

Technology for the Exploration of Ocean Resources

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Abstract

About 70% of the earth is covered by the oceans. It means, 70% of the earth resources are still unexplored for the human use. Energy, fresh water, minerals and biomass are some of the non-living and living resources that can be harvested from the oceans. The development of reliable technologies for the sustainable exploration and harvesting of these resources is the need of the hour. India, with a long coastline and vast Exclusive Economic Zone (EEZ) is realizing the importance of the resources and launched a mission to develop the technologies needed and to harvest the resources in an environmental friendly way. In order to leverage the exploration activities, NIOT has developed seabed crawler based mining machine, work-class deep water remotely operated vehicles and in-situ soil tester. After carrying out field demonstrations using crawler-based mining machine at about 500m water depth, the development of a 6000m depth rated demonstrative polymetallic nodule mining machine is underway. Studies such as environmental impact assessment studies and upstream metallurgical processes are being studied. Development and operation of Unmanned Submersibles like In-situ Soil tester and Deep Water Work Class Remotely Operated Vehicles, Underwater Drill up to a depth 5500 metres placed India in the select club of nations to achieve such technology. To further augment the exploration capabilities through direct human intervention and to empower the nation capacity building in the strategic deep ocean human missions, development of a 6000m depth rated manned scientific submersible is underway.. Efforts of the National Institute of Ocean Technology (NIOT), an autonomous institute of the Ministry Earth Sciences (MoES), Government, in this endeavour are presented in this presentation.

Dr. G. A. Ramadass is the director of the National Institute of Technology (NIOT), Chennai, an autonomous body under the Ministry of Earth Sciences, Government of India. His research areas include Deep Sea Technology, Deep sea Mining, Underwater Acoustics and Marine Instruments. Presently he is coordinating a project for the development Indian Manned Scientific Submersible 'MATSYA 6000' which is intended for carrying three scientists/engineers to 6000 metre depth in the ocean.

Since the inception of NIOT he has been leading different technology development projects. In 2010 he won the National Geoscience award under the Exploration of Oil and Natural Gas category and NRDC award for the year 2017. He led NIOT team during the 34th Indian Scientific Expedition to Antarctica in February- March 2015. Polar Remotely Operated Vehicle (PROVe), developed indigenously at NIOT, was used for exploration in the lake and shelf area of Antarctica during this expedition.

A doctorate from Indian Institute of Technology, Madras and M.Sc from IIT, Kharagpur, he handled technology development programmes leading to products and patents. He has been the Chief Scientist of several cruises and scientific explorations on-board various research vessels. He has a number of publications in the international journals, international conferences and four international patents.