Deployment of scientific equipment at EMSO Western Ionian Facility

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INGV

Workshop on Sea Operations for Ocean Observatories

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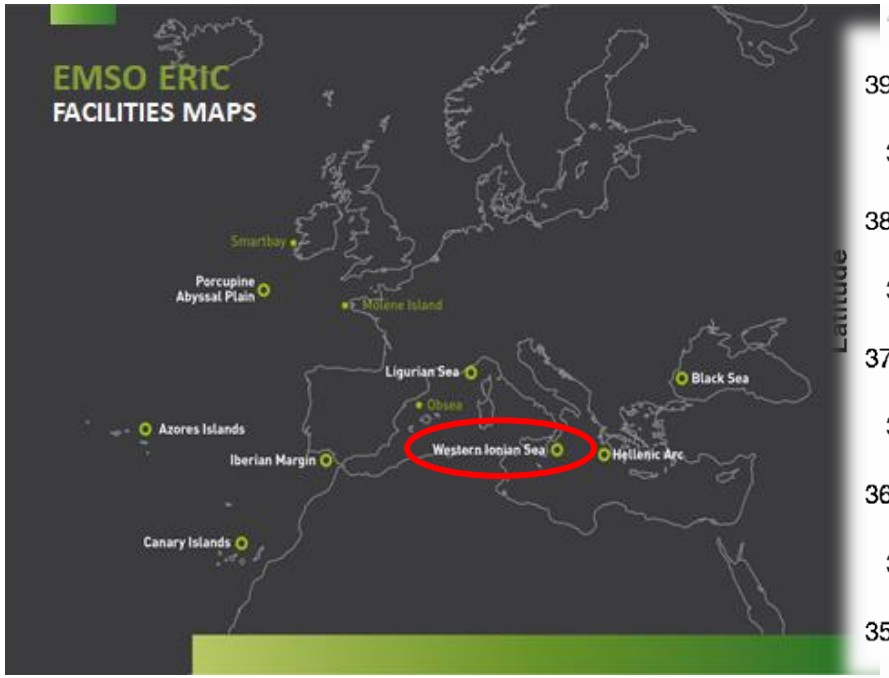
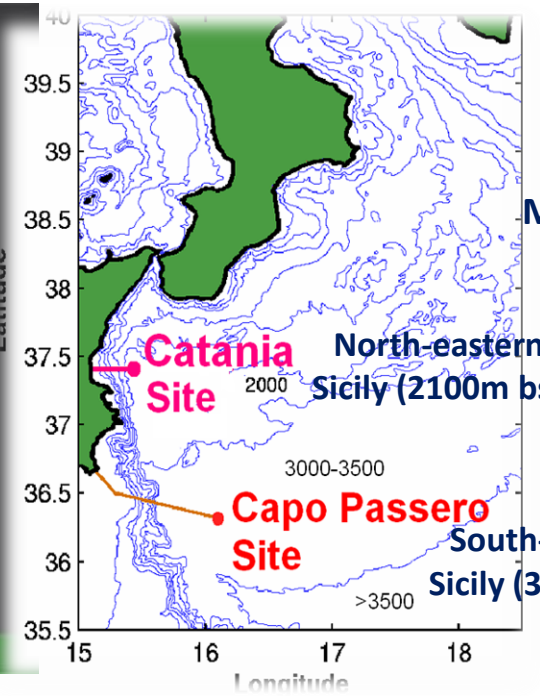
Western Ionian Sea facility

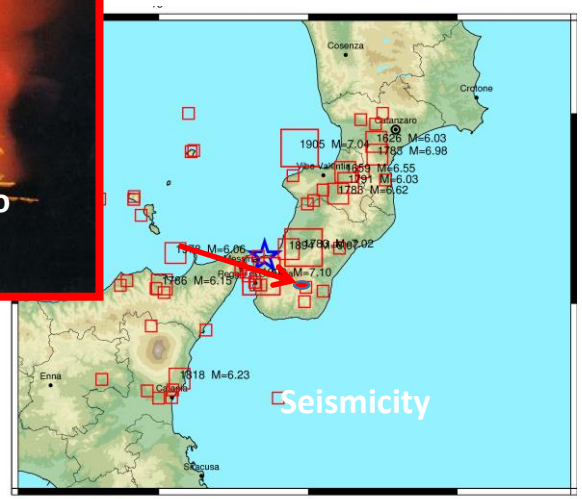
Western Ionian Sea: 25 km from Catania harbor (2100 m deep) INGV in collaboration with LNS-INFN is managing multi-parameter real-time NEMO-SN1 observatory since 2005. The infrastructure consists of a shore station connected to the observatory through a 28 km E/O cable.





