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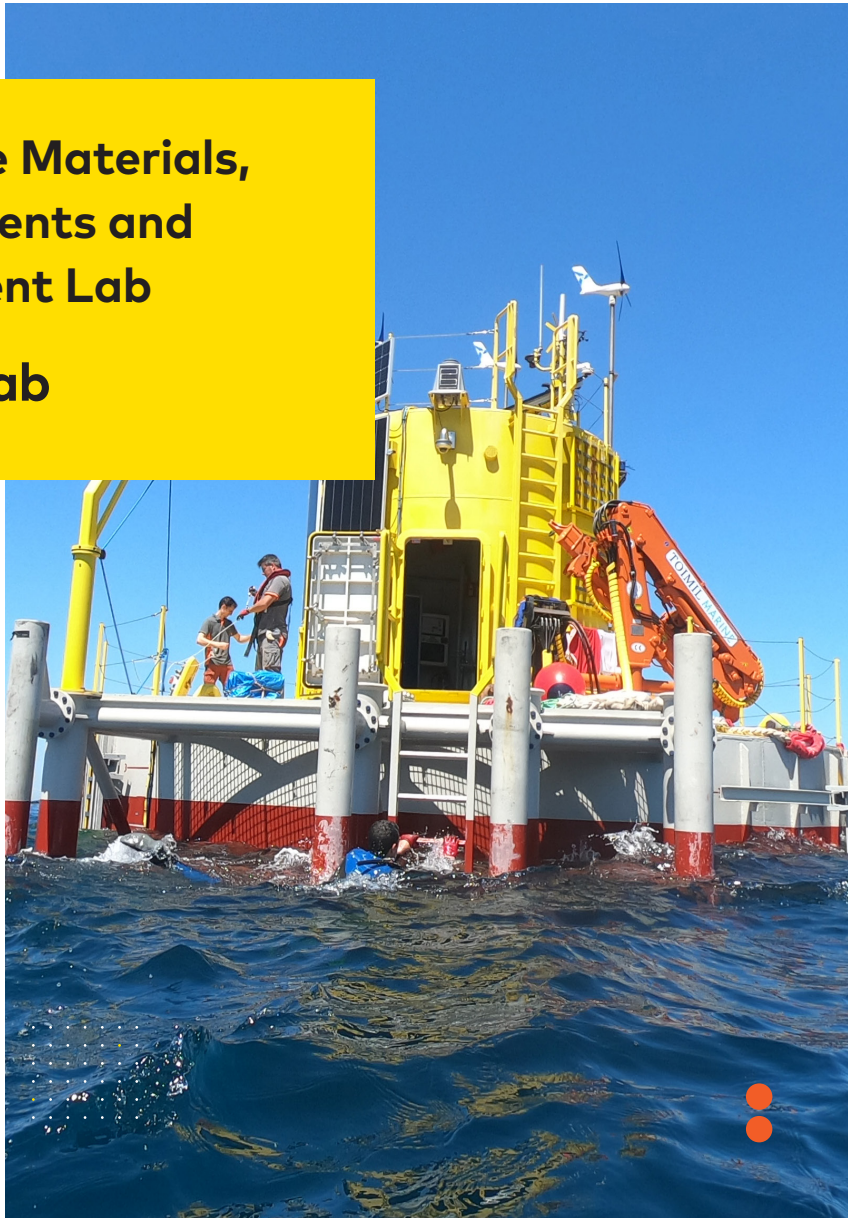
Offshore Materials, Components and Equipment Lab

HarshLab



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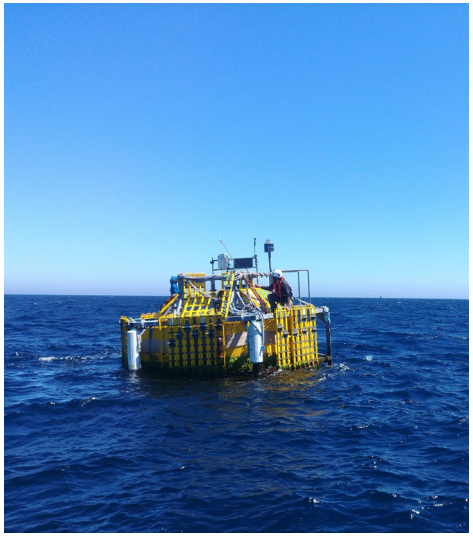
Advanced floating laboratory for the validation and experimentation of materials, components and equipment in real offshore environment

