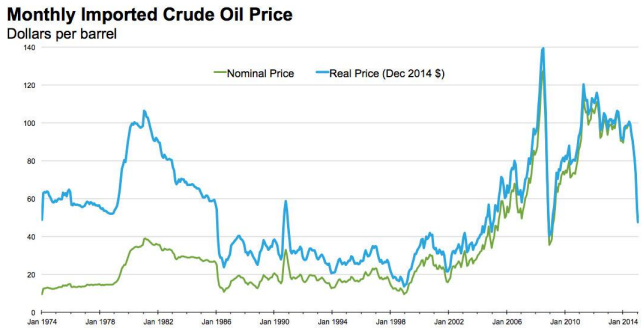
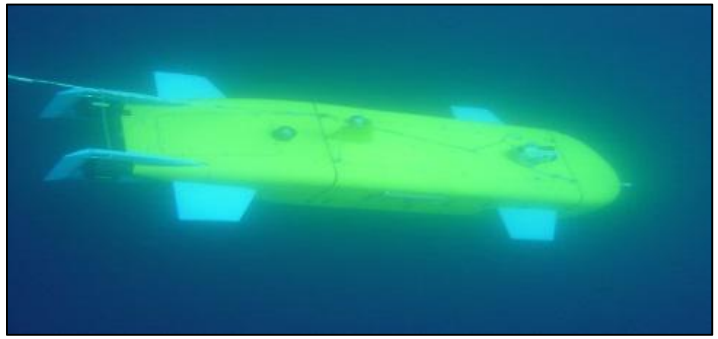
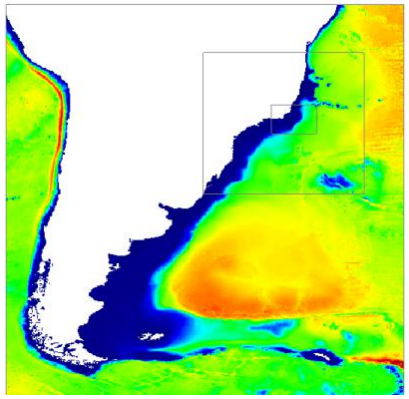


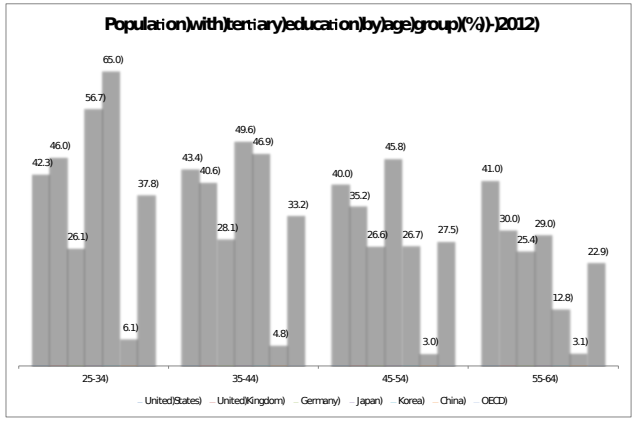


+Atlantic

Sustainable Exploitation of the Atlantic.

The case of Oil&Gas





FCT Fundação para a Ciência e a Tecnologia

Carnegie Mellon | PORTUGAL
AN INTERNATIONAL PARTNERSHIP

+Atlantic Aims

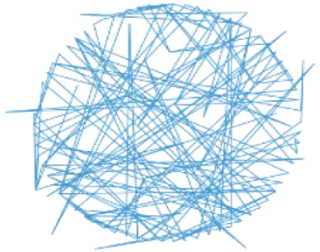
An integrated project aiming

- to **understand the constrains of Oil & Gas** offshore industry at local, regional and Atlantic scale and to identify how it impacts economy and environment

- to **identify technological opportunities** and to create an innovation agenda for Oil&Gas and for other offshore industries with identical needs