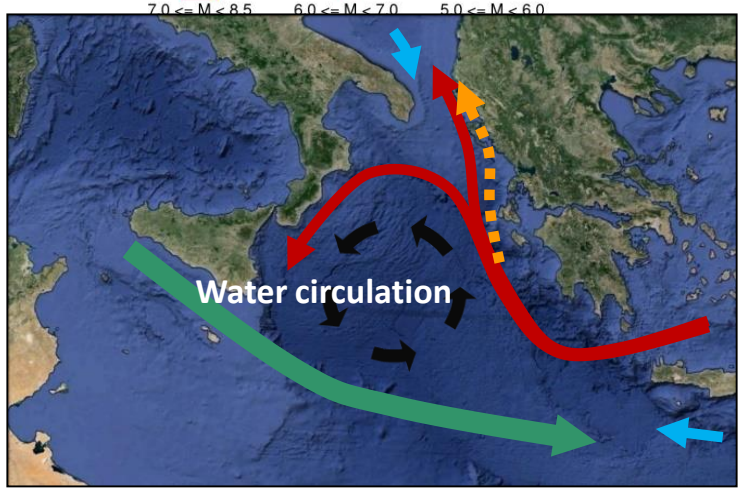
MoU INFN/INGV since 2001

Western Ionian Sea facility

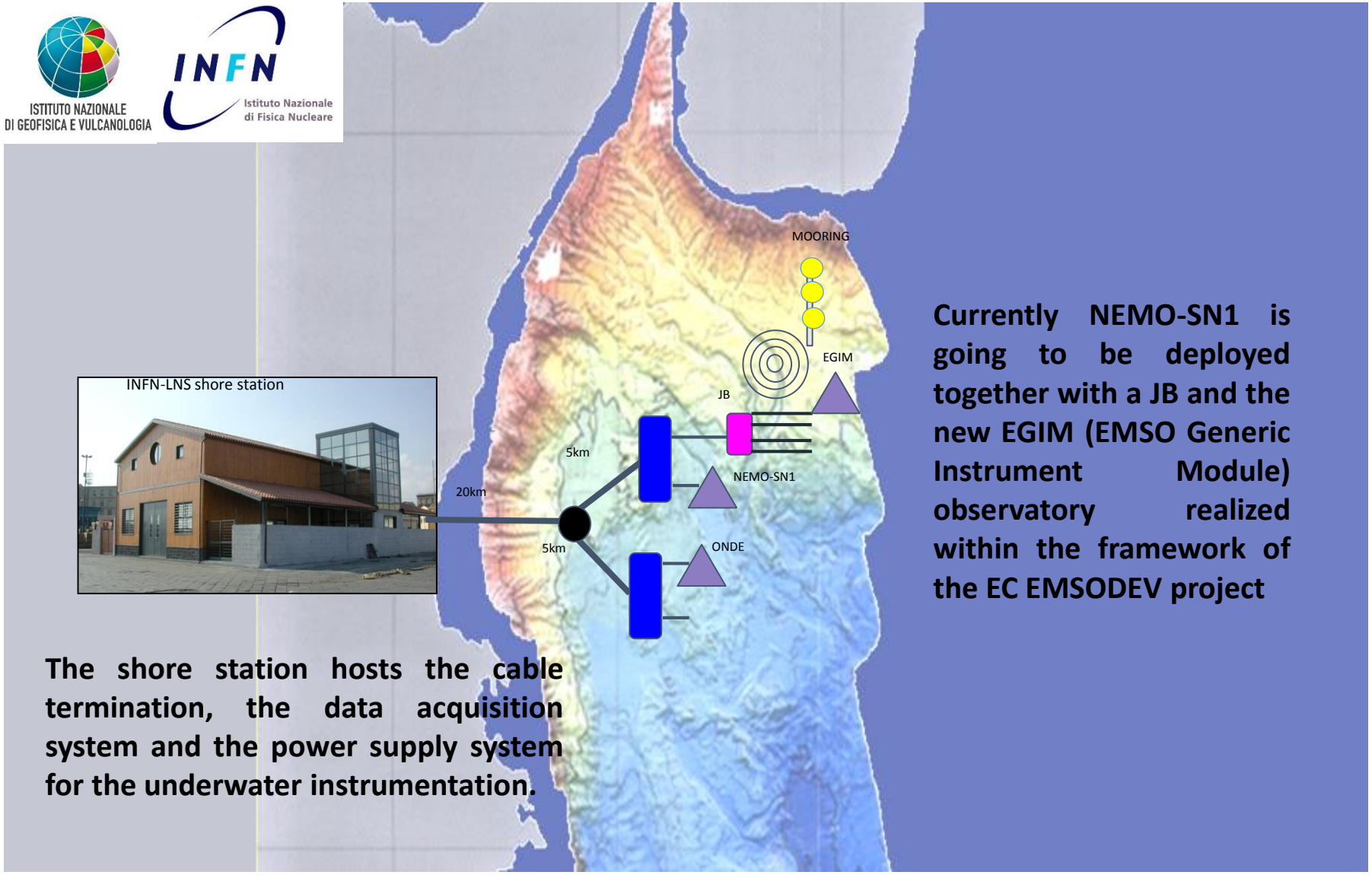


Science objectives

- Geo-hazard (Tsunami, Seismic and Volcanic monitoring)
- Oceanographic monitoring (seafloor and water column)
- Environmental monitoring (acoustic noise)
- Bioacoustics marine mammals tracking



