



European Innovation Partnership on Raw Materials

Application for a Raw Materials Commitment

[Innovative Mining of Marine Mineral Resources - A European Pilot Mining Test in the Atlantic on Tools, Facilities, Operations and Concepts](#)

Acronym:

Blue Atlantis

Links to the Strategic Implementation Plan:

- **[I. Technology Pillar](#)**
 - **[I.A Priority Area: Raw materials research and innovation coordination](#)**
 - **[Action area n° I.1 Improving R&D&I coordination in the EU](#)**
 - **[2\) Coordination of Member States and EU initiatives](#)**
 - **[3\) Collaboration between Raw materials community and society](#)**
 - **[I.B Priority Area: Technologies for primary and secondary raw materials' production](#)**
 - **[Action area n° I.2: Exploration](#)**
 - **[1\) New exploration technologies](#)**
 - **[2\) Geo-models](#)**
 - **[Action area n° I.3: Innovative extraction of raw materials](#)**
 - **[1\) Automated mining](#)**
 - **[2\) Mining of small deposits](#)**
 - **[3\) Alternative mining](#)**
 - **[4\) Deep-sea mining](#)**
 - **[Action area n° I.4: Processing and refining of raw materials](#)**
 - **[1\) Innovative and flexible processing](#)**
 - **[2\) Metallurgical systems](#)**
 - **[II. Non-Technology Pillar](#)**
 - **[II.A Priority Area: Improving Europe's raw materials framework conditions](#)**
 - **[Action area n° II.1: Minerals Policy Framework](#)**
 - **[1\) Benchmark analysis of existing national minerals policies](#)**
 - **[10\) Explore feasibility of rules for the exploitation of sub-surface and deep sea resources](#)**
 - **[11\) Ensure at EU level better communication and dissemination of the Commission's guidance on Natura 2000 and non-energy extractive industries](#)**
 - **[12\) Develop guidelines with EU reporting standards and national and EU mineral reporting schemes based on standard terminology](#)**

- **Action area n° II.2: Access to Mineral Potential in the EU**
 - **3) Intensify the general exploration/public identification of mineral potential**
- **Action area n° II.3: Public Awareness**
 - **1) Incorporate recent best practice examples of communication in EU**
 - **2) Promote early and open communication between mining companies, public authorities and neighbours and local communities.**
- **II.C Priority Area: Knowledge**
 - **Action area n° II.8: EU Raw Materials Knowledge Base**
 - **3) Raw materials intelligence - methods, tools and analysis**
 - **5) Collaboration with the rest of the world on raw materials information**
 - **6) Improvement of data collection**
 - **Action area n° II.9: Possible EIT Knowledge and Innovation Community**
 - **2) Integration of sea-bed mining**
 - **Action area n° II.10: Optimised raw materials flows along value chains**
 - **1) Raw material partnerships**
- **III. International Cooperation Pillar**
 - **III. International Cooperation Pillar**
 - **Action area n° III.1: Technology**
 - **1) Exploit synergies in R&D with regard to exploration, extraction and processing**
 - **3) Cooperation and best practice sharing in the area of Critical Raw Materials (CRM)**
 - **4) Develop ore metallurgy and processing techniques**

Objectives of the commitment:

Blue Atlantis will establish the world's only deep-sea mining test facility, covering RTD, mining tests, standards development and market access support. The consortium has 45 partners from 8 European countries along the entire value chain. Deep-sea mining has gone from a distant possibility to a likely reality within just a decade. There is a growing imperative for a better defined EU policy in this area. There are three good reasons why a deep-sea mining test in Europe would be important. First, securing raw materials for European industry, which depends on importing most strategic and critical metals, including: Co, Cu, Ga, Nb, Pt group metals, Ti, W, Zn, Au, Ag and Rare Earths. Second, Europe's leadership in advanced deep-sea technologies will be further enhanced on a global scale. Third, new education, skills and knowledge will be offered by universities and research centers.