+ Atlantic Partners

Funded Developers



LARSyS
Robotics and Systems in Engineering and Science

Carnegie Mellon University

WavEC
Offshore Renewables

arditi

iSQ

CEiiA

Self Funded Developers

Technip

emepc
Estrutura de Missão para a Extensão da Plataforma Continental

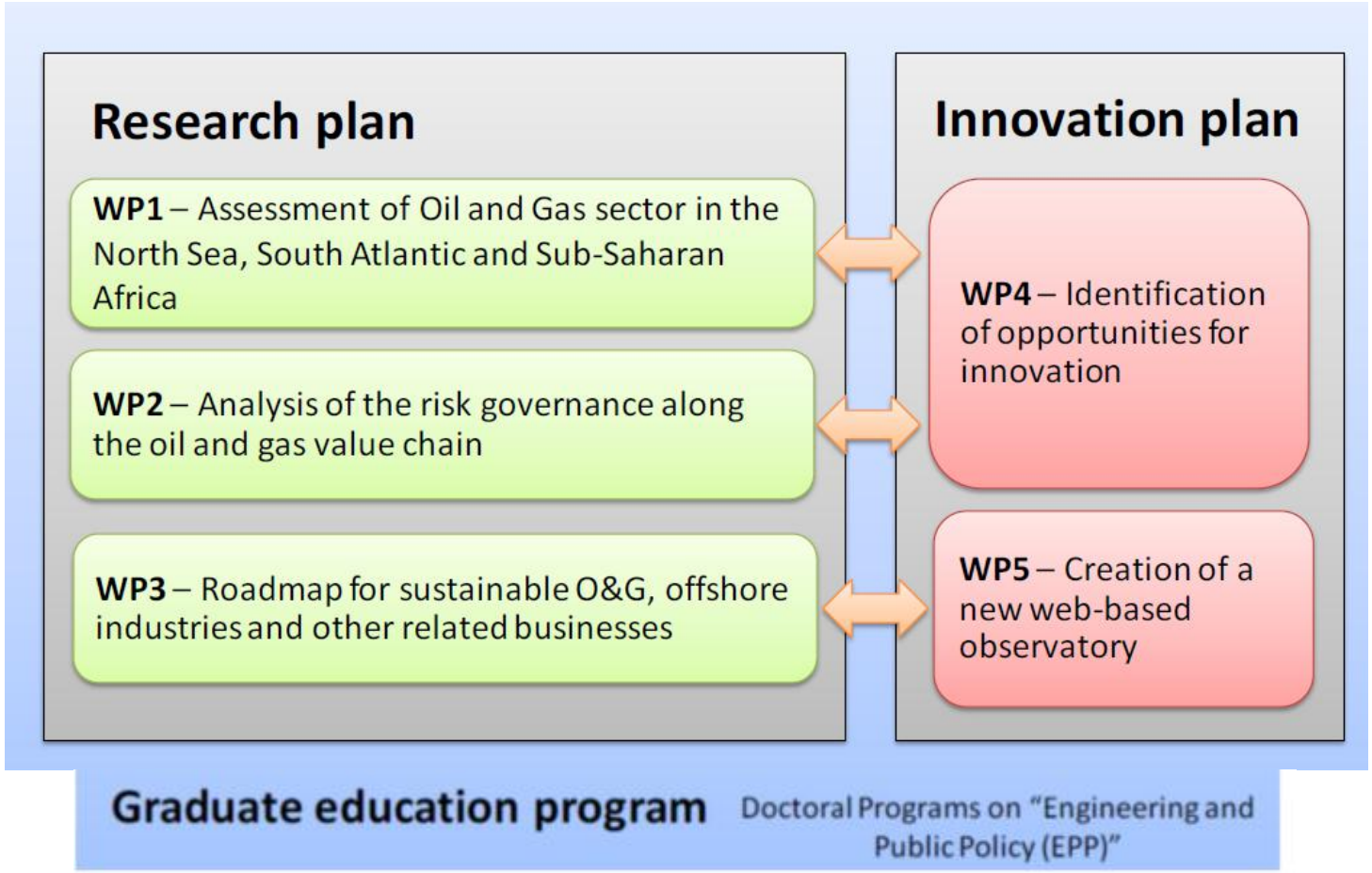
Other Contributors

ONIP

m·iti
Madeira Interactive Technologies Institute

Steinbeis

Project Plan



CMU's Contribution - Potential Questions

- How to best **utilize the benefits** of new oil & gas production?
- What are the **environmental impacts** of these strategies?
- Impacts of oil production **on other important sectors** in the economy?
  - Which industries can benefit from projected oil & gas supplies? Which industries may emerge?
- Which **disruptive technologies** may play a role?

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Police objective

Develop policy for optimal investment to promote sustainable oil& gas development

- Create economic, environmental models of global oil & gas production
- Develop models to first determine the industrial sectors in Brazil, the US, and the EU most likely impacted by the additional energy related activity
- Consider integrated US, Brazil, and EU models to determine the regional sectoral responses and trade interactions between regions
  - Potential economic and environmental hotspots
  - Economic sectors that may require additional resources to maximize potential or support to remain competitive under these new pressures

