

european
multidisciplinary
seafloor and water-column
observatory development



©lfremer

EGIM

EMSO GENERIC INSTRUMENT MODULE

Provides 7 generic parameters and can host up to 16 sensors
Compatible with mooring, cabled and non-cabled marine platforms
Ultra-low power and high bandwidth capacity
Time stamping suitable for seismology and acoustic sensor synchronization

DESCRIPTION

Developed within the frame of the European Union funded H2020 project EMSODEV, the EGIM is designed to consistently and continuously measure parameters of interest for the science areas outlined by EMSO (the European Multidisciplinary Seafloor and water column Observatory), established as a European Research Infrastructure Consortium (ERIC).

This infrastructure collects a long-term series of key parameters from a network of regional nodes deployed around Europe and provides accurate data on marine environmental parameters.

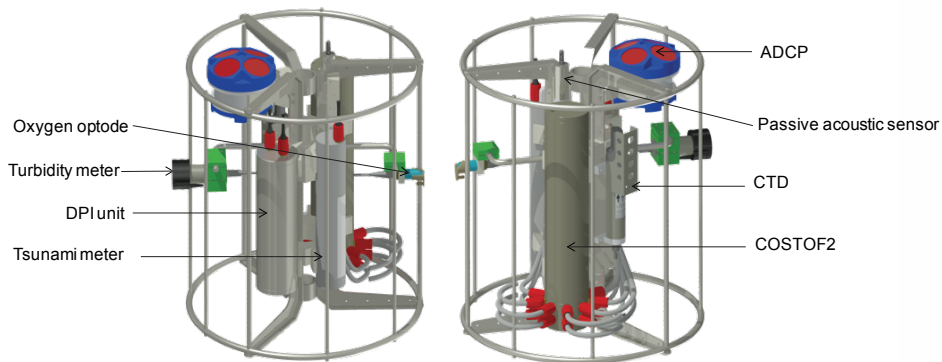
An initial set of parameters selected for the prototype EGIM, primarily focuses on sensors monitoring; temperature, conductivity, pressure, dissolved O₂, turbidity, acoustics and ocean currents.

Five additional sensors, including fluorescence /chlorophyll-A, pH, partial CO₂ pressure, partial CH₄ pressure, seismicity, pH, seismic and photographic/video image.

APPLICATIONS

The EGIM, provides real-time monitoring and input to the assessment of environmental parameters which are of benefit but not limited to:

Marine Strategy Framework Directive (MSFD)
Marine Renewable Energy (MRE)
Oil and Gas E&P
Deep sea Mining activities.



ADVANTAGES

The development of a common instrumentation module, EGIM, enhances the operational capacity of EMSO nodes (cabled or stand alone) in collecting scientifically relevant datasets. The EGIM development implements, common, standardized technologies based on architectures and interoperability established during previous EMSO funded projects (EMSO PP).

The service-provision capacity of EMSO nodes will be substantially increased by the EGIM, enabling EMSO observatories to serve the science community, industry and governmental organizations as well as other key stakeholders and even similar infrastructures.

REFERENCES

2016, EMSODEV: The EGIM Prototype was deployed in cabled mode on OBSEA from December 2016 to April 2017

<http://www.emsodev.eu/Files/Newsletters/EMSODEV-Newsletter-4.pdf>

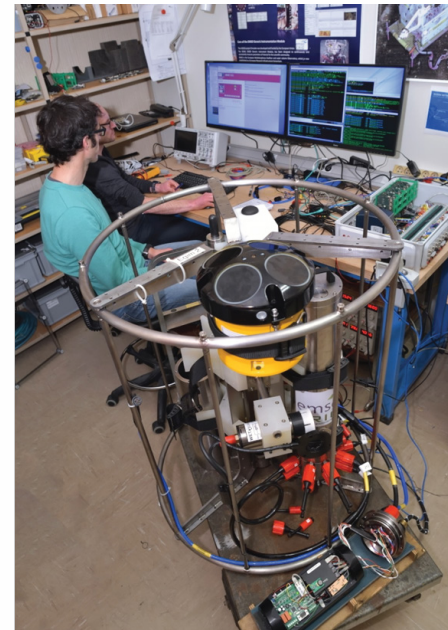
<https://doi.pangaea.de/10.1594/PANGAEA.88307>
<http://www.emsodev.eu/movies.html>

2017, EMSO-Azores: deployment of the EGIM prototype on EMSO Azores in non-cabled configuration

<http://video.iframe.fr/video?id=23802>

The EGIM benefits from his electronic front end "COSTOF2" TRL with long term reliability demonstrated on EMSO-Azores.