Description of the activities:

The seafloor around the Azores Archipelago provides an ideal location as a deep-sea mining test facility in European waters. Analyses show that the Mid-Atlantic ridge system near the Azores hosts seafloor massive sulfides (SMS) deposits. South of the Azores, between 36°N and 40°N, there are four known fields of hydrothermally active vents within the actual Portuguese EEZ on the Mid-Atlantic Ridge. Furthermore, there are manganese nodules and cobalt-rich crusts to be found within the Portuguese EEZ and extended continental shelf, which may be an additional source for deep-sea minerals. Blue Atlantis partners cover the entire deep-sea mining value chain with the following unique selling propositions:

- Strategic European leadership
- Strong industry partners with comprehensive marine mineral resource expertise
- Strong innovation-orientation combining the technical, scientific, and logistic resources of major universities and marine RTD institutions.
- Strong backing of national governments
- Strong environmental credentials. Only non-active SMS-sites will be considered for the mining test

- Expertise in risk assessment and standards development

Work Packages for a large-scale European Marine Mining Pilot Project:

1. Project management (Portuguese and German co-coordinators)
2. MetOcean studies
3. Environmental monitoring and assessment, incl. new technologies and early warning capacities during exploration, mining, and post-mining activities.
4. Exploration activities, especially of relevant non-active mining sites. Tools will include submersibles (AUV and ROV), high definition geophysical tools, thematic mapping, mineralogy and geochemistry as well as core drilling (e.g. with MeBo and Rockdrill).
5. Mining equipment development, including R&D projects and design activities related to:
 - Mining tools incl. shallow water tests
 - Intelligent detection supported by ROVs and AUVs
 - Buffer incl. SMS storage and flexible pipe/tube
 - Airlift- and/or slurry pump systems
 - Riser concept incl. tailing dumping pipe (design, dimension, material)
 - Energy supply
 - Underwater communication
 - Design and concept for surface vessel and/or floating structure
 - Tailing processing unit onboard surface vessel, incl. in recirculation in greater depths
 - Systems control and monitoring center
 - Test on land (LAB)
6. Evaluation of the R&D preparation projects
 - Main mining components and tools
 - Modification and realisation of selected components and tools
 - Construction
7. Mining test preparation
8. Mining support and production vessel preparation
9. Mining test operation
10. Processing concepts and technologies for marine mineral resources
11. Standards and risk assessment Deep-sea mining is dependent on new technologies and processes developed in a highly competitive world market. For this reason, the test facility will be complemented by the systematic development of standards (e.g. environmental, safety, technology, etc.) as well as a comprehensive risk assessment analysis of all aspects of deep-sea mining and technology deployment.
12. Education and Training Programmes
13. Dialogue with Stakeholders, including with:
 - regulators (e.g. government agencies) tasked with such issues environmental, safety and other agencies)
 - policy makers from environmental, trade and resources areas
 - industry regarding the strategic interests of European industry), and
 - NGOs and societal groups on issues related to public perception and acceptance.

A specific Working Group will be set-up to liaise with local governments in Portugal and the EU Institutions.

Description of the expected impacts:

Blue Atlantis will cement Europe's expertise for the whole deep-sea mining added value chain. With respect to the existing SMS-deposits in the EEZ of the Azores, the aim is to create marine mining test structures which are strongly linked to the proposed work packages. In addition to the mining test structure, the consortium proposes the preparation and implementation of a conceptual study for large scale facilities for deep-sea mining.

In cooperation with industry, research and government communities, all relevant aspects of the value chain should be addressed in a pilot mining operation. Blue Atlantis will cover inter alia the following key areas:

- geophysical exploration using new or modified tools and technologies
- Development of robotic tools for mineral exploration
- geological, mineralogical and geochemical evaluation, site selection and resource definition by drilling
- environmental and biological characterisation, baseline collection and monitoring
- development and testing of seafloor mining tools, lift and riser system
- development and testing of robotic tools to support monitoring, infrastructure maintenance and sustainable mining operations
- design studies of mining support and production vessel (MSV)
- „at sea“ pretreatment of ore, transportation issues, port facilities
- financing, economic models, and market impact
- preparation of UNCLOS implementation under national legislation
- legal requirements and fiscal impact
- public outreach and public awareness/ acceptance

Expected innovation outcomes:

New products to the market

New processes

New services

New technologies

New business models

New ideas to the market

Societal innovation

Comments:

The Consortium covers 45 partners from 8 European countries. These partners will be involved in 13 work packages:

1. Project management (3 partners)
2. MetOcean studies (7 partners)
3. Environmental monitoring and assessment (26 partners)
4. Exploration activities for SMS in the EEZ of the Azores (30 partners)
5. Mining Equipment Development (25 partners)
6. Evaluation of the R&D projects (18 partners)
7. Preparation of the mining test (17 partners)
8. Preparation of the mining support and production vessel (9 partners)
9. Mining test operation (19 partners)
10. Processing concepts and technologies (10 partners)
11. Standards and risk (8 partners)
12. Education and Training Programmes (15 partners)
13. Dialogue with Stakeholders (9 partners)

The consortium has strong links to the recent European FP7 R&D projects MIDAS (Ref.: 603418) and Blue Mining (Ref.: 604500)

Name of the coordinating organisation:

Working Group Marine Mineral Resources; German Association for Marine Technology

Country:

Germany

Entity profile:

Other

Other:

Not-for-profit legal entity in Germany

Role within the commitment:

The coordinators will integrate and harmonise the work package involvement of the different partners to minimize duplication of work and efforts for the future Proposal. Additionally to the general coordination tasks (finances, mile stones and deliverables, controlling, reporting, etc.) the coordinators will be partly involved in WPs 2, 3, 6, 7, 9 and 13). The coordinators cover the entire spectrum of the skills needed to coordinate such a comprehensive project.

Other partners:

Name of partner:

Konsortium Deutsche Meeresforschung e.V. (KDM)

Country:

Germany

Entity profile:

Other

Other:

Not-for-profit (charitable status) legal entity in Germany (eingetragener Verein)

Role within the commitment:

To contribute to providing support functions to the participating research community and contribute to building relations with stakeholder communities, especially at the European level.

Name of partner:

Bundesanstalt fuer Geowissenschaften und Rohstoffe (BGR)

Country:

Germany

Entity profile:

Governmental/public body

Role within the commitment:

Development and testing of new exploration methods (e.g., controlled source electromagnetic)

Name of partner:

Fundacao da Faculdade de Ciencias da Universidade de Lisboa (FFCUL)

Country:

Portugal

Entity profile:

Academia

Role within the commitment:

Participation in exploration and site selection and characterization, partly for automated (robotized) mining. Specific contribution will be the study of ores and cover rocks in real time. Later in-house validation and complementing the field data with measurements not possible to perform during cruises. Another subject of participation will be a close cooperation regarding the coordination of portuguese activities and the especially those activities within the Portuguese EEZ.

Name of partner:

IST - Instituto Superior Técnico; ISR - Institute for Systems and Robotics and CERENA - Center for Natural Resources and the Environment.

Country:

Portugal

Entity profile:

Academia

Role within the commitment:

1) ISR targets the development of cooperative marine robotic systems - with particular focus on Navigation and vehicle systems - optimized to substantially increase the efficacy of seafloor remote sensing operations for mining-related exploration and environmental impact assessment; 2) CERENA contributes with new mathematical and geostatistical methodologies for deep sea ore reserves and resource characterization in extreme environments, like deep and ultra-deep waters.

Name of partner:

Laboratório Nacional de Energia e Geologia (LNEG)

Country:

Portugal

Entity profile:

Governmental/public body

Role within the commitment:

Participation in the site's exploration and contribution to field data acquisition: ores and igneous rocks textural and mineralogical studies; geological interpretation of sonar data and ROV imagery. Contribution to ore characterization through post-cruise analytical work, by obtaining total rock and mineral chemical analyses; mineral processing (flotation bench tests and pilot plant). Collaboration in the geophysical and geochemical data interpretation.

Name of partner:

SPCN - Sociedade Portuguesa de Ciências Naturais

Country:

Portugal

Entity profile:

NGOs

Role within the commitment:

To bring together a multidisciplinary group of experts (Physical , Geological, Biological oceanographers and Sustainability scientist), to work with the objective to enable application of available science and technology that allow resource use while protecting and preserve the marine environment and to promote the cooperation among explorers and between explorers and the scientific community and civil society. Field work in test sites of seafloor massive sulfides (SMS).

Name of partner:

MARINTEK

Country:

Norway

Entity profile:

Private sector - large company

**Role within the
commitment:**

MARINTEK's primary interest lies in the potential for innovation within Marine Operations, and potential for technology transfer and cross-pollination between offshore oil&gas operations and marine mining operations. However, the challenges inherent in marine mining will require new knowledge and tools which can only be rationally answered by research and development. Marintek will contribute to WP 2, 3, 5 and 6.