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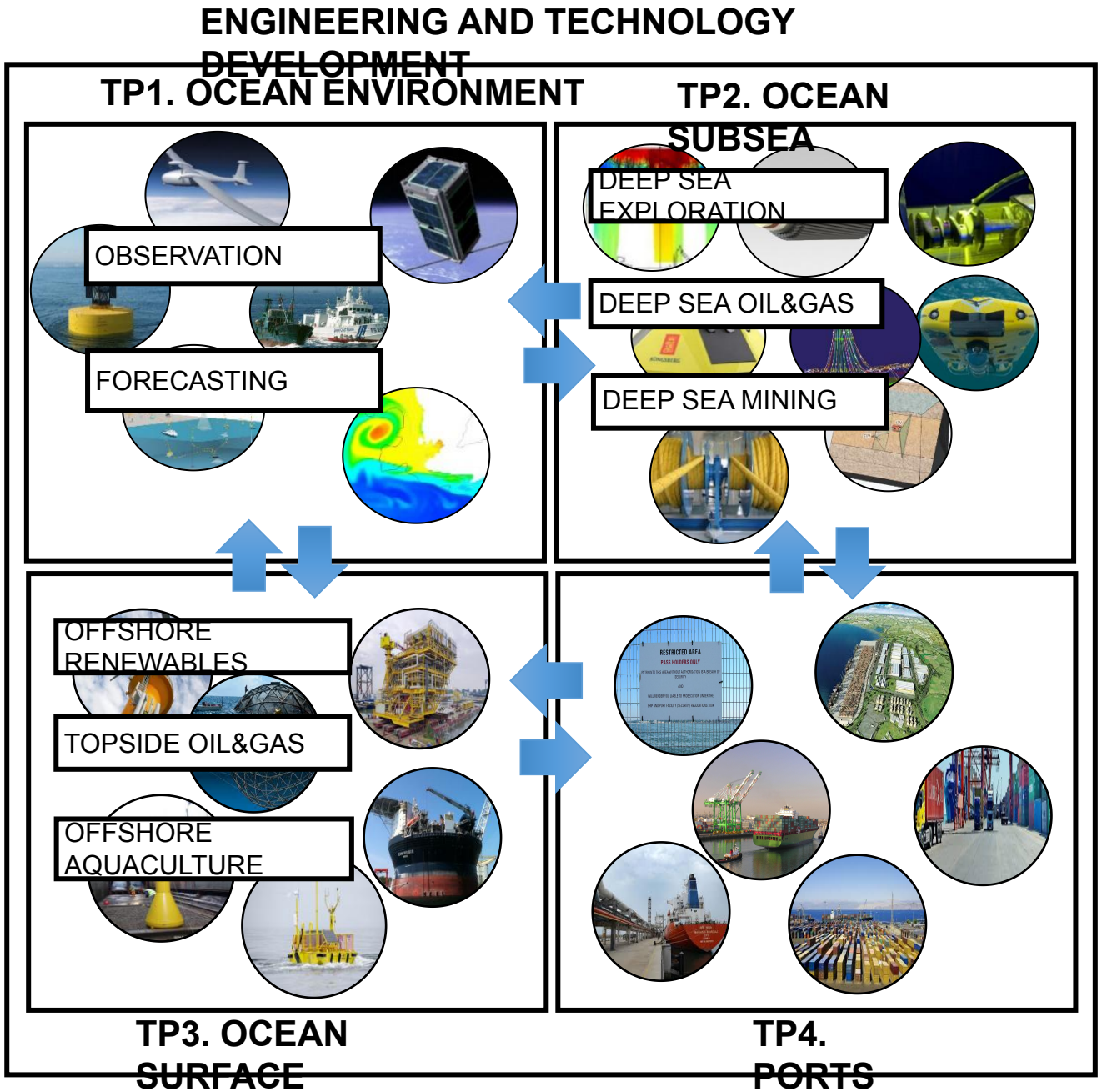
Technological Questions

- 4 technological platforms
- Challenges for potential technology developments projects



Low cost self-powered dynamic positioning multiuse platform

What kind of innovation is needed?

Low cost modular and scalable platform architectures that can be flexible and adaptive to current and new payloads

