

The EGIM, EMSO generic instrument module, step towards standardization

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1: IFREMER, Plouzané, FRANCE; 2: NOC, Southampton, UNITED KINGDOM; 3: CNRS IPGP, Paris, FRANCE; 4: HCMR, Anavyssos, GRECE; 5: UPC, Vilanova i la Geltrú, SPAIN



EMSO ERIC, the “European Multidisciplinary Seafloor and water column Observatory”, has developed the EGIM, EMSO Generic Instrument Module, in the frame of the H2020 project “EMSO-Dev”. The module aims at consistently and continuously measuring seven Essential Ocean Variables for the science areas at the various regional facilities pertaining to EMSO, placed at key sites around the European seas.

The EGIM core variables include temperature, conductivity, pressure, dissolved O₂, turbidity, ocean currents and ocean noise. These parameters are of great interest for different disciplines, ranging from geosciences to physical oceanography, to biogeochemistry and marine ecology, addressing Grand Challenges such as ocean acidification and warming. They support the Global Ocean Observing System, and the Marine Strategy Framework Directive towards evaluating environmental status of the European seas.

The EGIM is designed to adapt to the various EMSO Observing Unit configurations: mooring line, cabled or non-cabled sea bed station and surface buoy. Its compact and modular nature, low power requirements, mechanical design and embedded software allow for flexible deployment scenarios and can accommodate new instruments. These are key points to the modularity, inter-operability and capacity of future evolution of the EGIM.

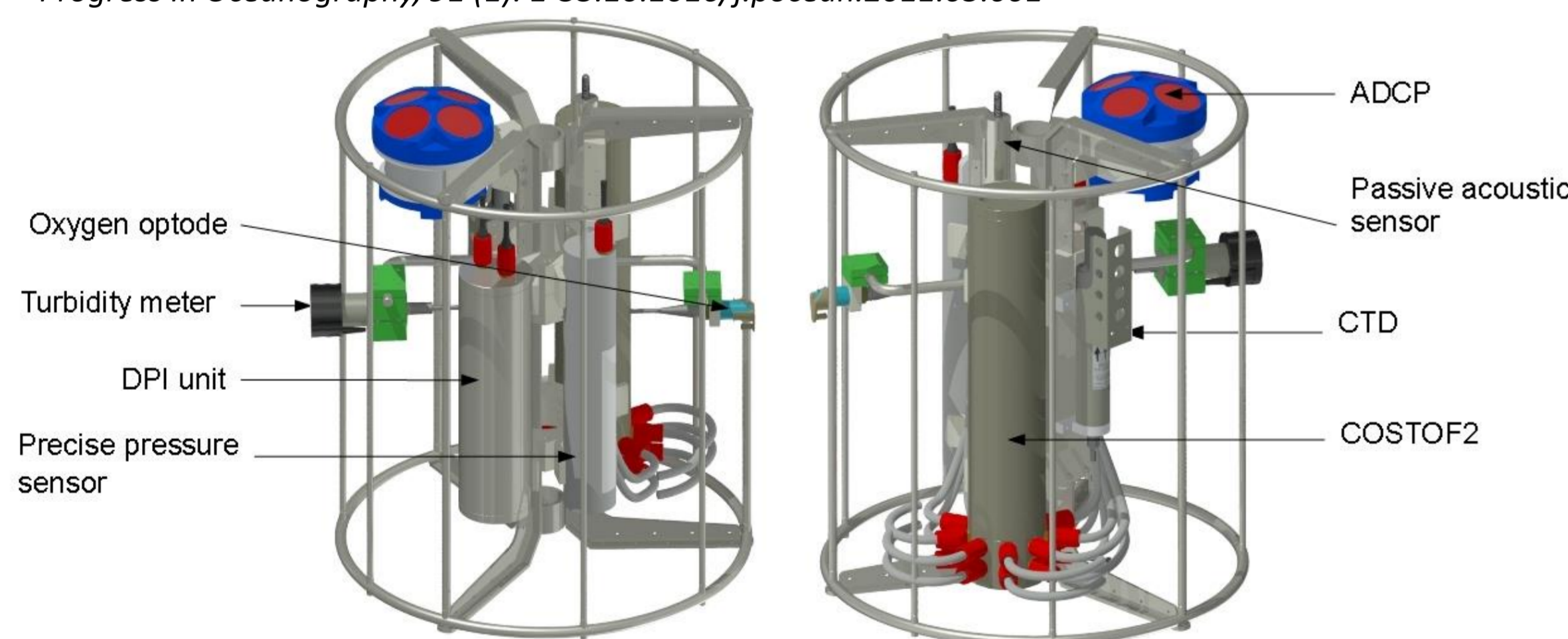
Using the EGIM as a common EOv measurement reference for all Regional Facilities is a crucial step towards standardization, increasing global reliability, data quality and reducing metrological discrepancy and costs across EMSO consortium. The EGIM can be considered as a milestone to meet the marine community need for of standardization and interoperability.