Name of partner:

SINTEF

Country:

Norway

Entity profile:

Other

Other:

private-public research foundation

**Role within the
commitment:**

As a research institute with extensive experience with offshore/subsea oil & gas production, our role is to generate research based innovation solutions on subsea mining processes, automatization of them, transport solutions, and the development of robust equipment based on advanced materials science and design solutions. On top of our agenda will be to utilize our marine environmental technology competence base for securing environmental sustainability.

Name of partner:

Norwegian University of Science and Technology (NTNU)

Country:

Norway

Entity profile:

Academia

**Role within the
commitment:**

NTNU has in cooperation with Statoil and Nordic Ocean Resources recently finalized a project to establish the potential of seabed mineral resources in Norway. A special focus was the massive sulfide mineralization along the Mid-Atlantic Ridge. NTNU would like to contribute to several of the proposed work packages and can offer substantial experience and expertise in the fields of exploration, marine engineering, marine operations and resource evaluation.

Name of partner:

CGB - Centre for Geobiology, University of Bergen

Country:

Norway

Entity profile:

Academia

**Role within the
commitment:**

Taking part on seafloor exploration through acoustics, hydrothermal plume detection, seafloor mapping and site characterization. Contributing to the regional and global understanding of SMS genesis, using geochemical and isotope data. Assessing potential impact of seabed mining via plume dispersal studies, in-situ experiments on seafloor weathering of newly exposed sulfide surfaces and possible release of toxic elements into the water column.

Name of partner:

University of Southampton

Country:

United Kingdom

Entity profile:

Academia

**Role within the
commitment:**

Role within the commitment: Scientific research partner. Ore deposit formation, resource/reserve evaluation, sub-surface exploration, environmental impact, engineering, biosphere and ecosystem impacts, seafloor mining and extraction engineering sciences and the environmental impact of engineered systems.

Name of partner:

Natural Environment Research Council (NERC)

Country:

United Kingdom

Entity profile:

Academia

**Role within the
commitment:**

The NERC partnership will bring research into resource validation and assessment, environmental impacts, sustainability of exploitation, and renewable and low carbon mineral production. We will do this through the deployment of 3 man years of research scientist staff time, deploying one of our ocean research vessels with autonomous underwater vehicle (AUV) and remotely controlled vehicle (ROV) operations, seafloor drilling rig and wire-line logging, and on shore geochemical and biology laboratories.

Name of partner:

Lloyd's Register EMEA

Country:

Germany

Entity profile:

Private sector - large company

**Role within the
commitment:**

To ensure that the entire supply chain is safe, responsible and sustainable by securing high technical standards of design, manufacture, construction, maintenance, operations and performance.

Name of partner:

Soil Machine Dynamics Ltd. (SMD)

Country:

United Kingdom

Entity profile:

Private sector - large company

**Role within the
commitment:**

Direct involvement in some work packages (WP 3, 5, 6, 7, 8, 9, 10 and 12) – assistance and advice in others – contact for multiple offshore operators that have relevant base knowledge that is not in the public domain.

Name of partner:

Sandvik Mining and Construction G.m.b.H.

Country:

Austria

Entity profile:

Private sector - large company

**Role within the
commitment:**

Depending on the finally available partners either the development of a sub-sea mining cutting system or of a sub-sea mining base machine unit focusing on mining massive polysulfide and alternatively on mining manganese nodules and manganese crusts. The idea is to develop a multipurpose machine which can either be generally used for mining one of the above mentioned types of submarine ore deposits or it can easily and quickly adapted for it.

Name of partner:

Jan De Nul N.V.

Country:

Belgium

Entity profile:

Private sector - large company

**Role within the
commitment:**

JDN's decade long experience in dredging projects has resulted in a continuous evaluation, adaptation and improvement of equipment and techniques. All these techniques - cutting, fluidisation, hydraulic transport and dewatering of solid material - are applicable to marine minerals mining. Experience with the general aspects related to mass transport in marine environment and working at sea are primary inputs in a successful pilot test.

Name of partner:

Technische Universität Clausthal

Country:

Germany

Entity profile:

Academia

**Role within the
commitment:**

Innovative extraction of Raw Materials.