Sea-scout buoy during the testing period at Tagus estuary, Lisbon

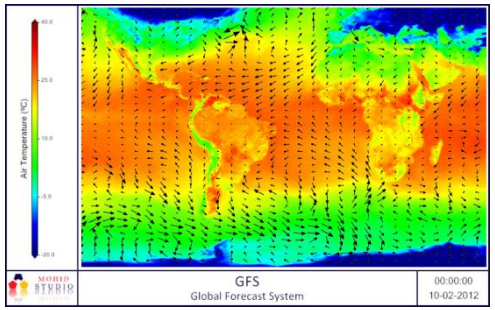
Modelling the ocean

LARSyS
Robotics and Systems in Engineering and Science

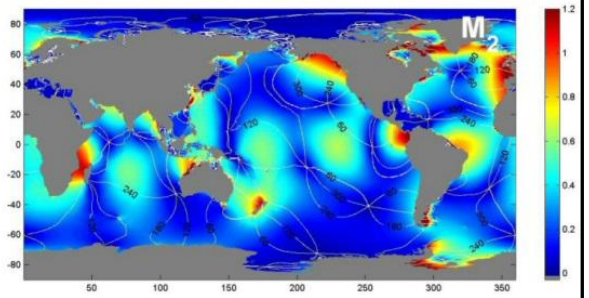
MARETEC
MARINE ENVIRONMENT & TECHNOLOGY CENTER

- Integrated computational models for better oceanic behavior prediction

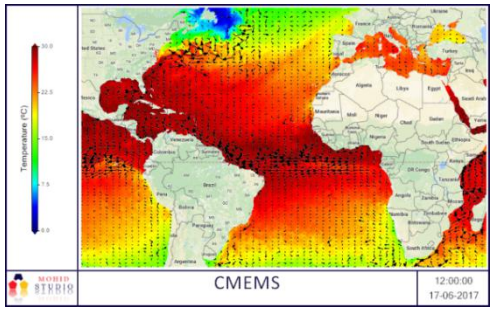
Global atmospheric models



