BACKGROUNDERS
Press Information Bureau
Government of India

DEEP OCEAN MISSION

India's Gateway to the Ocean Floor

August 17, 2025

"To make the country developed, we are now moving towards 'Samudra Manthan' (churning of the ocean). Taking forward our Samudra Manthan, we want to work in a mission mode towards finding oil reserves, gas reserves under the sea and hence India is going to start the National Deep Water Exploration Mission."

- PM Narendra Modi on 15th August, 2025

Key Takeaways

- **Deep Ocean Mission**, launched in 2021, focusses on sustainably harnessing ocean wealth and strengthening the Blue Economy.
- India's first manned submersible vehicle **'MATSYA 6000'** is being developed as part of the **Samudrayaan Project** under Deep Ocean Mission.
- Aquanauts **Cdr. Jatinder Pal Singh and Sh. Raju Ramesh** conducted deep dive upto **5000 m** in Deep Sea in August, 2025 marking the **first time** feat by India.
- **Over 100 kg of cobalt-rich polymetallic nodules** collected from 1173m depth in the Andaman Sea.

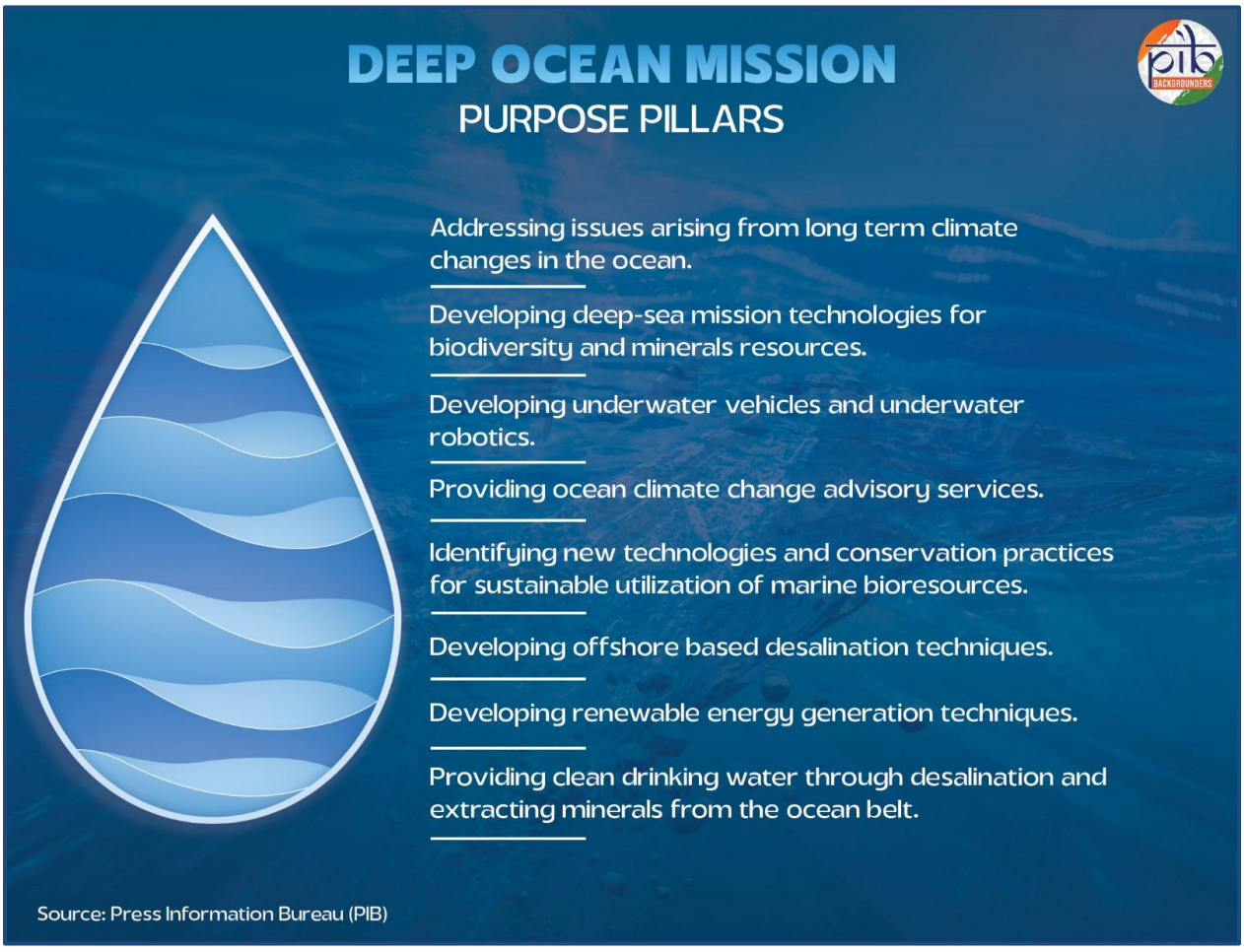
The Mission – Exploring The Unknown

The deep sea, still full of mysteries, holds not just the secrets of human origins but also clues to our long-term sustenance and preservation. To unlock its hidden potential, India's **Deep Ocean Mission** was launched on 07.09.2021 by the Ministry of Earth Sciences (MoES) with an aim to develop technologies for exploring and sustainably utilizing the deep ocean's living and non-living wealth.

With an overall investment of ₹4077 crore spread across five years, this mission isn't a one-time dive - it will unfold in phases and is designed as a full-throttle national project, driving forward India's Blue Economy, which includes all marine-based industries - from fishing and shipping to biotechnology and tourism.

Exploring these depths could provide solutions to global challenges like climate change. Considering this, the United Nations named the 2021-2030 decade as the '**Decade of Ocean Science for Sustainable Development**'. India's unique geography, with 7517 km of coastline, nine coastal states, and 1382 islands, gives it an edge in the sector. This is why, in the Vision of New India by 2030, the Government has placed Blue Economy among the ten core growth dimensions.