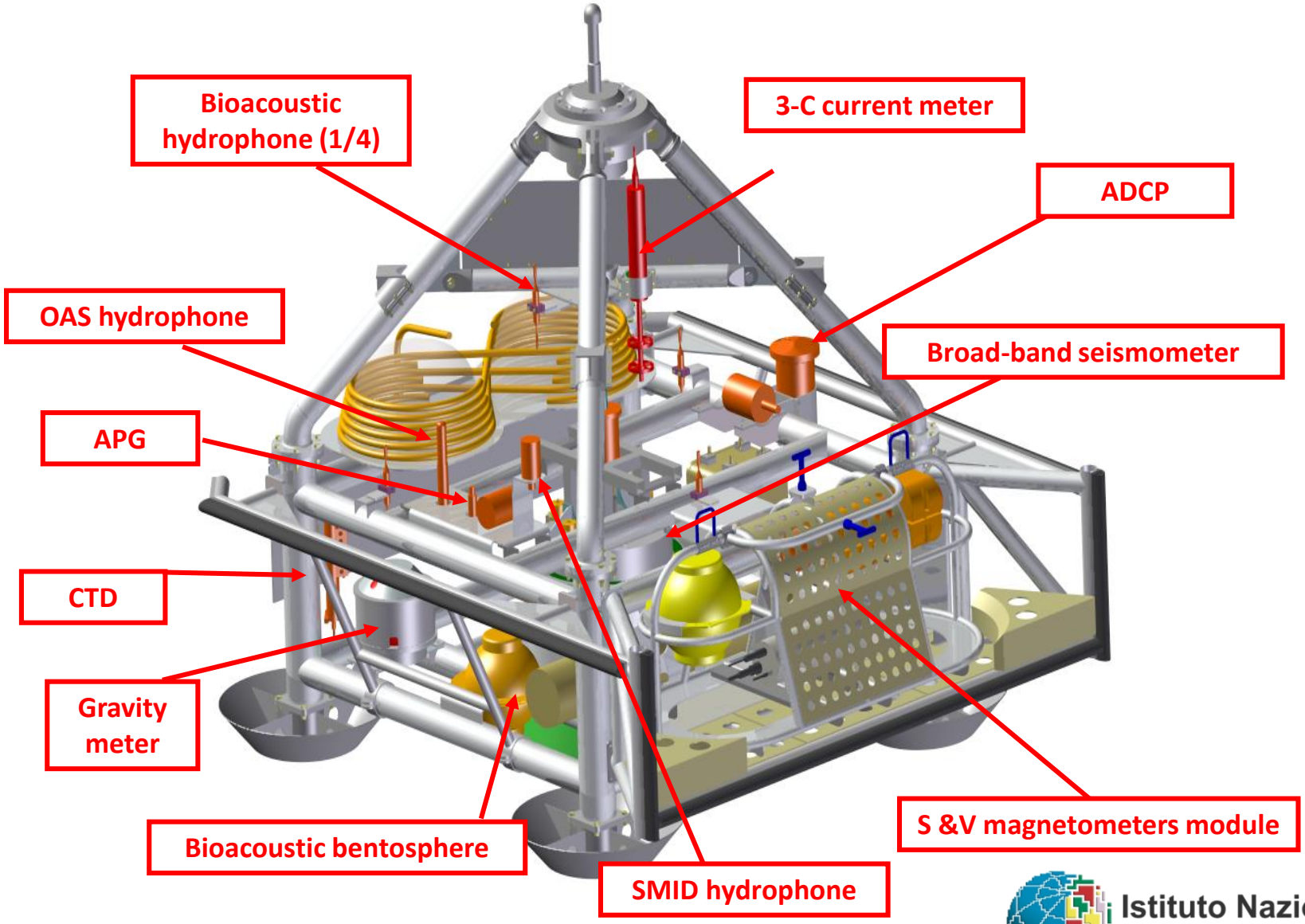
Western Ionian Sea facility



Currently NEMO-SN1 is going to be deployed together with a JB and the new EGIM (EMSO Generic Instrument Module) observatory realized within the framework of the EC EMSODEV project

The shore station hosts the cable termination, the data acquisition system and the power supply system for the underwater instrumentation.

NEMO-SN1



NEMO SN1: Stand-alone 2002-2003
Cabled (real-time data): 2005-2008 & 2012-2013
2019 (re-deployment during EMSODev project)

Junction Box

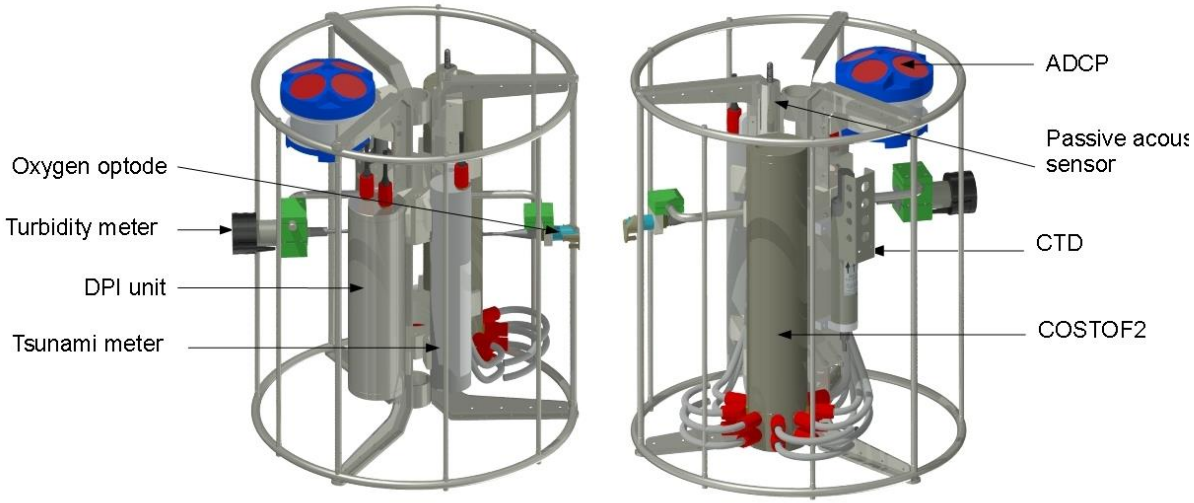
observatories can be connected to the junction box through a 50 m long jumper, terminated with the wet-mateable ROV operable E/O connector.
Each connector provides gigabit optical ethernet (Media converter Omnitron MiConverter 10/100/1000 Mbps, SFP transceiver 1310/1490 nm) and 350 VDC, 500 W power supply.
JB electrical connections are protected against short circuit and overcurrents.
Optical fibers and transceivers are doubled for redundancy.

