EMSO-ERIC

European Multidisciplinary Seafloor and water column Observatory

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WHAT IS EMSO

EMSO is a strategic Marine European Research Infrastructure Consortium (ERIC), with the capacity to collect high quality environmental parameters.

The aims:

- to explore the oceans;
- to gain a better understanding of phenomena happening within and below them;
- to explain the critical role that these phenomena play in the broader Earth systems.

The mission:

- provide deep sea high quality, long term time series
- develop technology for sensors, communications, offshore operations
- attract scientist, technicians, managers and industries
- collaborate with European and International Organizations and Institutions
- promote innovation and knowledge-sharing
- conduct outreach and communication
8 Regional Facilities & 3 Test sites located at strategic sites from the North Atlantic through the Mediterranean, to the Black Sea

Regional Facilities and Test Sites

Automated labs
- Cabled
- Standalone
Research consortium:
- Italy
- France
- Ireland
- Spain
- Greece
- United Kingdom
- Portugal
- Romania
EMSO Key Scientific Objectives

**Geosciences**
- Seismicity
- Gas hydrate stability
- Seabed fluid flow
- Submarine landslides
- Submarine volcanism
- Geo-hazard early warning

**Biogeochemistry**
- Ocean acidification & Solubility pump
- Biological pump
- Hypoxia
- Deep-ocean biogeochemical fluxes
- Continental shelf pump

**Physical Oceanography**
- Ocean warming
- Deep-ocean circulation
- Benthic and water column interactions
- Marine forecasting

**Marine Ecology**
- Climate forcing of ecosystems
- Molecules to microbes
- Fisheries
- Marine noise
- Deep biosphere
- Chemosynthetic ecology
DISTRIBUTED ORGANISATION MODE

EMSO ERIC provides harmonized integration, operation and development of Regional Facilities

- Science
- Data
- Engineering & Logistics
- Communication
- Industry & Innovation

It will increase visibility, capacity and research, supported by a distributed strategy, offering integrated services to a broad range of users
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Regional Facility goals
Regional Facility array of services
Regional Facility user base

MAPPING

Common goals
Integrated services
Expanded user base

It will increase visibility, capacity and research, supported by a distributed strategy, offering integrated services to a broad range of users
Services represent EMSO’s capacity to address common needs:

**Science**
Climate Change, ecosystems interactions, Geo/hazards, gas hydrate releases, anthropogenic marine impact

**Engineering & Logistics**
Testing and demonstration, marine operations, sensor & platform development, maintenance

**Data management**
Data acquisition, storage, QC and validation, data processing and visualization

**Communications**
Brand development, organizational cohesion, media, publications, capacity building, education

**Industry & innovation**
Consultancy & management, commercialization, partnerships, technology transfer
EMSO implementation and operation: DEVelopment of instrument module

EGIM

EMSO Generic Instrument Module is envisioned to ensure increased coordination, integration, interoperability and standardisation across sites and disciplines

Core variables captured by the EGIM and their cross-disciplinary application

<table>
<thead>
<tr>
<th>Variable</th>
<th>Geosciences</th>
<th>Physical Oceanography</th>
<th>Biogeochemistry</th>
<th>Marine Ecology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Conductivity</td>
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<td>X</td>
<td>X</td>
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<td>Pressure</td>
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<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Dissolved O₂</td>
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<tr>
<td>Turbidity</td>
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<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Ocean currents</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Passive acoustics</td>
<td>X</td>
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EMSO-Link EC Project
Enabling EMSO ERIC Objectives

- Additional member states and industrial partners
- Coordinate the construction of additional nodes & provide pilots of access
- Perform market studies & Investigate additional funding
- Additional servers to increase accessibility to data
- Outreach initiatives with dedicated office for science services, communication / dissemination

2017

2020
To enlarge and reinforce the existing membership;

To consolidate and promote the partnership between the Commission, Member States, Associated Countries and relevant stakeholders;

To upgrade the synergy with other related research Infrastructures;

To enhance the interaction with potential industrial users and technology partners increasing trust and awareness;

To increase international cooperation linking ocean scientists and engineers into an international team (global dimension).

http://emso.eu
Link with non-EMSO seafloor & water column observatories

Consolidate relations
• EMSO ERIC countries
• Germany
• The Netherlands
• Turkey
• Norway
• Sweden

Relationships
• Iceland
• Malta
• Slovenia
• Croatia
• Faroes
• Greenland
• Middle East
• Black Sea

Common Issues

Marine Technology

Metrology

Carbon flux

Climate Change
Mechanisms

Strategy Meetings

Metrology Activities

Event Mapping

IEEE Oceanic Engineering Society

ABERDEEN JUNE 19-22
ANCHORAGE September 18-21

European Geosciences Union

Best Practices

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EMSO ERIC seeks efficient mechanisms to connect with organisations designing and implementing policy at EU level

Contribution to MSFD indicators

Fixed Platform TT
Contribution to EOOS
An Integrated and Sustained European Ocean Observing System (EOOS)

Addressing the Seas and Oceans Grand Challenge

The EuroOCEAN 2010 Conference identified priority marine and maritime research challenges and opportunities in areas such as food, global environmental change, energy, marine biotechnology, maritime transport and marine spatial planning, including seabed mapping. The Conference delivered an unequivocal message on the societal and economic benefits Europe derives from the seas and oceans and of the crucial role that research and technology must play in addressing the Seas and Oceans Grand Challenge.