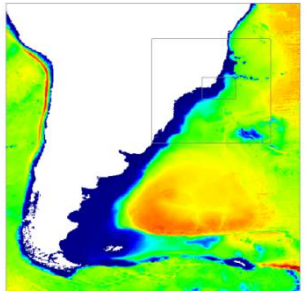
Global tide models



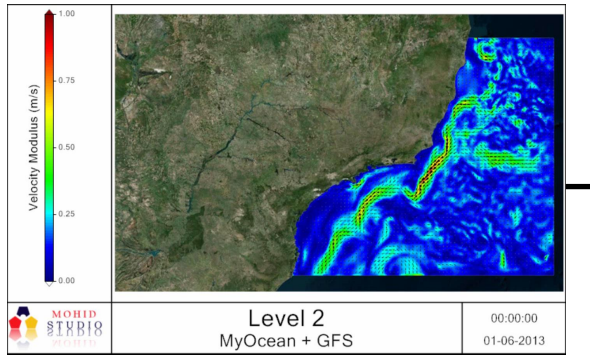
Global oceanic models



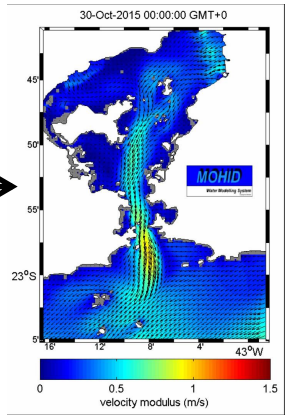
Global terrain models



Regional models



Local models



SubSea Monitoring

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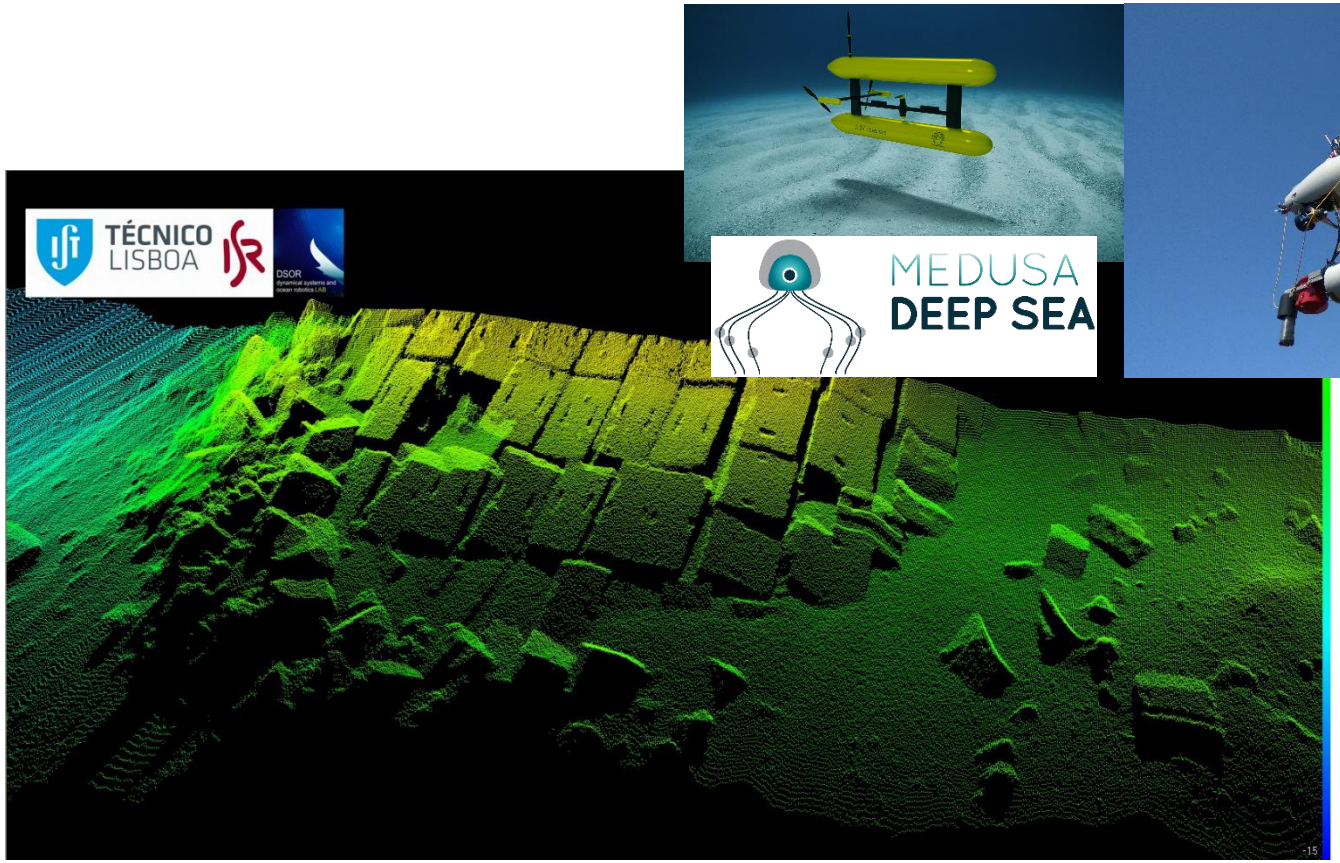
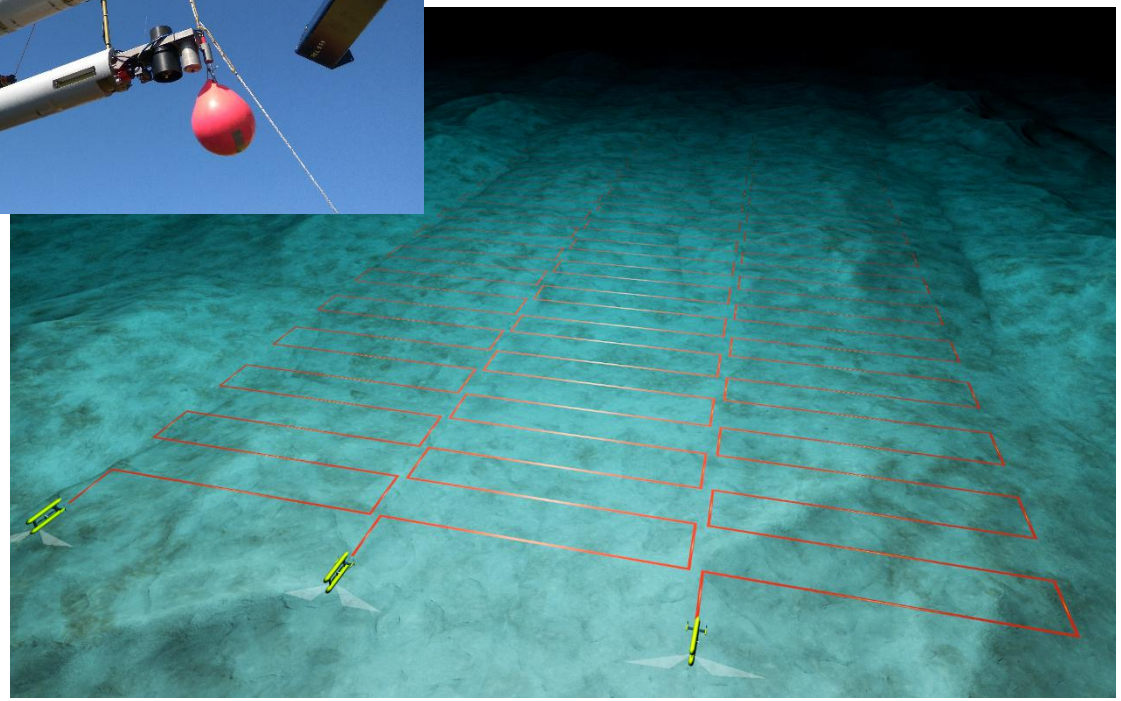
Robotics and Systems in Engineering and Science



