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PROJECT INTERACTIONS

The Blue Mining project will interact with other initiatives, current and past research projects. These are EC funded initiatives, like FP7 MIDAS (The MIDAS project addresses fundamental environmental issues relating to the exploitation of deep-sea mineral and energy resources) and ERA-MIN (Era-Min – Network on the Industrial Handling of Raw Materials for European Industries). Next to this the Blue Mining project will interact with the EC Study: "Study to investigate state of knowledge of Deep Sea Mining".



FACTS & FIGURES

Full name: Breakthrough Solutions for Mineral Extraction and Processing in Extreme Environments
Acronym: Blue Mining
Duration: 48 months / 4 years
Start date: 1 February 2014
Total budget: 15 M€
EC Funding: 10 M€



CONTACT

Technical coordination: MTI Holland B.V.
Mr Robert van de Ketterij
r.vandeketterij@mti-holland.com
+31 78 6910322
Project management: Uniresearch BV
Mr Cor van der Zweep
c.vanderzweep@uniresearch.com
+31 15 2754000
Project website: www.bluemining.eu

Flyer produced by Uniresearch / 1445

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under Grant Agreement no. 604500.



Breakthrough Solutions for
Mineral Extraction and Processing
in Extreme Environments



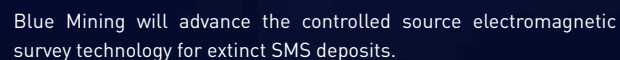
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Controlling these three capabilities is the key to accessing raw materials, decreasing EU dependency on imported resources, and strengthening Europe's mining sector and its technology providers.



In this rapidly changing global economic landscape, mining in the deep sea has gone from a distant possibility to a probable reality within just a decade. Although deep-sea minerals extraction was investigated in the 1970s, it was abandoned because of changing commodity economics, advances in

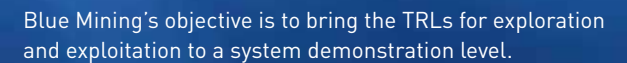


The developmental data from the 1970s, if still available, would not be adequate to allow for the engineering and construction of an integral system for the extraction of deep-sea minerals. Additional research and technological development work is required. At present the methods for deep-sea mining are yet to attain sufficient technology readiness levels for successful operations. The European partners in the Blue Mining project will take a step forward in the process of developing effective resource discovery, assessment and exploitation techniques.



Blue Mining has adopted the land-mining project development approach as the backbone for economical, overall technical, environmental and legal evaluation. Even for the most advanced deep-sea mining projects, no professional full-scale feasibility study is publicly available. Blue Mining will develop a blueprint for feasibility studies and validate this blueprint via the evaluation of deep-sea mining projects of two different resources: (extinct) Seafloor Massive Sulphides (eSMS) and Seafloor Manganese Nodules (SMnN). The project also studies incentives for sustainable deep-sea mining and resource management.

For the scientific and technical approach, Blue Mining has adopted the Technology Readiness Level (TRL) methodology. TRL is a measure used to assess the maturity of evolving technologies (devices, materials, components, software, work processes, etc.) during its development and in some cases during early operations.



The TRLs for the exploration of eSMS and SMnN are raised by research into self-potential surveys, controlled source electromagnetic surveys, optical mapping and geochemical grid sampling. Furthermore, seismic imaging, sub-seafloor drilling and sonar mapping – together with inversion of this data – will be used for faster and more reliable resource assessment.

The research into the exploitation of a deep-sea mine focuses on bringing the TRL of the vertical transport system (VTS) to a system demonstration level (in a relevant environment). A design methodology for the VTS will be devised, including investigation into wear, and models for the slurry flow and riser dynamics. Blue Mining will also create its own design for the VTS. This will be integrated into a concept design of a full deep-sea mining operation, including ship-to-ship transfer of ore.