HarshLab
OFFSHORE MATERIALS & COMPONENTS LAB



HarshLab1.0 (2018)

HarshLab2.0 (2022)

HarshLab is a **floating laboratory** for the evaluation of **solutions for the offshore industry.**

Current version of HarshLab has been hosting **research activities** in BiMEP area **since September 2018 until September 2021.**

In 2022, this first version has been replaced by a **bigger, more complex platform** that will be **connected to BiMEP's submarine grid** by means of an umbilical cable.

Technical Sheet

Dimensions:

- 8,5 m diameter
- 7,0 m high

Capacity:

- Exposition of more than 2000 samples in atmospheric, splash and immersion zones
- Space for component testing: 120 m^2 (60 m^2 outdoor deck, 57 m^2 in hold)
- Main crane capacity: 1 ton @ 5,25 m
- Auxiliar davit capacity: 300 kg @ 1,5 m
- Maximum payload: 9 ton

Grid connected (spring 2023):

- Umbilical cable for power and communications
- Connected to BiMEP's submarine grid at 690V/160 kVA
- Internal working voltage: alternating current at 400V and 230V and direct current at 24V and 12V
- Local photovoltaic and batteries system for feeding essential equipment onboard (AIS, lantern, etc.)
- Designed for connecting third party devices testing in BiMEP area to the submarine grid

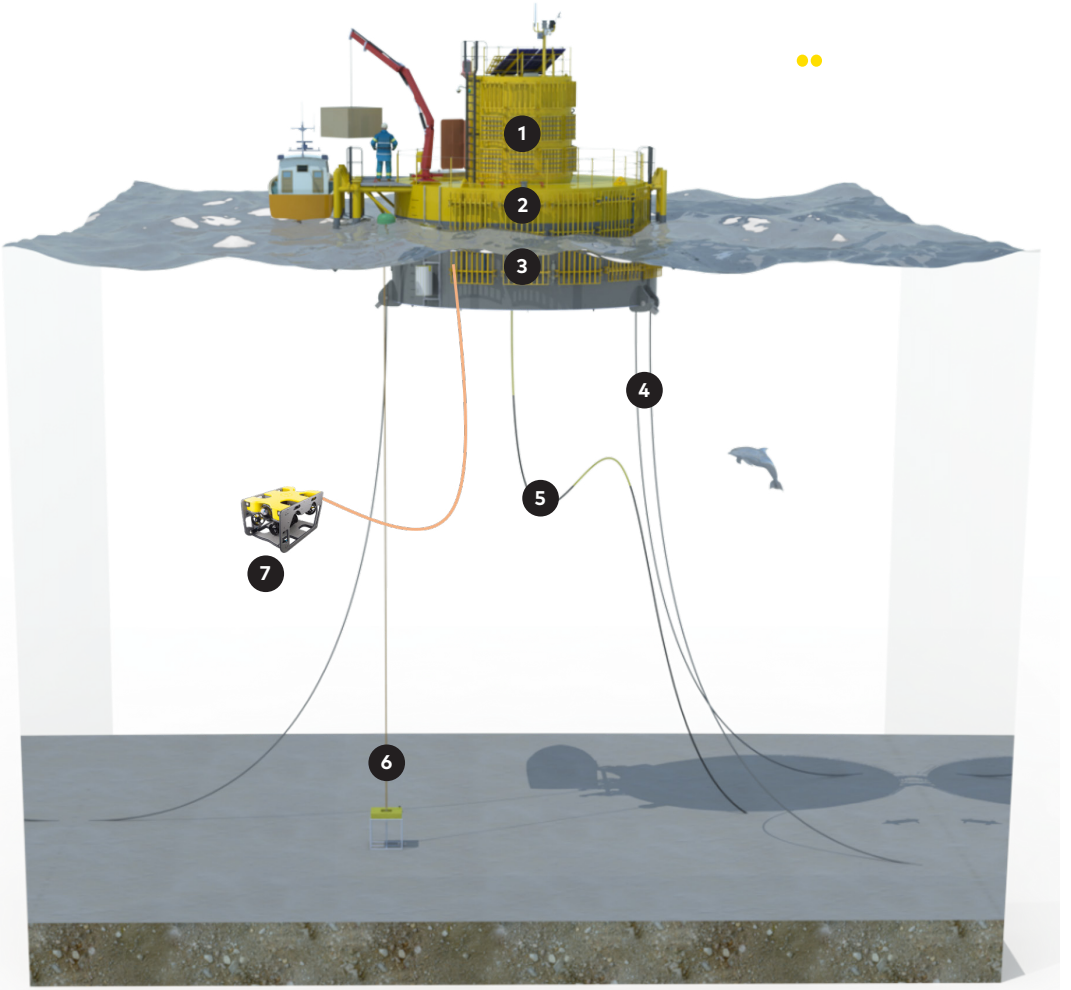
Testing solutions under controlled conditions