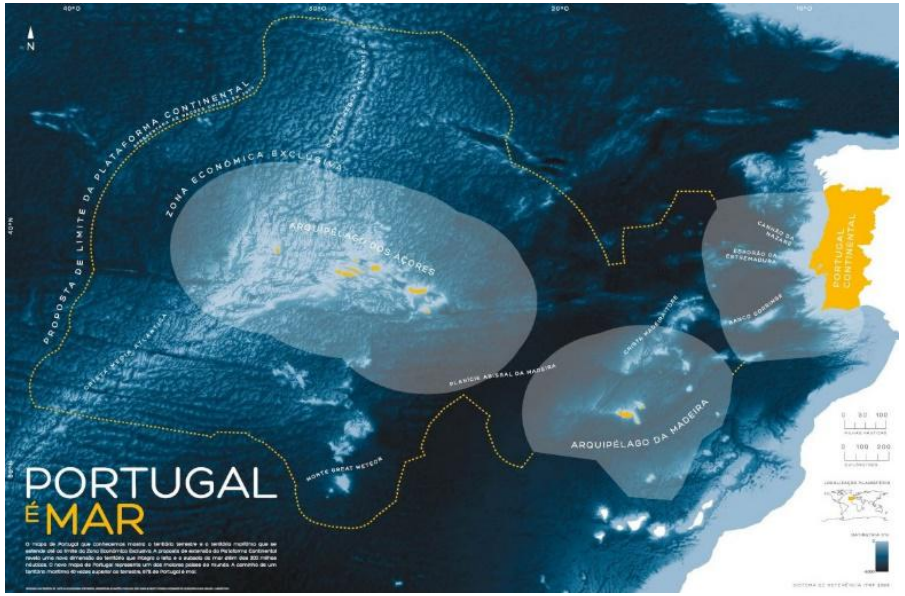


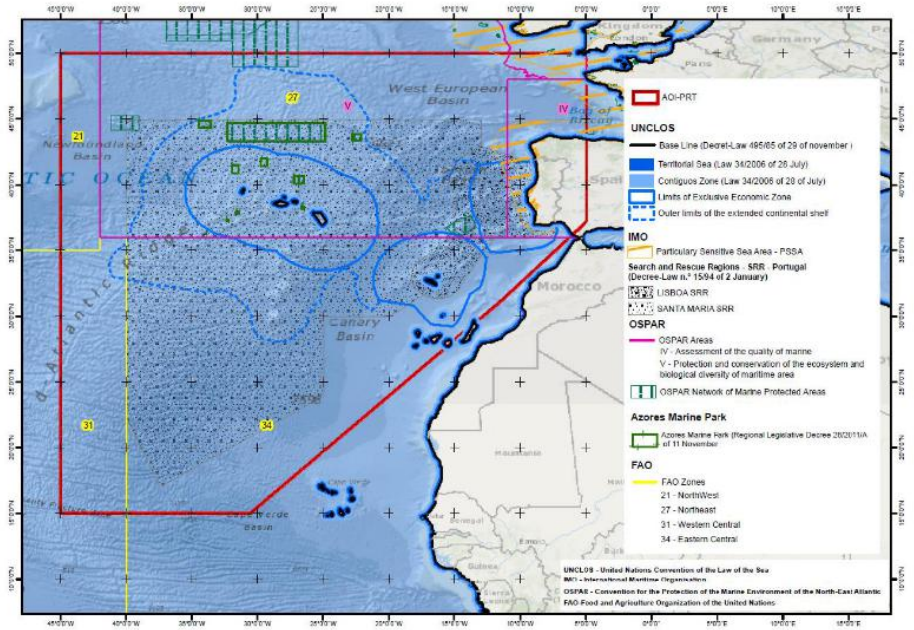
High Resolution mapping using MEDUSA DEEP SEA AUV

Why we need it (innovation)

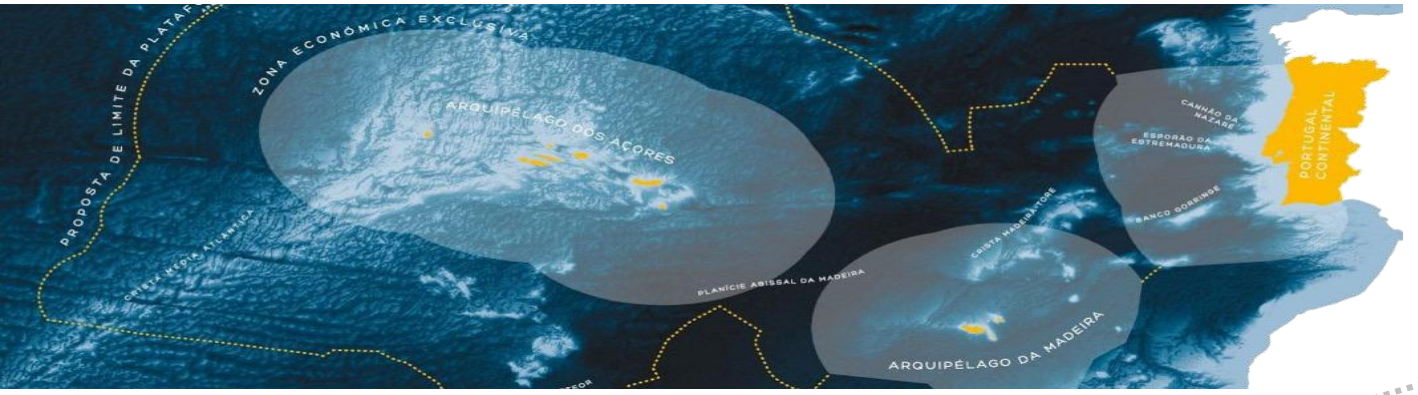
The seafloor under the Portuguese jurisdiction is largely unexplored, but a broad consensus exists regarding its potential as an enormous reservoir of living and non-living marine resources.

The work proposed is crucial to take solid steps to take solid steps to support sea governance and the sustainable use and management of marine resources.

