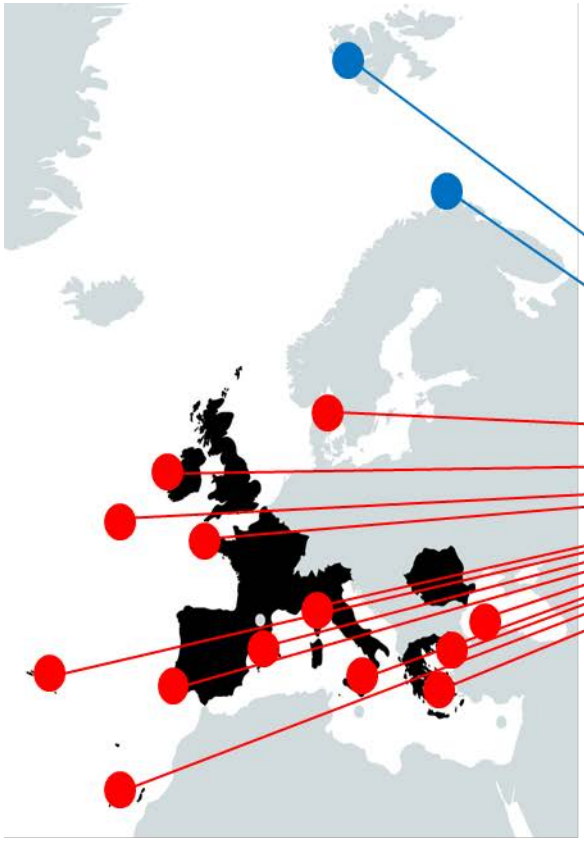
- Propose a long-term strategy of action in the EOOS of the European fleets ideally provided by EUROFLEETS 3 and supported by ERVO ?
- At worldwide scale a joint collaboration using the experiences of IRSO
- Include it in the implementation plans of other RIs such as EMSO ERIC,







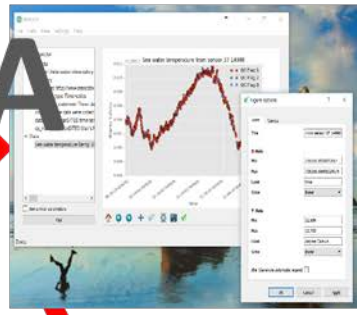
Providing High quality Environmental Data