100 m Teledyne-ODI jumper

EGIM - EMSO Generic Instrument Module

european multidisciplinary seafloor and water-column observatory development

Parametres	Sensors
Temperature, Conductivity, Pressure	SEABIRD SBE37-SIP
Pressure	SEABIRD SBE 54 Tsunami
Dissolved O_2, temperature	AADI-3005214831 DW4831
Turbidity	Wetlabs NTUrdt
Ocean currents, Compass and tilt meter	Teledyne Workhorse monitor ADCP 300 KHz
Passive acoustics, Compass and tilt meter	OceanSonics icListen SB60L-ETH



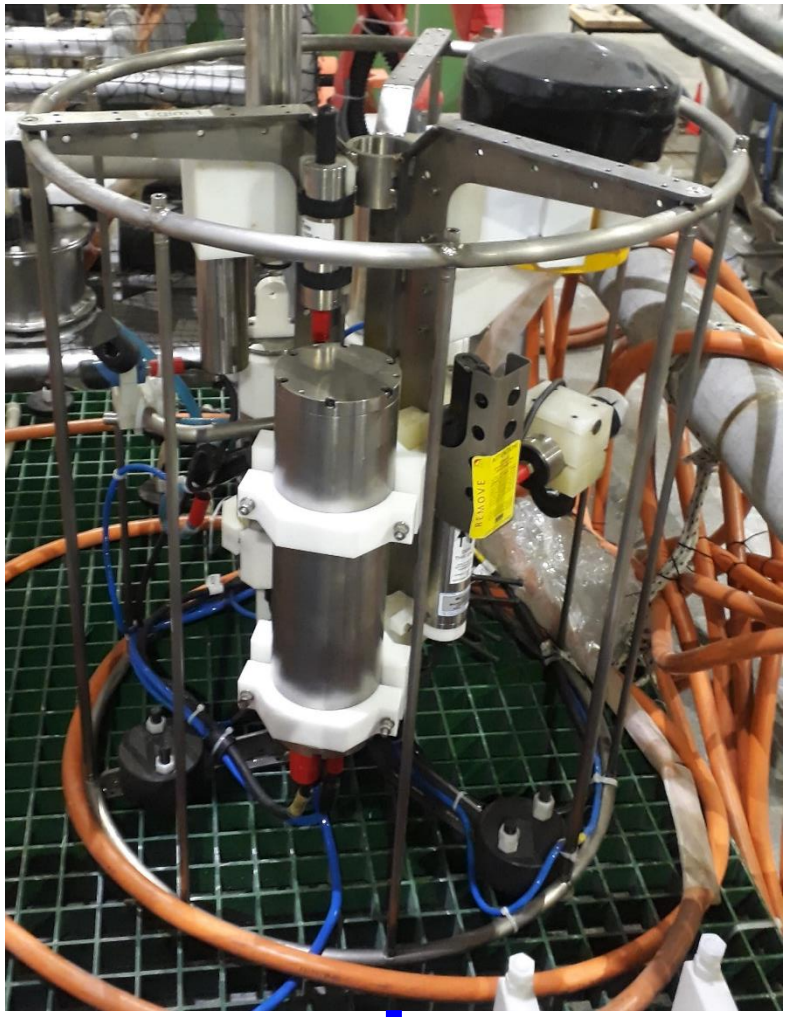
EGIM installation at Western Ionian (Catania)

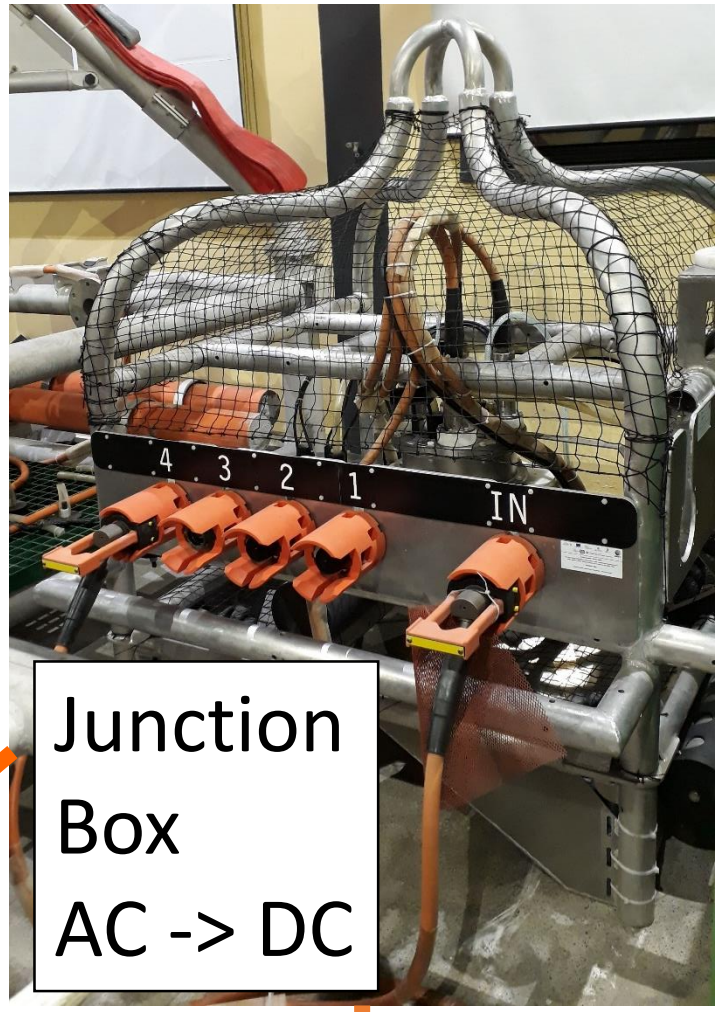
Dedicated electronic/vessel to interface COSTOF2 (ETH+serial)/ LAN on opctical cable

