

JERICO-S3 integrated innovative technologies for coastal monitoring

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Coastal Ocean Valorisation through Research & Technology

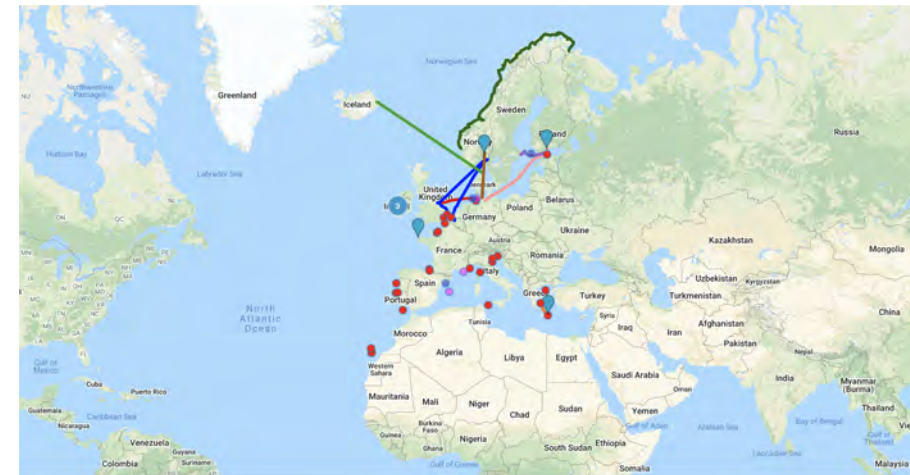


JERICO RI

JERICO-RI is an integrated pan-European **multidisciplinary** and **multi-platform research infrastructure** dedicated to a holistic appraisal of **coastal** marine system changes.

It aims to seamlessly bridge existing continental, atmospheric and open ocean RIs, thus **filling a key gap in the ESFRI landscape**. JERICO-RI establishes the framework upon which coastal marine systems are observed, analysed, understood and forecasted.

JERICO-RI aims to enable **open-access** to state-of-the-art and innovative facilities, resources, FAIR data and fit-for-purpose services, fostering **international science collaboration**.



Jerico-S3 technological innovation objectives

Progress in in-situ sensor and platform innovations to enable interoperability, multi-sensing, higher spatio-temporal resolution

Assess and demonstrate advances in artificial intelligence for adaptive sampling

Improve our capacity to cover EOVs and support coastal policies (EU, National)

Make resources (FAIRly) accessible, from data to methods and services, from a unified web-based platform

Perform an end-to-end demonstration at test and regional JERICO RI site

Build on existing capacities and latest developments in EU projects



From Science and EOVs to end-to-end demonstration of sensor system

Science Strategy - Coastal Variables for JERICO-RI

cEOV: Generic Variables
Region/site/challenge - Specific Variables

Generic and Specific sensor packages

Plankton dynamics sensor package - PdSP
Autonomous Coastal Observing Benthic Station – ACOBS
Coastal EGIM

Assessment of AI potential for self-awareness

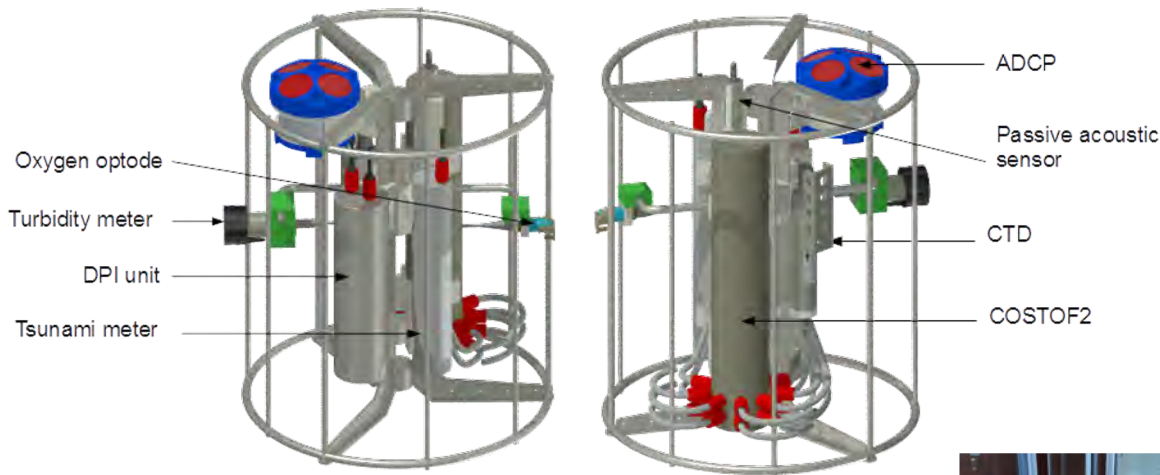
Adaptive sampling through embedded processing
Autonomous sensor control and configuration