The EGIM

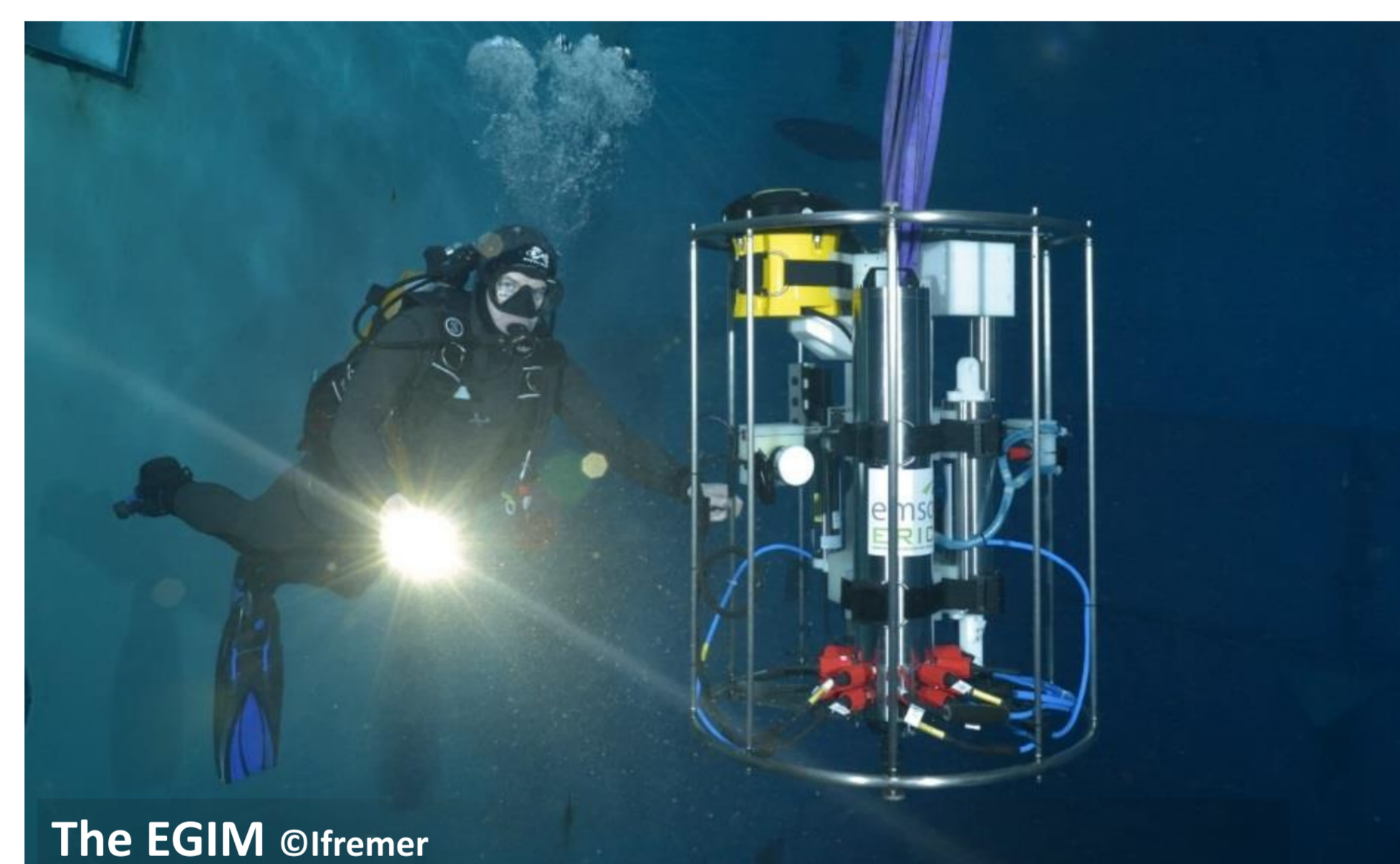
The core variables selected for the first units of the EGIM are temperature, conductivity, pressure, dissolved O₂, turbidity, ocean currents and ocean noise^[1]. On top of those parameters, the EGIM can host additional sensors: pH, partial CO₂ pressure, partial CH₄ pressure, seismicity, photographic/video image, seismic...