Name of partner:

MBT GmbH

Country:

Germany

Entity profile:

Private sector - SME

**Role within the
commitment:**

MBT is focused on oceanographic, marine geophysical and hydrographic sensor integration, underwater infrastructure technologies such as cable and connector systems including the design of high-speed broadband data telemetry system based on FO-technology. In addition, MBT is involved in the design of swell compensation for launch and recovery systems. Another focus area is data management solutions for marine environmental monitoring systems.

Name of partner:

EDM - Empresa de Desenvolvimento Mineiro, S.A

Country:

Portugal

**Role within the
commitment:**

Evaluation of the interaction, between environment, mining strategy and technical definition. The basic exploitation scenario will be evaluated. The studies will form a reliable basis for performance predictions and the estimation of mining costs. A profitability analysis will be carried out. Participation in the geological, geophysical and geochemical exploration surveys.

Name of partner:

GEOMAR, Helmholtz Centre for Ocean Research, Kiel

Country:

Germany

Entity profile:

Academia

**Role within the
commitment:**

Resource identification and characterization; environmental baseline studies; resource modelling, including numerical modelling fluid flow for exploration targeting; geological mapping, structural analysis, axis and off-axis settings; target definition including ROV mapping and sampling; resource characterization, including geometallurgical studies, physical rock properties studies; drilling and "reserve" estimation; ore characterization for geotechnical applications

Name of partner:

ENITECH Energietechnik - Elektronik GmbH

Country:

Germany

Entity profile:

Private sector - SME

**Role within the
commitment:**

ENITECH is specializes in supplying fluid free pressure tolerant systems. The new technology protects the electronic components with specially elastomer molds. We provide compact, lightweight, robust, and cost-effective components for diving depths of up to 6,000 m. · electric

underwater drives · Power electronics, DC / DC converter · Power supply systems, Li-Po battery systems · Control systems

Name of partner:

DNV GL

Country:

Germany

Entity profile:

Private sector - large company

Role within the commitment:

DNV GL envisions a commitment to perform Classification, Certification, and Advisory Services in the form of management system verification, environmental assessments, feasibility studies, Approval in Principle of underwater vehicles and mining tool concepts prior to detail design, support vessel integration, safety analysis, development of the mining standard, and training services with respect to Work Packages: , 3, 4, 5, 6, 8, 11 and 12.

Name of partner:

RWTH Aachen University, Institute of Mining Engineering I

Country:

Germany

Entity profile:

Academia

Role within the commitment:

WP4: Within the exploration stage of any mining project feasibility studies including economic feasibility (based on Cash Flow Models and expressed in Net Present Value (NPV), Internal Rate of Return (IRR) and other economic indicators) are a key aspect. WP12: BBK I plans to develop a pilot course "Planning of Deep Sea Mining Projects" to be included in the existing MSc program "Mineral Resources Engineering" at RWTH Aachen University.

Name of partner:

Aker Solutions GmbH

Country:

Germany

Entity profile:

Private sector - large company

Role within the commitment:

Aker Solutions will participate in the proposed project with main focus on the interface components for riser system for vertical transport of cuttings from the offshore mining process. Among the main interfaces are joint connections at topside level and buffer systems at sea bed level integrated to ensure a continuous feeding of the mining system.

Name of partner:

Helmholtz Center Dresden Rossendorf / Helmholtz Institute Freiberg for Resource Technology

Country:

Germany

Entity profile:

Academia

Role within the commitment:

Contribution to WP10 "Processing concept and technology for marine mineral resources" with the development of new processing schemes/concepts and applying new technologies.

Name of partner:

DFKI GmbH, RIC - Robotics Innovation Center, Bremen

Country:

Germany

Entity profile:

Other

Other:

Non-profit Research Institute

Role within the commitment:

Research partner, focus on Artificial Intelligence, mobile autonomous robotic systems, software frameworks (e.g. navigation, mapping, control, MMI). Contribution from WP3 to WP10 and WP13. Provision of test infrastructure for underwater vehicles as well subsystems. Provision of submersible autonomous robotic testing platforms. Development of mobile, intelligent underwater robotic and subsystems.