Demonstration

Design, build, test and demonstrate a coastal EGIM
FAIRness from e-JERICO infrastructure

EGIM and drivers



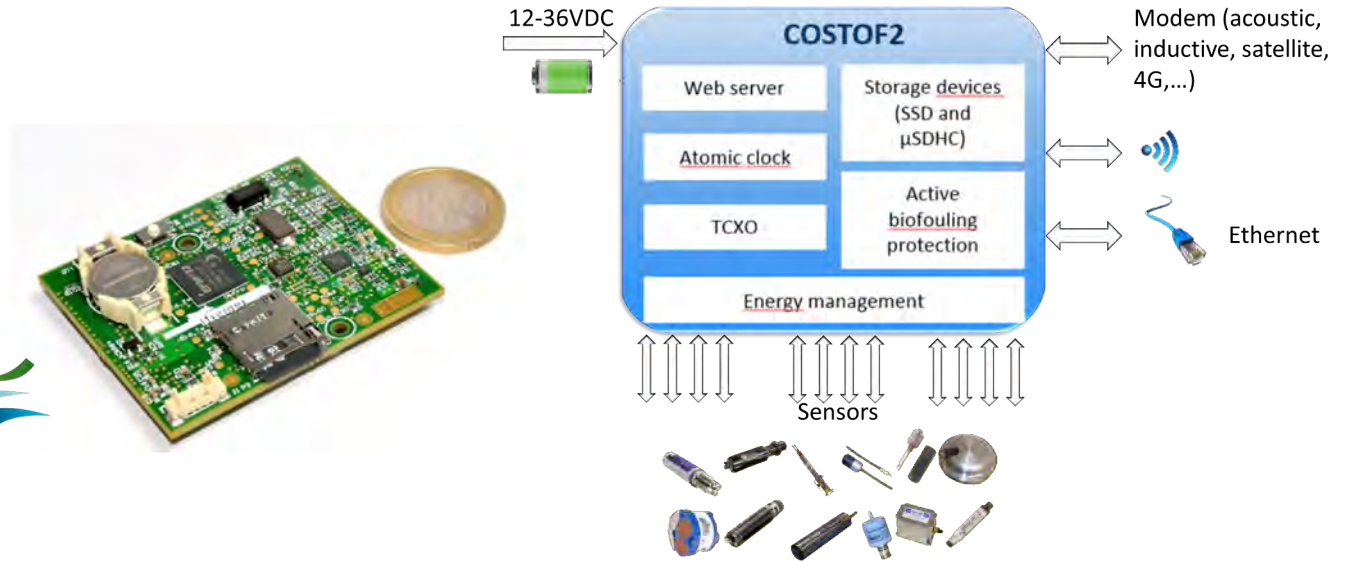
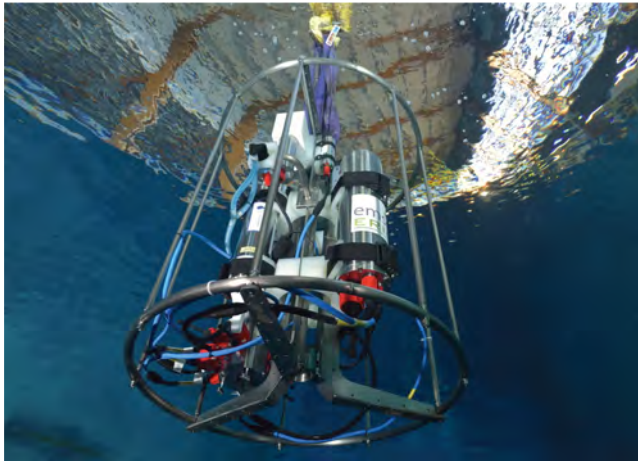
Manufacturer	Model	Type or mesurands
AANDERAA		3830 ₂ , T
AANDERAA		4330 ₂ , T
AIRMAR	WS200	Weather station
AXIS	Q1765	HD video camera (1080p)
AXIS	Q1798	HD video camera (4k)
BBE	Fluoroprobe	Chlorophyll
CONTROS	HydroC	CH ₄ , T
DLINK	DCS7010L	Video camera (720p)
GILL	MaxiMet GMX500	Weather station
GÜRALP	CMG-3ESPD	Ocean Bottom Seismometer
		Benthic chamber with water sampling
IFREMER	Calmar	
IFREMER	Chemini Fer	Iron
IFREMER	Chlorinator	Chlorine generator (actuator)
IFREMER	CISICS	T, Water sampler
IFREMER	Thermistor chain	Chain of 100 temperature sensors
IPGP	OBS	Ocean Bottom Seismometer
IUEM	pCO ₂	pCO ₂ (surface)
LEICA	GR25	Geodetic GPS
MAXIM	DS18B20	T (1 wire thermistor)
McMURDO	Kanaton3	Automatic Identification System
NKE	MP6	T, pH, CTD, O ₂ , Chlorophyll
NORTEK	Awac	ADCP
OCEANSONICS	icListen	Hydrophone
PAROSCIENTIFIC	8CB	Absolute pressure gauge
RDI	Workhorse	ADCP
SATLANTIC	PAR	Photosynthetically Active Radiation
SEABIRD	Hydrocat	CTD, O ₂
SEABIRD	SBE37	CTD
SEABIRD	SBE54	Absolute pressure gauge
SEABIRD	SeapHOx	CTD, pH, O ₂
UNISENSE	MP4-8	Mini/micro-profiler
University of Washington	BARS	Chlorinity, T
WETLABS (SEABIRD)	ECO-NTU	Turbidity