HarshLab allows the **evaluation of equipment and components in real offshore environment in a wide variety of conditions** ranging from atmospheric to seabed.

Harshlab allows testing solutions for the offshore industry in a real environment and under controlled conditions.

Connected to electrical grid and cable communications, HarshLab offers a ROV for **submarine inspections** and a submarine modem for the **development of novel communication systems with submerged devices.**

More information at:
https://harshlab.eu/en/



1 I Testing in atmospheric zone

2 I Testing in splash zone

3 I Testing in immersion zone

4 I Testing of mooring components

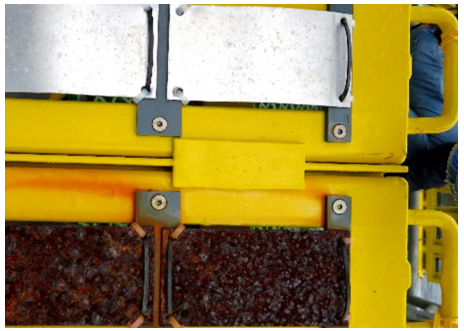
5 I Testing of umbilicals, connectors and risers

6 I Testing in seabed (65m depth)

7 I ROV for submarine operations

Testing at HarshLab

Corrosion testing



Atmospheric and splash zones have a corrosivity classification of CX. Immersion zone is classified as Im2, so **both ensure the highest corrosion rate.**

Ageing testing

Not only nude and coated metallic surfaces can be tested in our platform, but also other **non-metallic materials that need to withstand harsh marine conditions** while **maintaining their properties** (flexibility, aesthetic, etc).

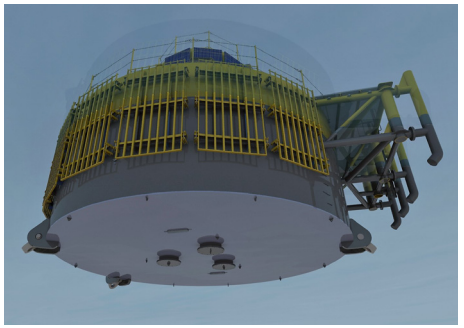
Testing of offshore communication systems

Telecommunications via cable, **meteorological station, GPS** based tracking system, submarine modem for **communications of submerged devices with surface** and a small **ROV** for inspections.

Antifouling solutions

BiMEP is an open sea area **especially prone to biofouling growth**, so test immersion and splash zones of HarshLab are particularly suitable for **testing experimental antifouling solutions under real offshore conditions.**

Validation of risers, connectors and umbilicals



HarshLab offers two available connectors in the hull, which poses an excellent opportunity for the validation of **innovative connection systems of risers, conectors and umbilicals** in real conditions.

