

# The European Consortium EMSO and the crucial role of international collaboration in ocean observing systems

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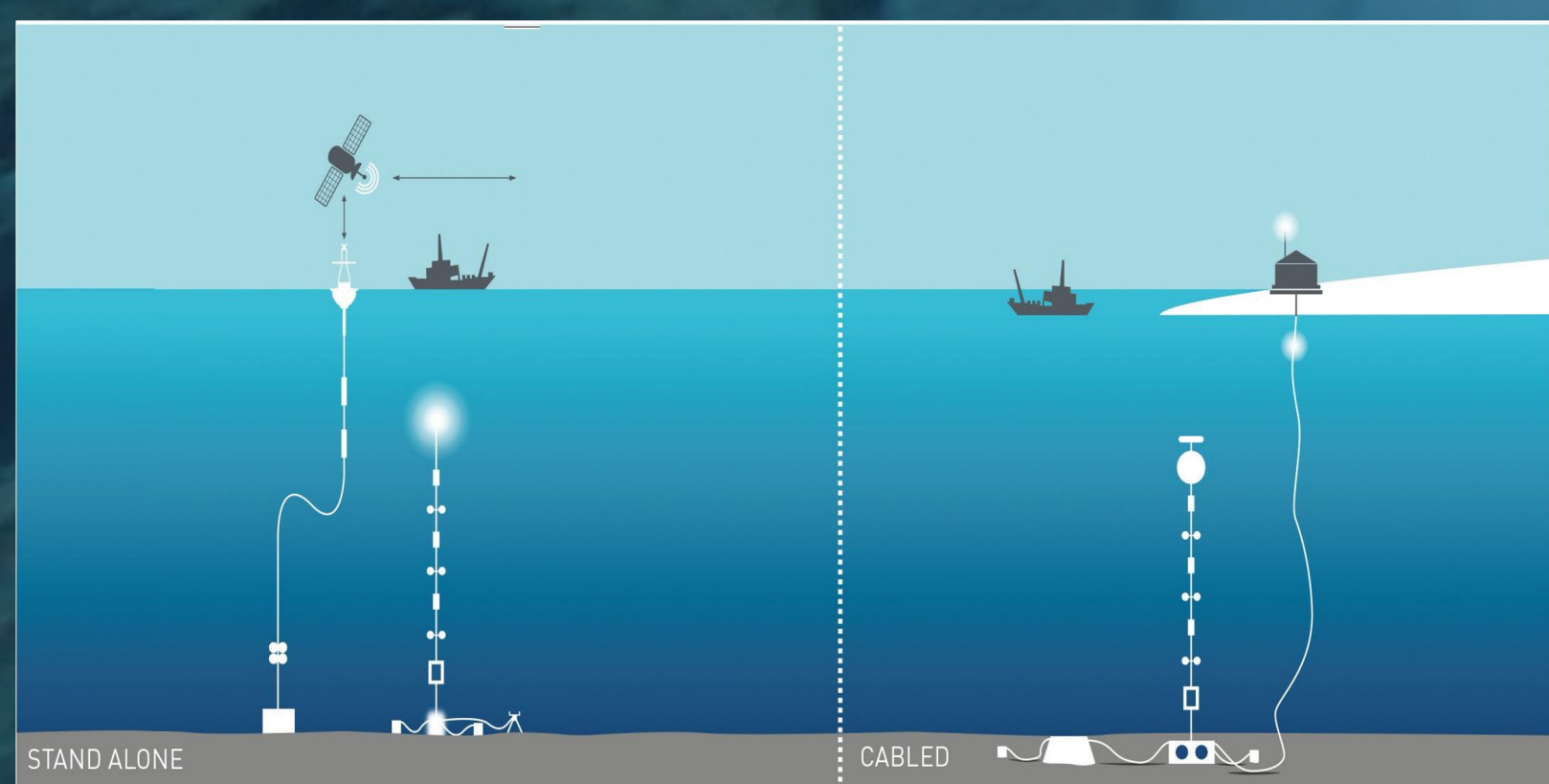
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## INTRODUCTION

EMSO, the European Multidisciplinary Seafloor and water column Observatory, is a European Research Infrastructure Consortium (ERIC) of eight countries: Italy (host country), France, Greece, Ireland, Norway, Portugal, Romania, and Spain. It aims to promote excellent science through the coordinated operation of a key environmental distributed infrastructure of 13 Regional Facilities cabled and stand-alone, including deep-sea multi-sensor platforms, two of them are shallow-water test sites and provide services for the scientific community, the industry and other stakeholders.