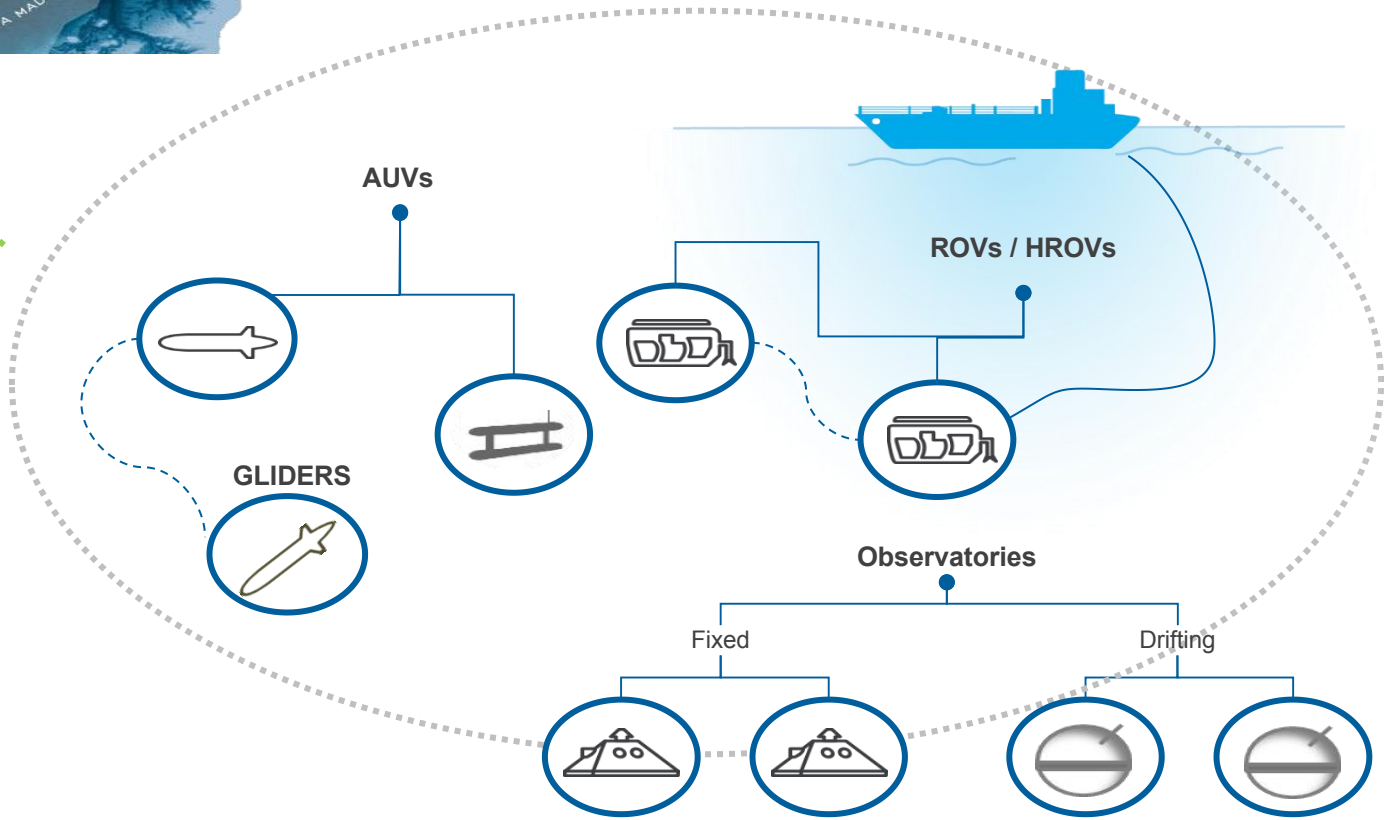




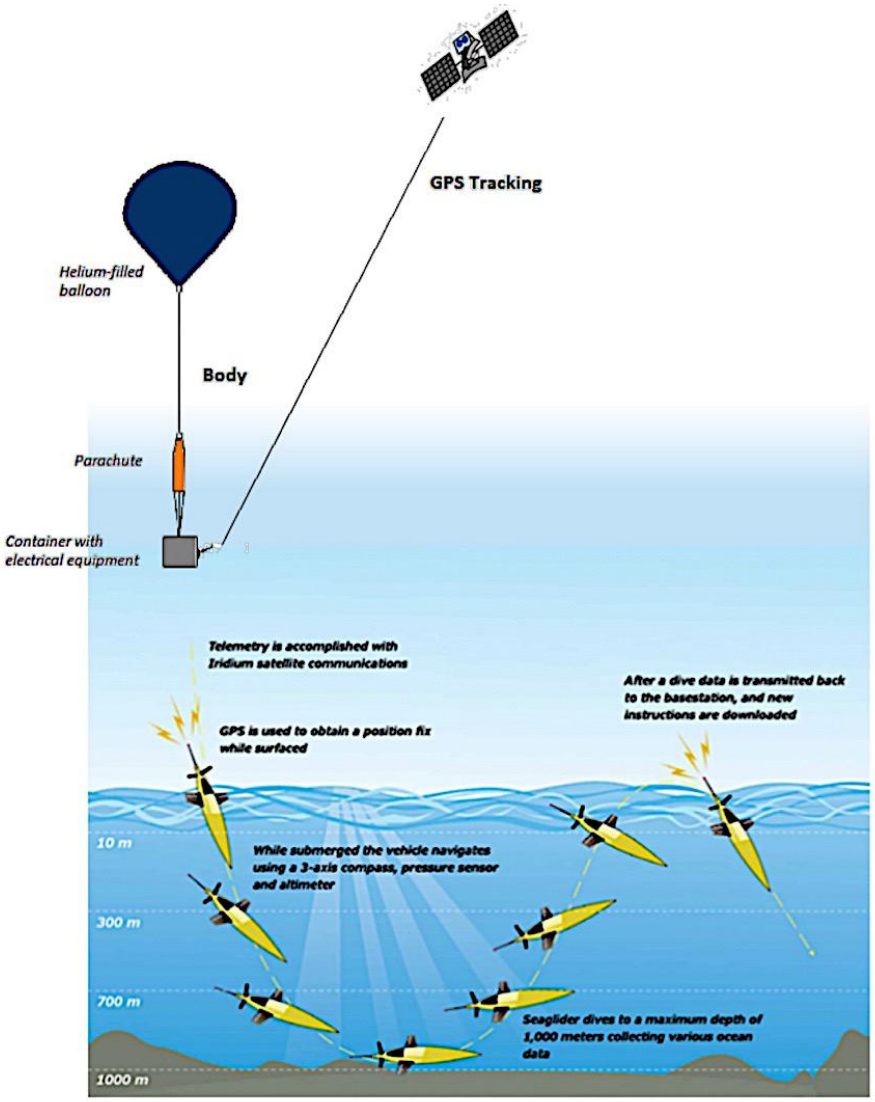
Data management



Ocean Exploration & Monitoring



Remote sensing autonomous submersible platforms



OCEAN OBSERVATION
OCEAN SUBSEA
OCEAN SURFACE

WHAT IS NEEDED?

- ASSESSMENT OF OFFSHORE SEABED RESOURCES FOR EXPLORATION FEASIBILITY
- SEABED MAPPING AND ITS CHARACTERISATION

WHY IS NEEDED?

- LOW COST ALTERNATIVE TECHNOLOGY /METHODOLOGY USING MODELS AND SATELLITE DATA SOURCES (ESA DATA – COPERNICUS CONSTELLATION)
- INCREASE OF SATELLITE DATA FEASIBILITY THROUGH A VALIDATED EXPLORATION
- INCREASED ACCESSIBILITY TO EXPLOIT REMOTE OCEAN AREAS

WHO NEEDS IT?

- SUBSEA MINING INDUSTRY
- O&G

Inspection of RISERS & PIPELINES

OCEAN SUBSEA

WHAT IS NEEDED?

- CRITICAL COMPONENTS IN O&G OPERATION REQUIRING HIGH PERFORMANCE INSPECTION
- NDT TECHNIQUE WITH HIGH EFFICIENCY FOR LONG RANGE INSPECTION AND FOR DIFFICULT ACCESS COMPONENTS
- UT GUIDED WAVES FOR HEALTH STRUCTURAL CONDITION AND FULL MONITORING

WHY IS NEEDED?