Dedicated frame to host EGIM and to allow deployment & recovery operation @ 2100 m

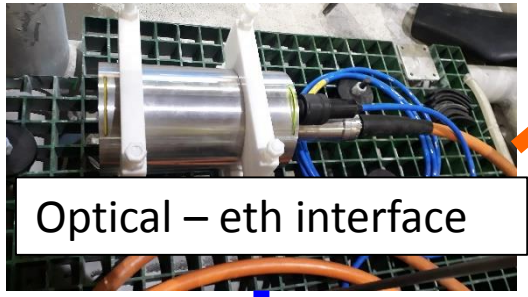
www.emsodev.eu

Underwater connection for EGIM
Lab test Catania
Jan 2019





Junction Box
AC -> DC

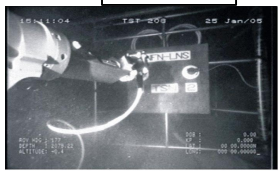


Optical – eth interface

Electro Optical cable 350 VDC

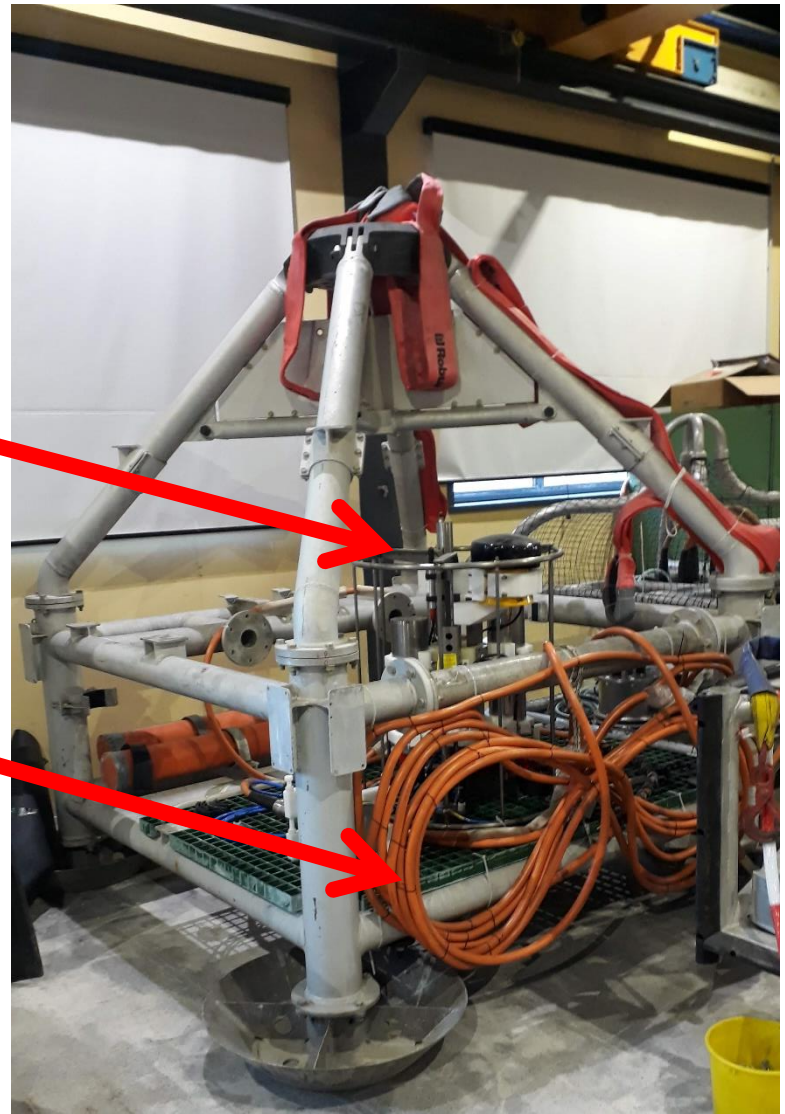
Power+ ethernet cable from DPI