Name of partner:

BAUER Maschinen GmbH

Country:

Germany

Entity profile:

Private sector - large company

Role within the commitment:

A fast and reliable geotechnical characterization and mineral assessment of the seafloor is mandatory. For this purpose, BAUER aims at upgrading its seabed drilling rig MeBo200 with new geophysical measurement methods in order to provide an exploration engine for SMS deposits able to gather information regarding the extension and properties of the SMS sediments directly during the deployment of the drill rig.

Name of partner:

EvoLogics GmbH

Country:

Germany

Entity profile:

Private sector - SME

Role within the commitment:

• Wireless UW Communion, Navigation & Monitoring Network, acoustic ultra-broadband telemetry with integrated UW-GPS, LBL & USBL functionality • New techniques for quality and quantity assessments of raw materials: high resolution sub-bottom profiler with acoustic spectral analyses, Neutron Impulse Technique • Bionic robots - AUV "Task Force" for survey, inspection and environmental monitoring • System improvement for serial production

Name of partner:

Fraunhofer IOSB

Country:

Germany

Entity profile:

Governmental/public body

Role within the**commitment:**

Under the umbrella of Fraunhofer IOSB several Fraunhofer institutes will contribute to this EIP in the field of maritime technologies, such as • Fraunhofer IGD: Maritime graphics • Fraunhofer IOSB: Autonomous and remotely operated underwater vehicles, exploration, inspection, vehicle guidance as well as underwater vision. Furthermore, other Fraunhofer institutes which deal with acoustic sensors, materials, production and process engineering can contribute to this EIP (e.g. Fraunhofer UMSICHT and IBMT).

Name of partner:

ATLAS MARIDAN Aps

Country:

Denmark

Entity profile:

Private sector - SME

Role within the**commitment:**

R&D deep diving 6.000m AUV, long endurance system, new sonars and new sensors, system structure design, realisation easy-quick battery change, precise deep sea navigation, compact LARS, real environment tests, partner in pilot mining testphase

Name of partner:

KGHM Polska Miedź S.A.

Country:

Poland

Entity profile:

Private sector - large company

Role within the**commitment:**

Partner's role is focused on idea (concept) and implementation (e.g. prototype construction) of high-energetic jetting technologies for machining and/or output collecting, having in mind it's advantages, e.g. minimization of complicated mechanisms in hard to reach work conditions, and positive aspects of environmentally friendly technology.

Name of partner:

University of Szczecin

Country:

Poland

Entity profile:

Academia

Role within the**commitment:**

. - Complex mineralogical and geochemical polymetallicore/sediment description. - Mining impact on a seabed environment. - Metals transport/remobilization within water and nearby sediments caused mining processes. Sediment contamination. - Geomodelling and metal resources estimations using geostatistical methods. - Complex geological data acquisition and processing (seismo-acoustics, drilling logs). - Preparation of educational/training courses concerning necessity of marine mining

Name of partner:

University of Wrocław, Dept. Applied Geology and Geochemistry

Country:

Poland

Entity profile:

Academia

**Role within the
commitment:**

Stable isotopic studies on ore-forming processes, mass balances, contamination and environmental variations. Legal and business aspects of exploration and exploitation activities.

Name of partner:

Maritime University of Szczecin (MUS)

Country:

Poland

Entity profile:

Academia

**Role within the
commitment:**

Deliver the knowledge on offshore technology. MUS is research ship Navigator XXI owner. The ship could be applied for preliminary and monitoring researches.

Name of partner:

Estrutura de Missão para a Extensão da Plataforma Continental (EMEPC)

Country:

Portugal

Entity profile:

Governmental/public body

**Role within the
commitment:**

The EMEPC will contribute to the exploration effort to find the suitable places on the oceanic floor to develop a pilot plant and to monitor the marine environment during pilot mining. The EMEPC will take advantage of the operational capabilities at sea, which were acquired through the development of the Luso ROV (rated to 6000 m below sea level).

Name of partner:

IDL- Instituto Dom Luiz

Country:

Portugal

Entity profile:

Academia

Role within the

commitment:

Participation in the geological/geophysical surveying sustaining the evaluation and selection of key target areas. Specific contribution will include combine interpretation of available (and to be acquired) geophysical data (e.g. swath bathymetry, reflection seismics, back-scatter) to produce detailed morphotectonic maps, conveying a specific structural insight of key problems for a better assessment of the regional/local geotectonic setting.