COSTOF2 Services

Energy management,
 Communication with the external world,
 Measurement sequencing and local data storage,
 Precision time stamping
 Data pre-processing, likely to generate alerts
 Protection against biofouling.

Technical specifications

12 sensor ports,
 Ethernet, Serial (RS232,RS485) and 1-wire data links,
 12V-24VDC (optional 48VDC), 3A power outputs,
 Digital IO, PWM outputs, analogical inputs,
 Autonomous and cabled modes,
 FTP, HTTP servers, remote serial port (transparent mode),
 Modems management (acoustic, inductive, satellite 4G,...),
 Underwater WIFI link (configuration, data retrieval),
 Ultra low power consumption (0.5mW sleep mode with TCXO)
 Time stamping (TCXO, optional atomic clock),
 Sensor synchronization (NMEA, PPS – TTL or RS485),
 Data storage on μ SD and back up on SSD,
 Active protection against fouling (seawater electro-chlorination),
 Sensor Software Development kit
 Integration of Sensor ML generic driver (Work in process)
 Technical data monitoring (Energy, voltage, current, temperature, pressure,
 pitch, tilt, roll, storage capacity, water intrusion detection),
 Housing: Titanium (optional material available).



From EGIM to cEGIM, and plankton dynamics

6000m depth rated -> 200m rated (lower-cost, broader EOV coverage)

Improved interoperability

Processing capacity for enhanced autonomy

Extension to BGC and Biology (demo: Pelagic plankton dynamics)

-> sensors

Physics

- 1 CTD (EGIM)
- 2 ADCP (EGIM)
- 3 Turbidity (EGIM)
- ~~Hydrophone (EGIM)~~
- ~~Tsunami-meter (EGIM)~~

