

european  
multidisciplinary  
seafloor and water-column  
observatory development



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# 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.

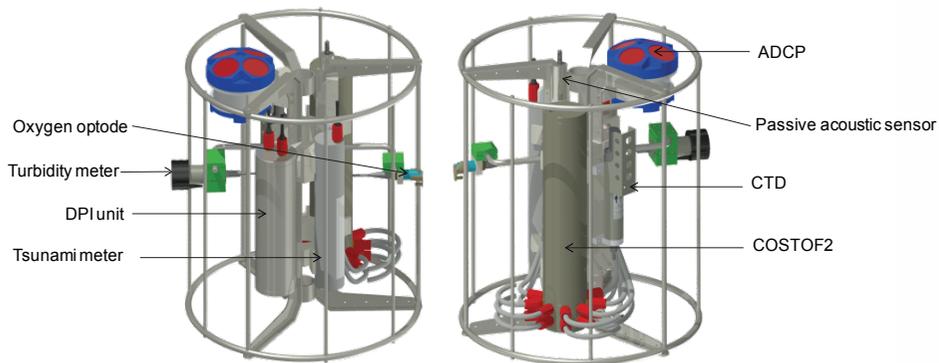
An initial set of parameters selected for the prototype EGIM, primarily focuses on sensors monitoring; temperature, conductivity, pressure, dissolved O<sub>2</sub>, turbidity, acoustics and ocean currents.

Five additional sensors, including fluorescence /chlorophyll-A, pH, partial CO<sub>2</sub> pressure, partial CH<sub>4</sub> 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>

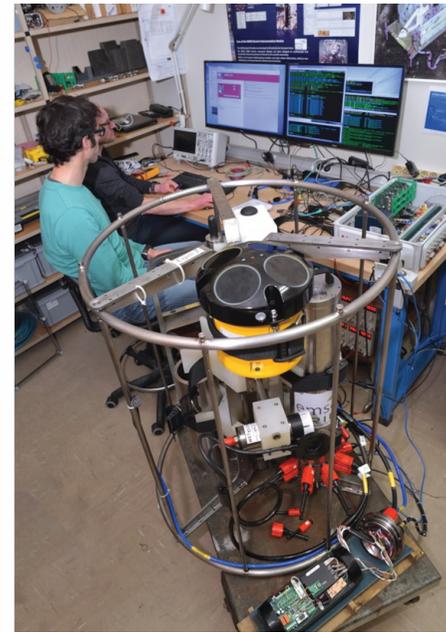
<https://doi.pangaea.de/10.1594/PANGAEA.88307>  
<http://www.emsodev.eu/movies.html>

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 <sup>-7</sup> 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



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## PARTNERS

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	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
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	SMARTBAY, IRELAND
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Credits for the pictures and drawing: Ifremer

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