## MISSION

EMSO ERIC aims to promote advances in the knowledge of deep ocean and water column processes, through multidisciplinary monitoring, analysis and dissemination of data obtained in the different regional facilities (see enclosed map) through deep sea sites, sensors and other instruments, capable to ensure long-term sustained observations of the state of the ocean. EMSO ERIC multi-parameter long time-series cover a wide range of critical oceanic essential variables (EOVs) that cannot be attained by classical disciplinary research marine expeditions.



## EMSO THEMATIC AREAS



### MARINE ECOSYSTEMS

Distribution and abundance of sea life, ocean productivity, biodiversity, ecosystem function, living resources, carbon cycling and climate feedback.



### CLIMATE CHANGE

Deep ocean circulation and exchange with shallow layers, variation of ocean constituents, sea level rise.



### GEOHAZARDS

Slope instabilities, hydrothermal vents, seismic and volcanic events, tsunamis.



### TECHNOLOGICAL CHALLENGE

New marine sensors, monitoring systems and auxiliary devices, hardware, software, smart cables, co-developing with scientific users and industry.

## INTERNATIONAL COLLABORATIONS

EMSO ERIC has a strong international dimension. It actively participates in European programs and networks, such as the European Research & Innovation Programme Horizon Europe, but also the Copernicus Programme and the EMODnet network, by providing marine data, as well as intergovernmental initiatives such as EOOS (European Ocean Observing System) by being involved in the Operations Committee.

EMSO established cross-collaboration and cooperation with other European research infrastructures in the environmental domain, sharing goals: Euro-Argo (a European infrastructure examining the role of oceans in the global climate system) and ICOS (Integrated Carbon Observation System) currently participating in the GEORGE project, funded by the EU, with the aim of providing reliable and high-quality scientific data on the state of the ocean and increasing acidification (exchange of CO<sub>2</sub> with the atmosphere) and helping decision-making by authorities on how to adapt and mitigate the impact of climate change. GEORGE project represents a great opportunity to improve and harmonise marine data collection methods and ocean observation technologies from different parts of the water ocean: ICOS conducts surface ocean observations, Euro-Argo carries out both horizontal and vertical water column observations with extensive spatial coverage and EMSO examines the seafloor observations.



EMSO, together with many other Research Institutions, Infrastructures and Citizen Science associations, is now working within the EU project ANERIS to tackle the rapid loss of ocean biodiversity by developing innovative tools and technology for monitoring, research and management of marine life, and introducing the concept of Operational Marine Biology (OMB). Thanks to this biodiversity information system, the science community will acquire long-term routine measurements of ocean and coastal ecosystems with a quick interpretation and dissemination to all relevant stakeholders.

## BACKGROUND

More than

**80%**  
of the ocean remains  
unexplored

Only about

**7%**  
of the world's oceans  
are designated as  
marine protected  
areas

Marine observations are essential to progress in our understanding of the ocean and its role in a changing environment, it has been becoming more and more urgent to increase coverage and resolution of physical, chemical and biological processes in space and time through high-quality observations and data.

## “One Ocean Network for Deep Observation”, a UN Ocean Decade endorsed action

In the global context, EMSO is also key partner of the Decade Ocean Program “One Ocean Network for Deep Observation (One Deep Ocean)”, a coordination between international organizations and inter/multidisciplinary observatories and surveying technologies at various sites in the global ocean. Its principal aim is to integrate knowledge on deep-sea ecosystems functioning under global changes, to advance hazard mitigation from natural hazards and to engage citizens with the deep ocean that faces a growing pressure because of human activities.

In the South Pacific, last May, scientists from IFREMER and the JAMSTEC installed a new underwater observation system to study the seamounts in the Coral Sea, south of New Caledonia. It will help develop a new generation of multidisciplinary deep-sea observatories.

Lead Institution: IFREMER.

Key partners: EMSO ERIC, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Ocean Network Canada (ONC)



## COMMITTED COUNTRIES AND REPRESENTING ENTITIES

- FRANCE Ifremer - L'Institut Français de Recherche pour l'Exploitation de la Mer; CNRS - Le Centre National de la Recherche Scientifique
- GREECE HCMR - Hellenic Centre for Marine Research
- IRELAND MI - Marine Institute
- ITALY INGV - Istituto Nazionale di Geofisica e Vulcanologia
- NORWAY RCN - The Research Council of Norway
- PORTUGAL FCT - Fundação para a Ciência e a Tecnologia
- ROMANIA GeoEcoMar - National Research and Development Institute for Marine Geology and Geoecology
- SPAIN PLOCAN - Plataforma Océánica de Canarias



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