Biogeochemistry

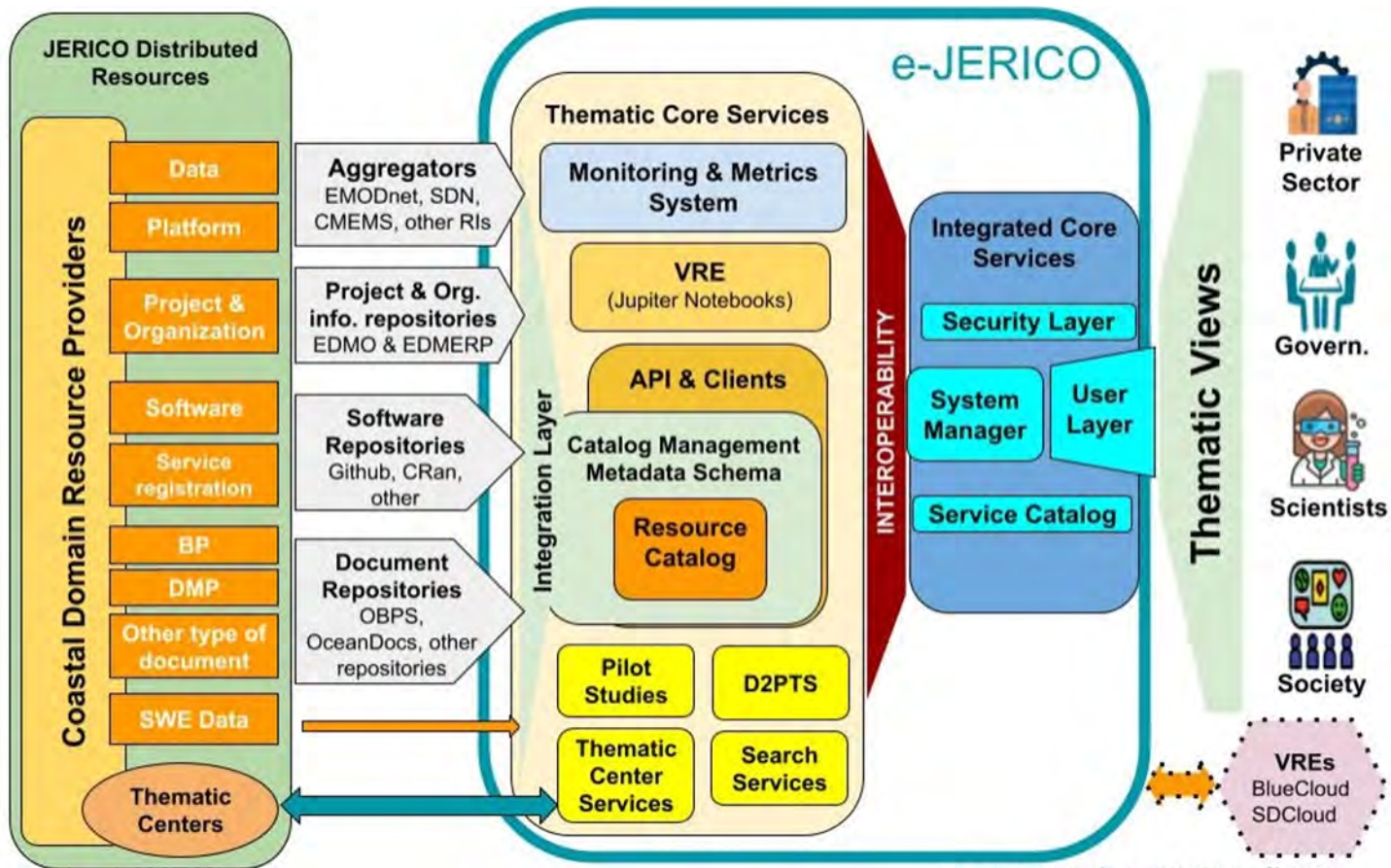
- 4 Optode-O2 (EGIM)
- 5 pCO2 sensor
- 6 pH sensor
- 7 Nutrient sensor (NO3, +)
- 8 Fluorometer (CDOM)

Biology

- 9 Chl-a – or...
- 10 Spectrofluorometer (Chl-a, PC, PE, Fuco)
- 11 Flow cytometer (pico, nano, micro phytoplankton)
- 12 UVP (Zooplankton size)
- 13 FRRF (Primary production)

Other - required

- 14 Processing module
 - 15 Chlorinator for optical sensors (EGIM)
- High TRL Required
EU OoT projects (TRL7 min, NeXOS, Senseocean, etc.)
Jerico-Next developments
Commercial sensors



Next steps

- Select best site and sensors for demonstration
- Develop drivers for BGC and biological sensors
- Implement data and sensor interoperability standards
- Deploy JERICO virtual access platform
- Start integrating existing and new sensor and data services

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Thanks!

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Jerico RI & S3 website: <https://www.jerico-ri.eu>



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