The European marine science and technology community, building on existing achievements and initiatives, is ready to address this challenge in partnership with industry and the public sector, and call upon the European Union and its Member and Associated States to facilitate this response by delivering the following proactive and integrating actions:

1. Joint Programming
   Develop an integrating framework, combining the assets of European programmes with those of Member States, to address the Grand Challenge of the Seas and Oceans, including the identification and delivery of critical marine research infrastructures. The Joint Programming Initiative on “Healthy and Productive Seas and Oceans” has the appropriate scale of integration and should be actively supported by the European Commission and Member States.

2. European Ocean Observing System
   Support the development of a truly integrated and sustainably funded “European Ocean Observing System” to (i) re-establish Europe’s global leading role in marine science and technology; (ii) respond to societal needs by supporting major policy initiatives such as the Integrated Maritime Policy and the Marine Strategy Framework Directive; and (iii) support European contributions to global observing systems. This could be achieved through better coordination of national capabilities with appropriate new investments, in coordination with relevant initiatives (e.g. ESFRI, EUMODNET, GMES) and the engagement of end-users.

3. Research to Knowledge
   Establish appropriate mechanisms to keep under review current marine and maritime research programmes and projects with a view to enhancing their impact by (i) exploiting the results of this research; and (ii) identifying existing and emerging gaps. This should be supported by a repository for the reports and findings of national and EU marine and maritime research projects, programmes and initiatives, with capacity for archiving, translating, analysing, reporting and developing integrated knowledge products to facilitate policy development, decision making, management actions, innovation, education and public awareness.

EuroOcean 2010
Ostend Declaration

Ostend Declaration – Adopted on 13 October 2010
EuroGOOS - MoU between EuroGOOS and EMSO will be signed this week

JPI Oceans – Discussions towards a common meeting to explore future possibilities of cooperation.

DG MARE - A white paper on the contribution of EMSO nodes to the MSFD.

- EMSO is a powerful, large-scale, strategically distributed world-class ERIC
- EMSO allows the pooling of resources and coordination to assemble harmonised data into a comprehensive regional ocean picture / EGIM
- EMSO makes available outcomes on an open and interoperable access basis

A white paper on the capacity of EMSO nodes to contribute to the MSFD

http://emso.eu

• Different directives, legislative tools and governance among EU States.
• Very little harmonization at national and international levels in the collection of marine data
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http://emso.eu
Formal agreements with particular emphasis on infrastructural synergies and data sharing

ENVRI-FAIR
New possibilities

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Special events as the one organized during the Oceanology International Conference (13-15 March 2018, London) can help to:

- Ø promote EMSO ERIC nodes at test beds to the industry
- Ø participation of industry in the user community of EMSO ERIC (especially in the Technical Committee)
- Ø adopt and use Yellow Pages to connect with SME's
- Ø setup a forum between industry and EMSO ERIC.

Meetings with potential industrial users and technology partners.
- Cluster initiated by FixO3
- Forum for Coastal Technology (J-N)
- Alliance for Coastal Technology - ACT

Use of the EMSO ERIC nodes as test beds for industrial equipment through TNA

Long-term sustainability plan for ESONET Yellow Pages

Participation of industry in the user community of EMSO ERIC (ESONET-Vi and to STEAC- Scientific, Technical and Ethical Advisory Committee)

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  - Service Group on Industry & Innovation
  - Include Industry People in EMSO-ERIC bodies
  - Promote regulation regarding the production of marine products in EU

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Why is it important?

Global challenges must be addressed in a coordinated manner.

Need to strengthen the dialogue between international RI’s.

Common practices:
- Technology exchange
- Data
  - QC
  - Access
  - Sharing

Climate
Operationa
l Services
Marine Ecosystem Health
AIM:
• exchange know-how,
• align strategies & practices
• encourage new developments
• promote a global dimension.

Establishment of an international board, which will among other things, will organise a biennial EMSO ERIC scientific and technical conference

workshops focusing on the exchange of best practices between node operators

Common science-policy and technology briefing papers as an outcome of meetings enhancing the role of the EU in international organisations and multilateral fora.

Communication platform/forum in the EMSO ERIC webpage for interaction, exchange of experience and material such as operating protocols.

Links with International Observatory Programs
The International Observatory Programs

http://emso.eu
4th All Regions meeting, Rome Oct 2017

- 3 days, 120+ participants, 56 presentations, 33 posters
- chief scientists and engineers from 4 International RI’s (IMOS, OOI, DONET, ONC)
The International Observatory Programs

ONC and EMSO MoU signed May 2018
http://emso.eu
Opportunities

CERTIFICATION / LABELING

EGIM

2.4bn€ under Open Science Pillar on Research Infrastructures
The EMSO-Link project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreements N° 731036.

Thank you for your attention.