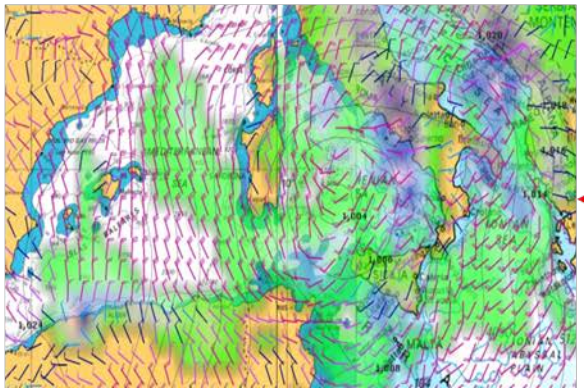


emso dev

RESTful API

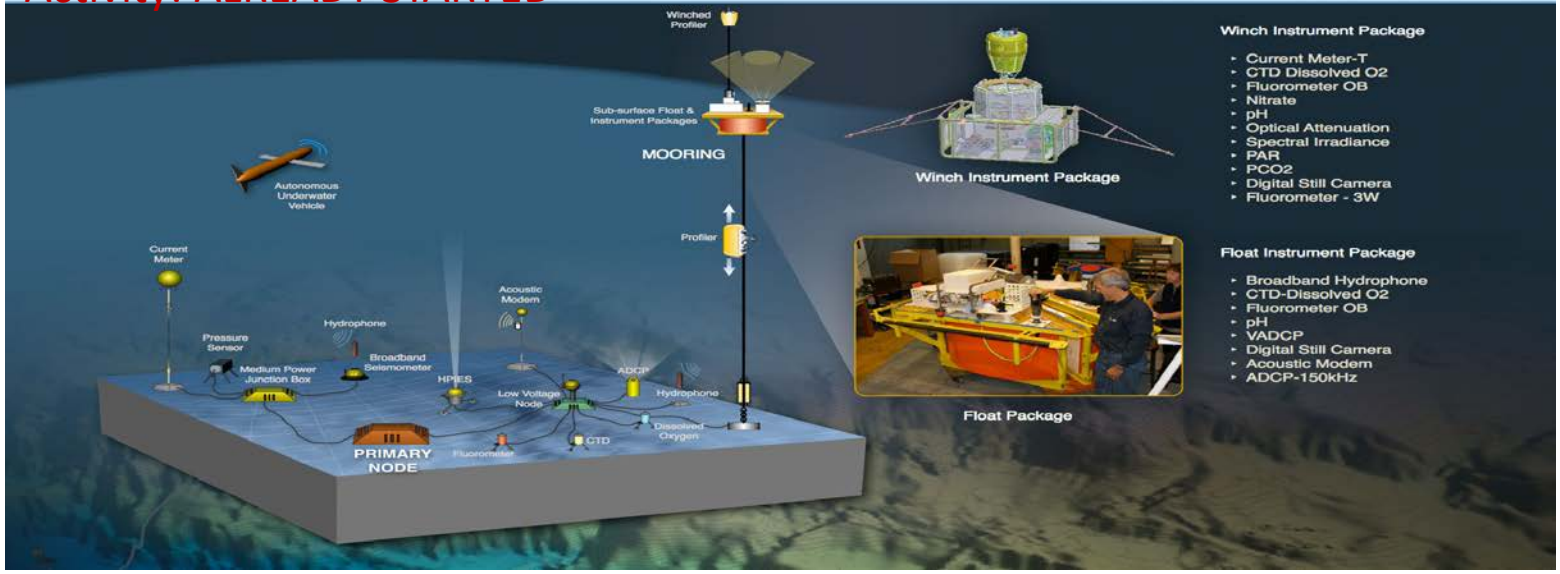
MOODA





NEXT STEP

Activity: ALREADY STARTED



EMSO ERIC MAIN SERVICE GROUPS

- ENGINEERING & LOGISTICS
- DATA
- SCIENCE
- COMMUNICATIONS

EMSO ERIC first 3-years goals

Confirm Regional Teams Managing the nodes and implement 4 Services Groups

SCIENCE | DATA | ENGINEERING & LOGISTICS | COMMUNICATIONS

EMSODEV (2015-2018):

Development of Generic Instrument Modules to ensure increased coordination, integration, interoperability and standardisation across sites and disciplines

DMP-Data Management Platform to guarantee the data accessibility to the scientific users and stakeholders

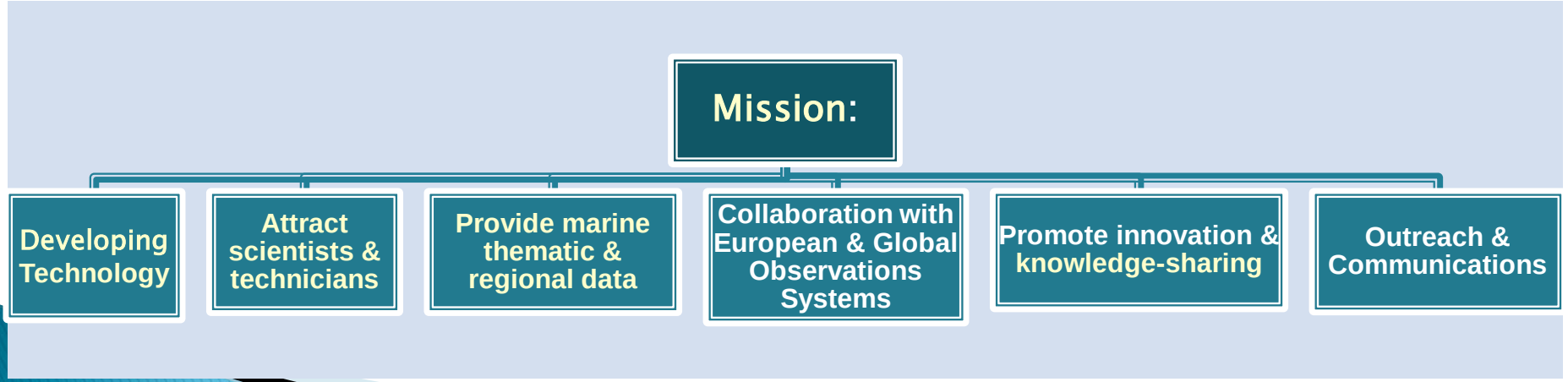
EMSO-Link (2017-2020):

Enabling EMSO ERIC Objectives to add other member states and industrial partners, to coordinate the construction of additional nodes and provide pilots of access, and to perform market studies and investigate additional funding

Research Infrastructure Mission

Data from the seafloor/sub-seafloor and water column are essential for intelligently understanding fundamental processes occurring in the ocean and affecting European and global society

Subjects such as how **ocean circulation affects climate change**, how to promote and **develop sustainable marine resources**, **implement tsunami early warning**, or **monitor/mitigate the loss of biodiversity** in the ocean ecosystem are **issues of high economic and health impact in modern societies**. The implementation of EMSO ERIC distributed Marine Infrastructure will greatly advance knowledge required to tackle these challenging issues.