CTF

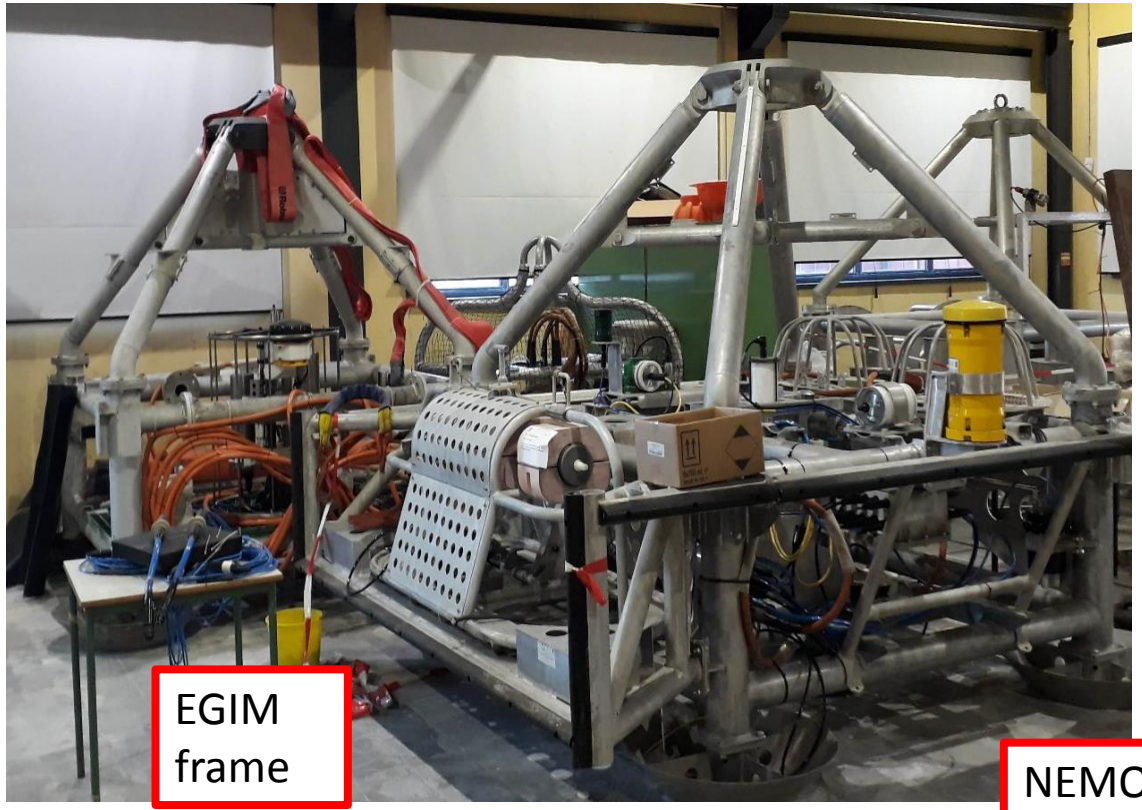


Electro Optical cable 450 V AC

Western Ionian EGIM frame



EGIM installed inside a dedicated frame (SN1 – like) to allow deployment @2100 m depth

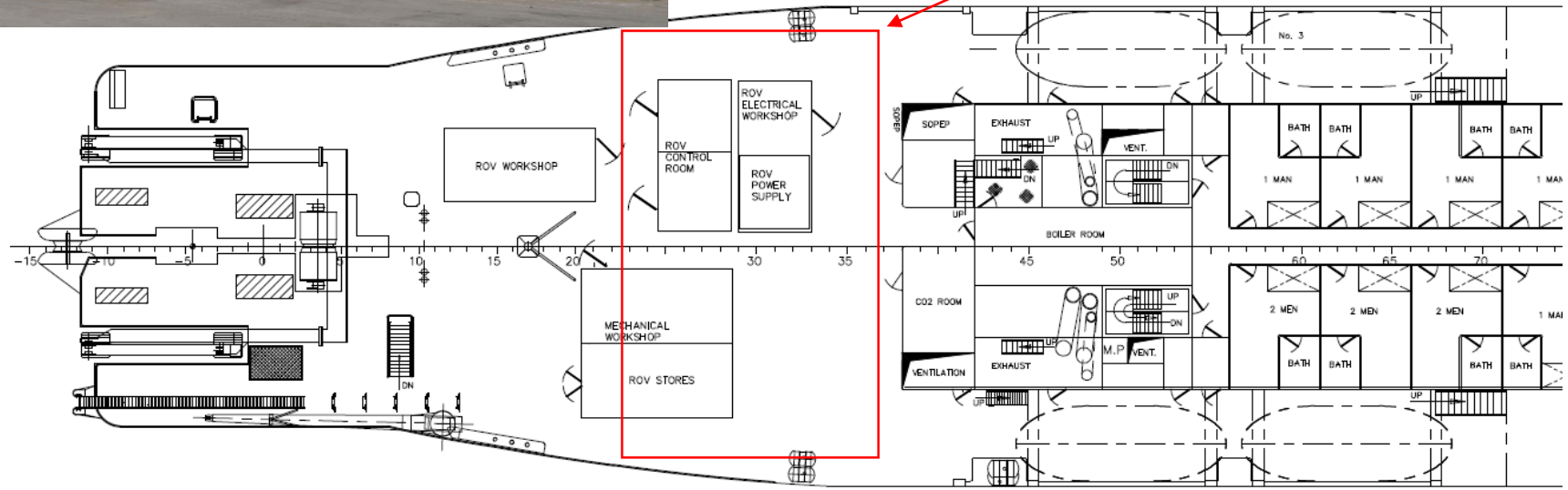


Next Sea Operations

Antonio Meucci cable layer

In the framework of MECMA Consortium
(**M**editerranean **C**able **M**aintenance **A**greement)