Name of partner:

IMAR - Instituto do Mar

Country:

Portugal

Entity profile:

Academia

Role within the**commitment:**

The operation of the regional research vessel and the use of the University of the Azores, Campus of Horta, infrastructures is secure through the commitment of IMAR. The permanent team existing in Campus of Horta will also be devoted the fulfillment of the objectives of Atlantis.

Name of partner:

FEUP - Faculdade de Engenharia da Universidade do Porto

Country:

Portugal

Entity profile:

Academia

Role within the**commitment:**

The role of FEUP relies on i) LSTS (<http://lsts.fe.up.pt>) that targets the development of robotic systems requiring navigation, sensing, and cooperative control to enable a effective presence in remote, hostile locations to support sustainable mining operations; ii) CIGAR (<http://paginas.fe.up.pt/~cigar>) with application of ore processing and hydrometallurgy to the recover metals from massif poly-metallic sulphides, cobalt crusts and nodules.

Name of partner:

Instituto Português do Mar e da Atmosfera (IPMA)

Country:

Portugal

Entity profile:

Academia

Role within the**commitment:**

Develop studies on the distribution, origin and composition of metallic and nonmetallic mineral resources and environmental impact of their exploitation. IPMA can contribute with expertise for the: coordination of exploration surveys in the Legal Platform of Portugal (LPP); coordination of the marine database of raw materials resources in the LPP; study of the ferromanganese and sulphide deposits within the LPP.

Name of partner:

Universidade de Aveiro

Country:

Portugal

Entity profile:

Academia

**Role within the
commitment:**

Application of geophysical methods for massive sulphide exploration, and development of new/modified geophysical tools/technologies; geological site evaluation and characterization of the mineralizations structural control; habitat mapping with high resolution multibeam/backscatter, side-scan sonar, high resolution seismic methods and biological studies; studies for the use of the non-metallic component of the deposit for industrial use.

Name of partner:

University of Evora/Hercules Laboratory

Country:

Portugal

Entity profile:

Academia

**Role within the
commitment:**

Hercules 2014 updated research facility can offer high quality analytical data. The capabilities are focused in micro-analytical techniques and can deliver useful information on phase, major and trace chemical composition in small volumes. The distribution of phases and elements can be ascertained by mapping. This knowledge is essential to estimate the economic value of raw materials and marine resources and to create accurate exploration models.

Name of partner:

Nautilus Minerals Inc.

Country:

Canada

Entity profile:

Private sector - large company

**Role within the
commitment:**

The main activities of Nautilus Minerals will include exploration and extraction. Exploration will be aimed specifically at finding on any European tenements granted to the Nautilus. Nautilus currently has several such prospecting licences applications in the EEZ of Portugal, surrounding the Azores Islands. Nautilus Minerals currently procures significant engineering and fabrication services from within the European Union.

Name of partner:

Harren & Partner Ship Management GmbH & Co. KG

Country:

Germany

Entity profile:

Private sector - SME

**Role within the
commitment:**

Harren & Partner, well-established shipping company (55 vessels), fills the role as maritime logistics partner within the marine mining value chain. We have profound knowledge in ship-building, ship-conversions as well as marine offshore operations and overland transport projects. As partner of Nautilus Minerals we made significant contributions to the navel design of a Mining Support & Production Vessel (MSV). We are ready to design, construct, manage and operate a MSV.

Name of partner:

Fugro EMU Limited

Country:

United Kingdom

Entity profile:

Private sector - large company

Role within the commitment:

Fugro Group is currently actively involved in R&D to provide environmental survey, monitoring and EIA for deep sea resource exploration as part of the MIDAS and other UK funded projects. Within the EIP, Fugro will build on this knowledge, further developing acoustic and optical sensors, increasing AUV capabilities, improving the efficacy of environmental survey and monitoring, and supporting the development of robust policy and legislation.

Existing EU contribution:

Yes

Source:

FP 7

Period to implement the commitment:

Wednesday, 1 April, 2015 to Tuesday, 31 March, 2020

Source URL: <https://ec.europa.eu/growth/tools-databases/eip-raw-materials/en/content/innovative-mining-marine-mineral-resources-%E2%80%93-european-pilot-mining-test-atlantic-tools>