The EGIM provides the following services to its sensors: power distribution, time stamping, data storage and backup, protection against the environment and fouling, as well as bi-directional communication with the external world.

[1] Ruhl Henry &all. 2011 Societal need for improved understanding of climate change, anthropogenic impacts, and geo-hazard warning drive development of ocean observatories in European Seas. Progress In Oceanography, 91 (1). 1-33.10.1016/j.pocan.2011.05.001



- Height: 1,300 mm
- Diameter: 850mm
- Weight in air: 130 daN
- Operation depth: 4850m (6000m for the electronic core COSTOF2 and the power interface DPI)



The EGIM measures essential variables consistently

The EGIM aims to set up a number of ocean locations where the same set of core variables are measured homogeneously, to ensure the best measurement quality and long-term reliability in line with the Best Practices Handbook (FIXO3) and ESONET-EMSO Label using:

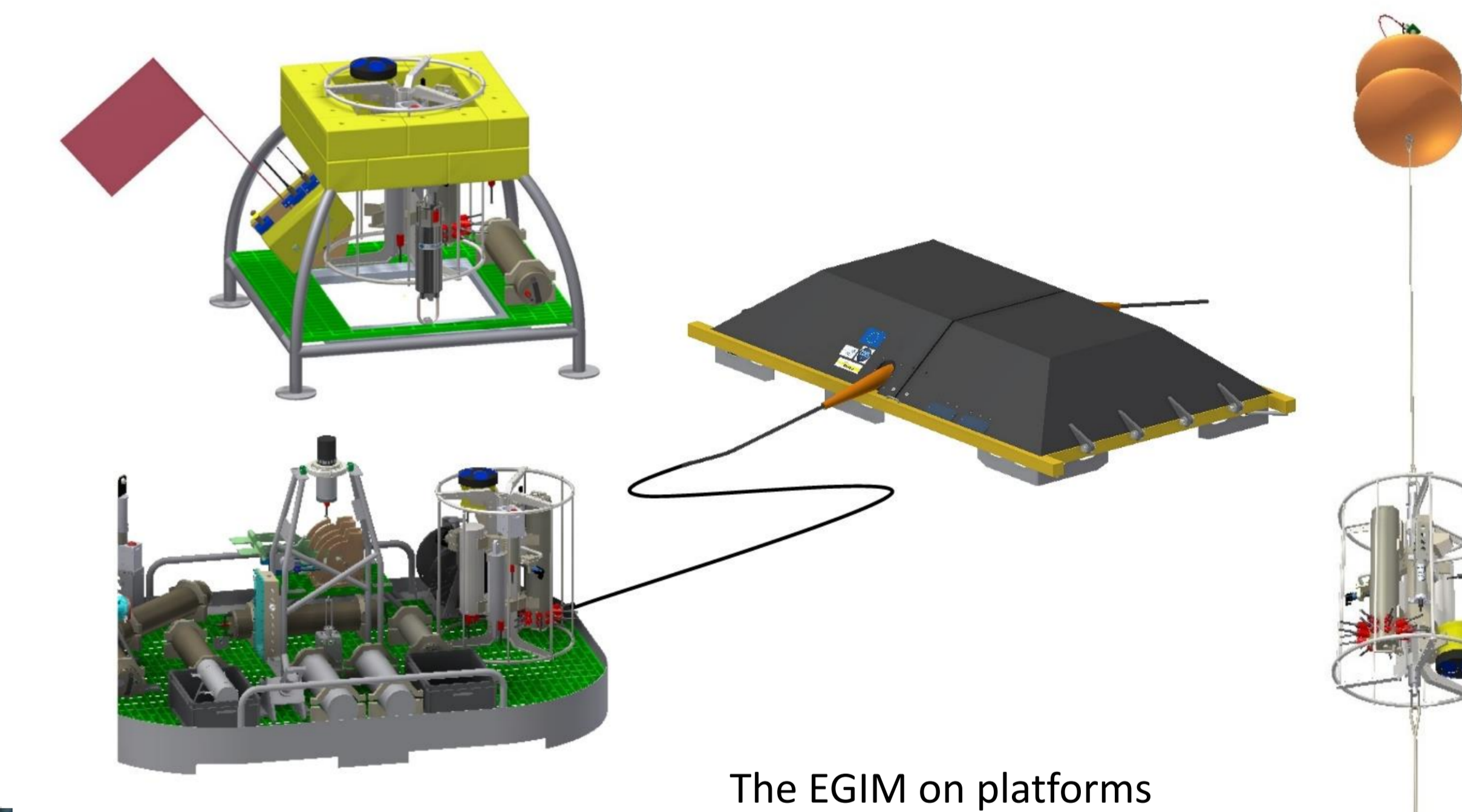
- identical hardware,
- the same sensor references,
- the same qualification methods,
- the same calibration methods,
- the same maintenance procedures,
- the same data format and access.

The EGIM references

2016-17: Four-month shallow water test period. The EGIM was installed on OBSEA observatory offshore Barcelona, <https://doi.pangaea.de/10.1594/PANGAEA.88307>

2017-18: Deep Sea deployment in autonomous mode on EMSO-Azores, on the mid-Atlantic ridge, at a 1700 m water depth (<https://campagnes.flotteoceanographique.fr/campagnes/17000500/>). The EGIM was set at the Lucky Strike hydrothermal vent site to monitor local hydrodynamic variability and complement the data obtained by the numerous sensors set on this site: oceanographic mooring deployed south of the vent field, the multidisciplinary SeaMoN East seabed station, autonomous current meters, temperature probes... <http://www.emso-fr.org/EMSO-Azores/Data-download>

2019: Deployment of the two EGIM replicas, one connected to the cable which runs from Catania on EMSO Western Ionian Regional Facility (East of Sicily), the other in the Atlantic Ocean near the Canary Islands, under different configurations including open-ocean mooring on ESTOC site.



The EGIM is a crucial step towards standardization and interoperability

The EGIM is multi-purpose and matches all the EMSO site and discipline specific requirements. Using the EGIM as the sole reference for all Regional Facilities enhances standardization, increases global reliability and reduces costs and discrepancy across EMSO.

The service-provision capacity of the Regional Facilities will be substantially increased, enabling EMSO Observatories to serve not only the science community but also governmental organizations, industries, other stakeholders, and similar infrastructures.



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