- UPSTREAM O&G DEMANDS FAST AND RELIABLE INSPECTION
- DIFFICULT ACCESSED COMPONENTS

WHO NEEDS IT?

- OIL & GAS OPERATORS (PETROBRAS, …)

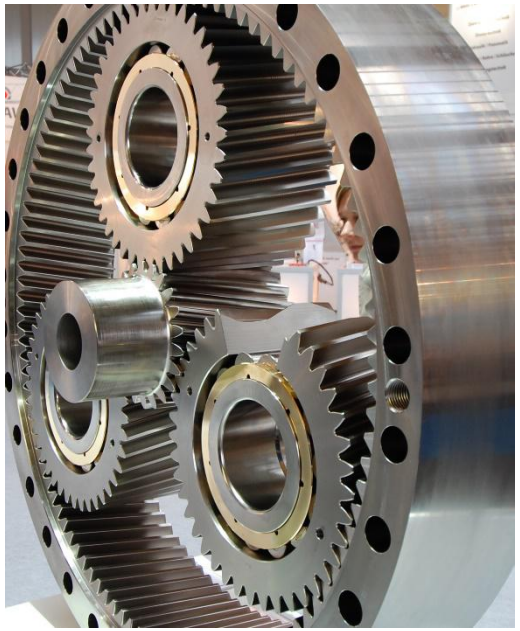
PETROBRAS

Design and development of a new high nitrogen bearing **STEEL** for offshore **WIND** turbines

OCEAN SURFAC

WHAT IS NEEDED?

- PHYSICAL METALLURGY, DESIGN AND MODELLING OF NEW GENERIC STEEL GRADES FOR IMPROVED PROPERTIES (FATIGUE, CREEP, CORROSION)
- LIFE CYCLE ASSESSMENT AND COST BENEFIT ANALYSIS



WHY IS NEEDED?

- IMPROVED QUALITY AND RESISTANCE TO CORROSION AND FATIGUE
- ADVANCED AND EFFICIENT PRODUCTION PROCESSES
- LOW COST PRODUCTION

WHO NEEDS IT?

- OFFSHORE STAKEHOLDERS
- BEARINGS SUPPLIERS

Research Fund for Coal & Steel

ISQ

Who are our potential clients?

- Oil and gas platforms (or other offshore platforms)
- Aquaculture farms
- Renewable energy parks (wave, tidal, wind)
- Public and research agencies

Marine Protected Areas (including remote)

Coastal monitoring and surveillance

Port administrations