EMSO-ERIC Strategy- MAIN PILLARS

Outline a sustainable business plan

a) Preparation of a five-year action plan and financial projection

- Develop existing regional partner facilities
- Define technology transfer strategy for completed projects (legacy), and others in progress
- Prepare service agreements with stakeholders

b) Establish strategy for financial sustainability

- European Commission infrastructure calls and others
- Industry accords
- Public and Private partnering agreements

c) Science and Technology Plan

- Define compliance policy with **EU directives** (e.g., INSPIRE, MSFD)

Scientific & Societal demand for Environmental Marine Research Infrastructures

Engagements to inspire EMSO ERIC Research:

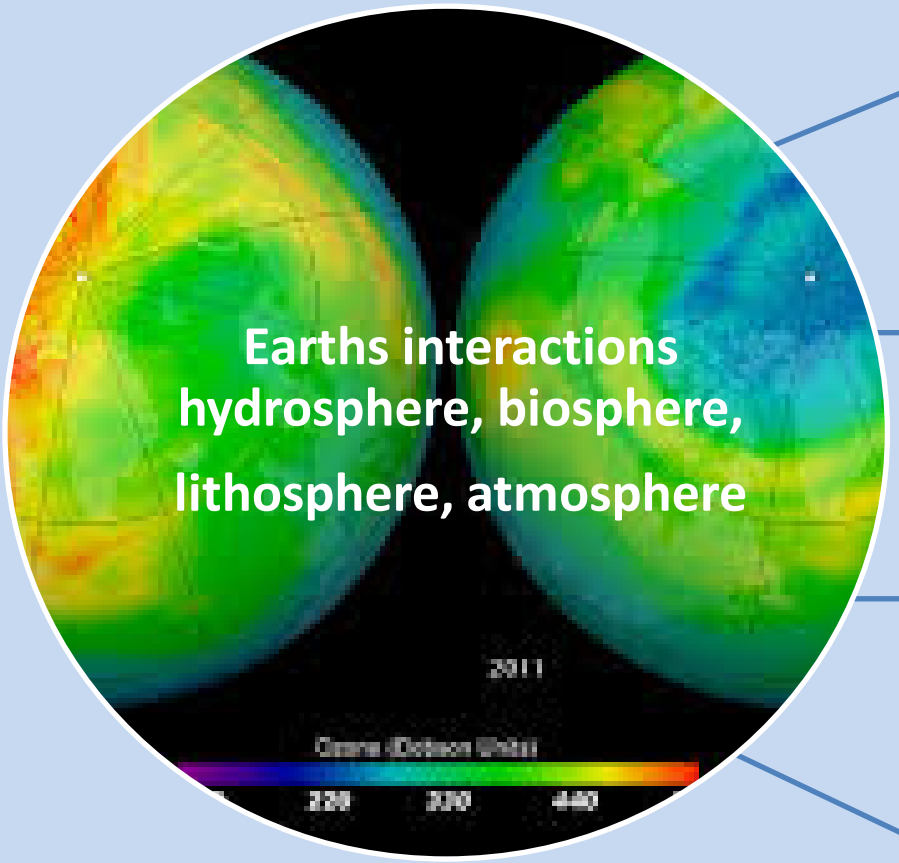
- **Increase European Node Coverage,** integrating FixO3 legacy moorings/observatories, expanding exiting nodes, enhancing cabling nodes, etc.
- **Enlarge Membership,** consolidate and promote better integration with **Germany**, **The Netherlands**, **Sweden**, **Norway**, **Turkey,** and pursue relations with interested countries such as **Malta**, **Croatia**, **Cyprus**, **Iceland**
- **Enhance international cooperation** with programs such as ICDP/IODP, OceanSites, IOOS. Enact MOU´s with **sister initiatives**, such as ONC, OOI, DONET, IMOS, ECSSOS, MACHO
- Share Marine Vision with JPI-Oceans, EuroGOOS, and ESF-Marine Board
- **Increase visibility** Launching pilots of access provision
- **Outreach** Define a communication and branding strategy
- **Interaction with EU programmes** Such as those of the European Institute of Innovation and Technology (EIT). Establish formal relations especially with DG R&I, DG ENV and DG MARE

Scientific & Societal demand for
Environmental Marine Research Infrastructures

european multidisciplinary seafloor & water column observatory

emso ERIC

Facilitating the *Blue Economy*



Geohazard and early warning for earthquakes ,tsunamis, gas-hydrates release,

Interactions between ecosystems , biodiversity, biogeochemistry physic and climate for e.g. understanding present and past climate changes?

Impact of exploration and extraction of natural resources and living resources

Observation on how Natural and Anthropogenic changes

Connecting scientific outcomes to stake holders and policy makers

EMSO ERIC was constituted on September 29, 2016 (EU Official Journal L268/59 October 1st, 2016)