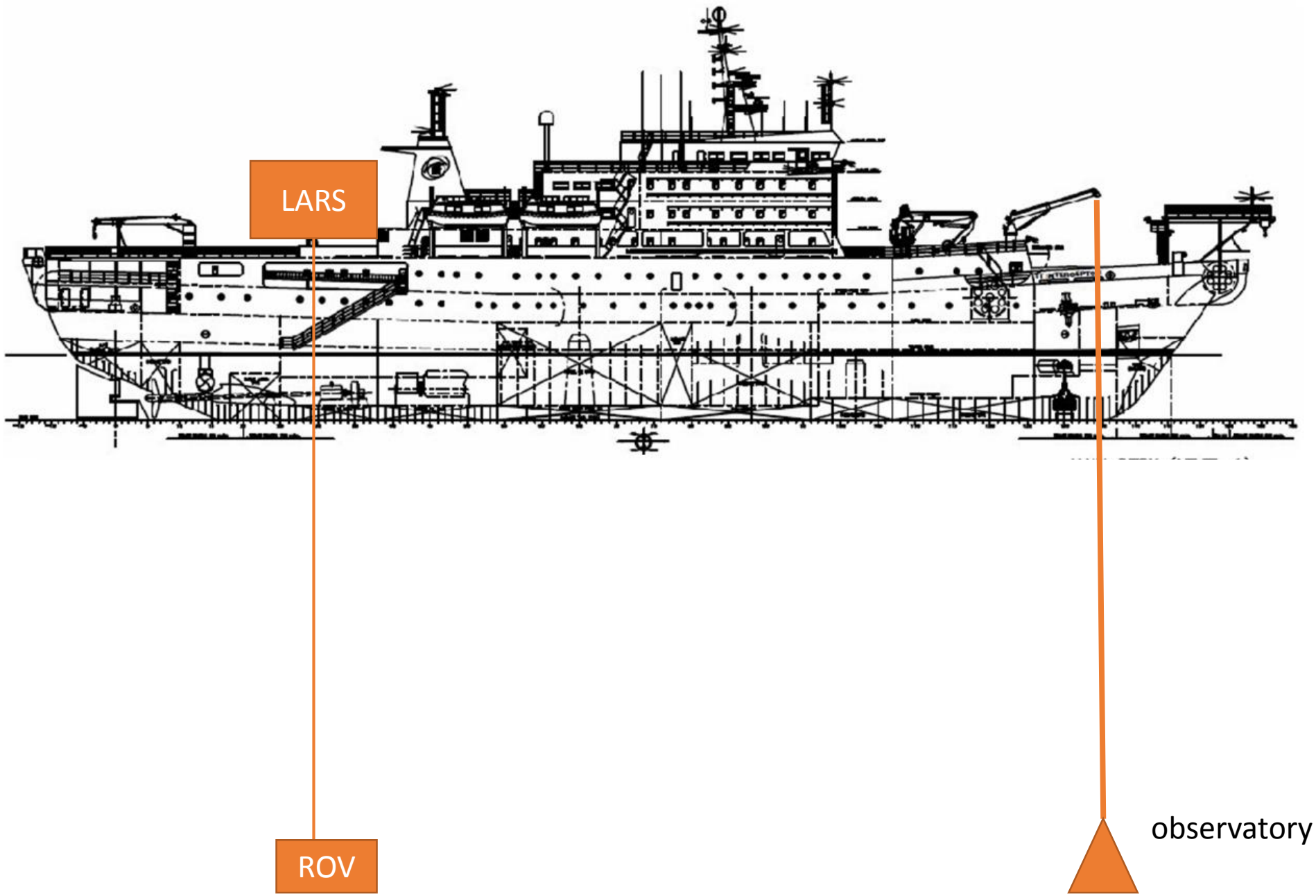
LARS and ROV container



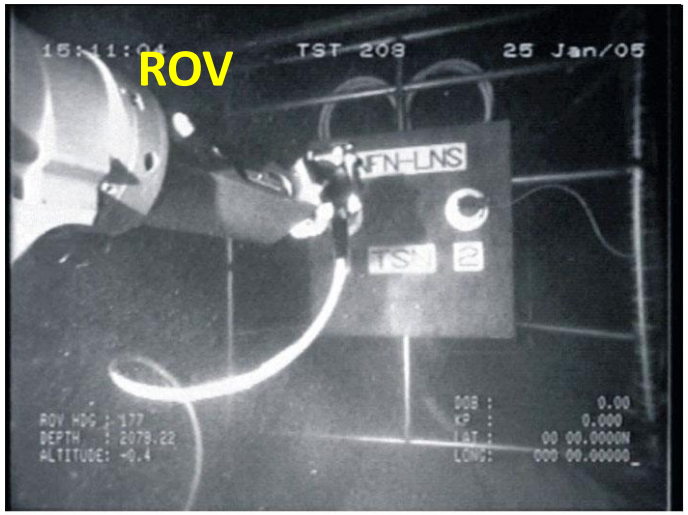
Next Sea Operations

ROV General Specification

Depth Rating 3000msw
Length 1860mm - Height 1200mm - Width 1200mm
Weight 970kg
Thrust (fwd/rev/lat/vert) 225/225/225/170kgf
Payload (standard) 160kg
Auxiliary Power 600Vdc – 15KW
Auxillary Hydraulic System 5KW, 10KW & 15KW
Valve pack 12 station (standard), 16 station (optional)
System Power Requirements 440 Vac 3ph 50/60 Hz 110 kVA
LARS 55 kVA – ROV 40 kVA – Control Van 15 kVA