COSTOF2 is manufactured by RTSYS under Ifremer license



CURRENT PROFILE

Velocity accuracy	1% ±0,5 cm/s
Direction accuracy	±2°
Velocity sensitivity	0.1 cm/s
Direction sensitivity	0.01°

PASSIVE ACOUSTICS

Measurement range	20 to 200.000 Hz 0.1 to 100 Hz (Geology specific)
Accuracy	1 V/μPa
Sensitivity	-190 dB (re 1V/μPa)

OPERATING CHARACTERISTICS

Electronic core: COSTOF2

Power supply: up to 3A per sensor

Serves 7 core parameters and of up to 16 sensors

Embedded web server

Consumption: 1,5 mW in sleep mode with TCXO

Embedded atomic clock < 9.10-10 aging monthly

Communication protocol:

- Ethernet or RS232/485/422 or 1-wire sensors
- Wifi link for easy communication in air and underwater

SENSOR SPECIFICATIONS

CONDUCTIVITY

Measurement range	0 to 7 S/m
Accuracy	0.001 S/m
Sensitivity	0.00005 S/m

TEMPERATURE

Measurement range	-5 to 35 °C
Accuracy	0.005 °C
Sensitivity	0.0001 °C

PRESSURE

Measurement range	0 to 625 bars
Accuracy	0.01% FSR
Sensitivity	1.10 ⁻⁷ FSR

DISSOLVED OXYGEN

Measurement range	0 to 465 μmol/l
Accuracy	Less than 8 μmol/l
Sensitivity	Less than 1 μmol/l

TURBIDITY and OPTICAL BACKSCATTER

Measurement range	0 to 150 NTU
Accuracy	0.1 NTU
Sensitivity	0.02 NTU

X TECHNICAL SPECIFICATIONS

- Weight in air (cabled configuration: 113 daN
- Weight in sea water: 56 daN

Dimensions: Ø 850 mm 1,300 mm high

Temperature range:

- Short term running: 35°C with solar radiation
- Long term running: 25°C (Maximal in-situ temperature)
- Storage : -20°C/72 h
- Sleeping mode: -20°C/16 h
- Running : -2°C

Depth range:

- 4830 m maximal operating pressure due to the sensor specifications
- COSTOF2 and DPI are rated 6000 m depth

Power supply required

12 to 36 VDC or 250 to 425 VDC



The EMSODEV project (no. 676555) is supported by DG Research and Innovation of the European Commission under the Research Infrastructures Programme of the H2020

PARTNERS

	STITUTO NAZIONALE DI GEOFISICA E VULCANOLOGIA, Italy
	INSTITUT FRANCAIS DE RECHERCHE POUR L'EXPLOITATION DE LA MER, France
	HELLENIC CENTRE FOR MARINE RESEARCH, Greece
	AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS, Spain
	NATURAL ENVIROMENT RESEARCH COUNCIL – NATIONAL OCEANOGRAPHY CENTRE, UK
	MARINE INSTITUTE, Ireland
	UNIVERSITAET BREMEN (UniHB), Germany
	INSTITUTO PORTUGUES DO MAR E DA ATMOSFERA IP, Portugal
	NATIONAL INSTITUTE OF MARINE GEOLOGY AND GEOECOLOGY, Romania
	SLR ENVIRONMENTAL CONSULTING LIMITED, Ireland
	ENGINEERING - INGEGNERIA INFORMATICA SPA, Italy

THIRD PARTIES

	SpaceEarth Technology is a spin-off of Istituto Nazionale di Geofisica e Vulcanologia, INGV, Italy
	UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH, Spain
	EXPANDABLE SEAFLOOR OBSERVATORY, Spain
	PLATAFORMA DE CIENCIA DE CANARIAS THE OCEANIC PLATFORM OF THE CANARY ISLANDS, Spain
	SMARTBAY, IRELAND
	UNIVERSIDADE DO PORTO, Portugal
	ISTITUTO DO MAR, Portugal
	INSTITUTO SUPERIOR TÉCNICO, Portugal
	CENTRO DE INVESTIGAÇÃO TECNOLÓGICA DO ALGARVE, Portugal

Credits for the pictures and drawing: Ifremer

European Multidisciplinary Seafloor and water-column Observatory DEVELOPMENT (EMSODEV)
 Coordinator: Istituto Nazionale di Geofisica e Vulcanologia (INGV)
 Address: Via di Vigna Murata, 605, 00143 Rome (Italy)
 Tel. +39 06 51860428 | Fax +39 06 51860338 | Email: interim.office@emso-eu.org