Testing equipment in service

Able to host validation of **grid connected prototypes in service in immersion, deck or in hold.**

Meteoceanic conditions

Meteorological data

- Annual precipitation: 1500 mm/year
- Mean interannual temperature: 13ºC
- Average interannual max temperature: 16ºC
- Average interannual min temperature: 10ºC
- Average insolation: 1825 hours/year
- Average annual wetting time (Hr>80%, Tª>0º): 5.690 hours
- https://tinyurl.com/w54enqm

Oceanographic data

- Water temperature min/max: 11ºC (Jan) - 22ºC (Aug)
- Significant wave height min/med/max: 1,15 m / 1,67 m / 9,62 m
- Average salinity: 35 USP
- Average dissolved O2: 6 mL/l.
- Average transmittance: 88%
- http://dss.trlplus.com/

Main identified biofouling species

- *Bryozoan*
- *Perforatus perforatus*
- *Anomia ephippium*
- *Hiatella arctica*
- *Mytilus galloprovincialis*

We can provide full set of data related to the ongoing trials: meteorological, oceanographic data, corrosion rate, appearance... as well as valuable correlations between the observed variables, using advanced data analytics techniques.

R&D in HarshLab

HarshLab is **open** to private **industrial** users, **public** funded **research initiatives**, or other collaborative **public private partnership** initiatives.

HarshLab infrastructure allows researchers to understand how **offshore conditions may hinder lifetime expectancy** of components, materials and equipment designed to withstand harsh conditions in offshore industry.

Some of these conditions can be simulated in the laboratory with different climatic chambers and regular corrosion tests, but others, such initiation of corrosion phenomena in materials and coatings caused by fouling, **cannot be easily replicated in the laboratory.**

Comprehensive solution for floating offshore wind O&M via new technology development (FLOAT&M)

https://www.floatmproject.com/en/

Marine renewables Infrastructure network for enhancing energy technologies (MaRINET 2)

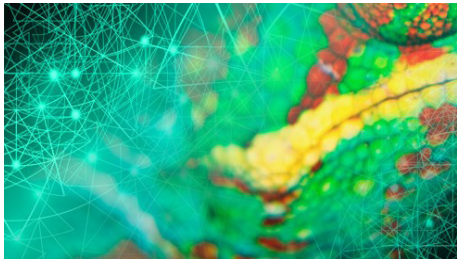
http://www.marinet2.eu/

Next Evolution in Materials and Models for Ocean Energy (NEMMO)

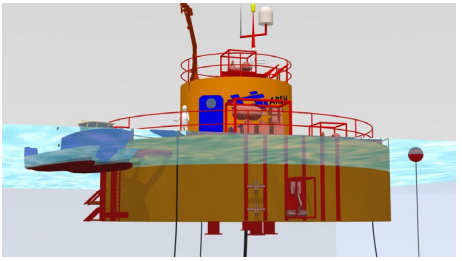
http://nemmo.eu/

Applied research for the development of floating substations for offshore wind energy (WIN2GRID)

https://www.wind2gridproject.com/en/



Innovation Ecosystem to Accelerate the industrial uptake of advanced surface nano-technologies



Technologies for the design, advance manufacturing and validation of components for energy facilities in offshore environments (HARSH)

http://www.clusterenergia.com/harsh-en

Location

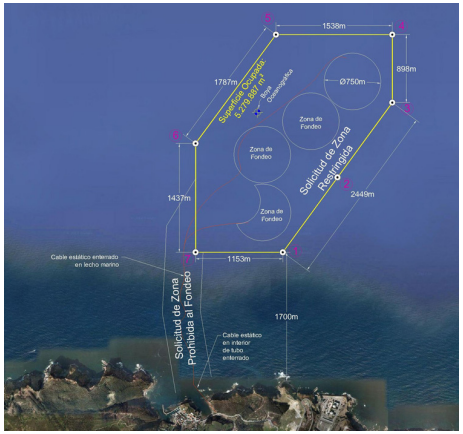
HarshLab is moored in the Biscay Marine Energy Platform - BiMEP (*http://bimep.com/en/*)

BiMEP is an **experimental sea zone** with a total surface area of 5.3 km^2 situated in the Biscay Gulf, **1,6 nautical miles** in front of the village of Armintza (Bizkaia, Spain).

BiMEP area is **well communicated with the port** of Armintza and it is under 24/7 surveillance, which allows a **quick access to samples** under trial while ensuring 100% offshore conditions.

BiMEP is an **open sea test site for ocean energy converters** trials:

- 13,2 kV - 5MW subsea export cables
- 24/7 surveillance and monitoring
- Research and data centre (monitoring and control)



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