LARS
ROV
observatory

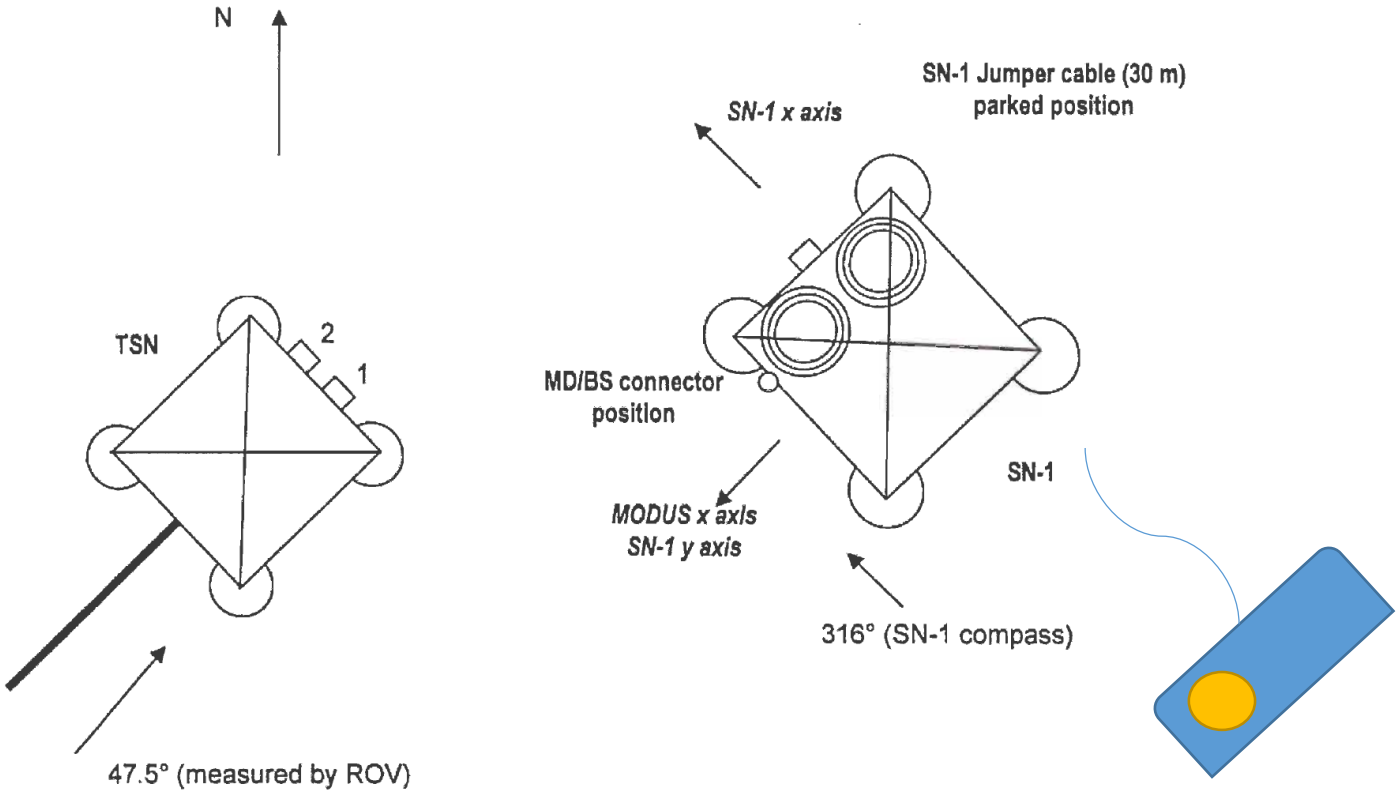
Underwater operations



Cable termination frame with 2 plugs

1. Deployment of 100 m jumper to connect JB to termination frame plug#2
2. Deployment and JB connection
3. Deployment and EGIM connection (50 m jumper with penetrator) to JB
4. Deployment of SN1 to termination frame plug#1

Underwater operations



That's the story:

ISSUE 1: finding vessel with DP2 and ROV up 3000m

First solution in Spring 2018: INGV made a bid and we had the chance to use FUGRO vessel + ROV but EGIM was delivered with big delay. Then no availability of FUGRO vessels with suitable ROVs in Mediterranean area for almost 3 years.

bck solution: we try with MECMA option (MEUCCI and CROZE by Orange Marine), ROV ok but with too short umbilical.
We find suitable TOMAHAWK ROV up 3000m, usually employed by oil and gas offshore companies.
We adapt the MEUCCI deck to host TOMAHAWK LARS

ISSUE 2: availability of ROV needs to fit with MECMA duties
A call from Telecomm Company has priority 1, INGV with priority 2.
Oil and gas companies contracts are more interesting for ROVs than 5 days contract by INGV.

ISSUE 3: it's everything ok?
Last week we have ROV and Vessel available, but….LARS and ROV were not in very good conditions after a journey in Noth Sea. We are waiting the company to fix all the problems in the system….

Fair Winds and Following Seas

Thank you!