The MoES leads this multi-agency effort, steering India toward the goal of tapping into ocean resources and boosting the country's maritime economy to surpass ₹100 billion. It's about turning deep-sea potential into sustainable prosperity.



Mission Components

- **Development of Technologies for Deep Sea Mining, and Manned Submersible:** India is building a manned submersible to take three people down to 6000 meters in the ocean. Alongside, an Integrated Mining System will be developed to extract polymetallic nodules from the deep sea in the Central Indian Ocean. These efforts will support future commercial mineral exploration, once global rules are set by the International Seabed Authority. This project is key to advancing India's Blue Economy, especially in deep-sea mining and energy.
- **Development of Ocean Climate Change Advisory Services:** An observations and model suite will be developed to study and forecast key climate variables from seasonal to decadal scales. This proof-of-concept initiative aims to enhance understanding of climate trends and contribute to the Blue Economy focusing on promoting coastal tourism.
- **Technological innovations for exploration and conservation of deep-sea biodiversity:**The core focus is on bio-prospecting deep-sea flora, fauna, and microbes, alongside research into the sustainable use of deep-sea biological resources. This initiative will advance the Blue Economy priority area of marine fisheries and allied services.
- **Deep Ocean Survey and Exploration:** This initiative focuses on identifying multi-metal hydrothermal sulphide sites along the Indian Ocean mid-oceanic ridges and supports deep-sea resource exploration under the Blue Economy.
- **Energy and freshwater from the Ocean:** This proof-of-concept proposes studies and engineering design for an offshore Ocean Thermal Energy Conversion (OTEC) powered desalination plant, supporting the Blue Economy focus on offshore energy development.
- **Advanced Marine Station for Ocean Biology:** This component focuses on building talent and innovation in ocean biology and engineering, turning research into industrial products via on-site incubators. It supports marine biology, blue trade, and manufacturing under the Blue Economy.

Project Samudrayaan – The Deep-Sea Leap

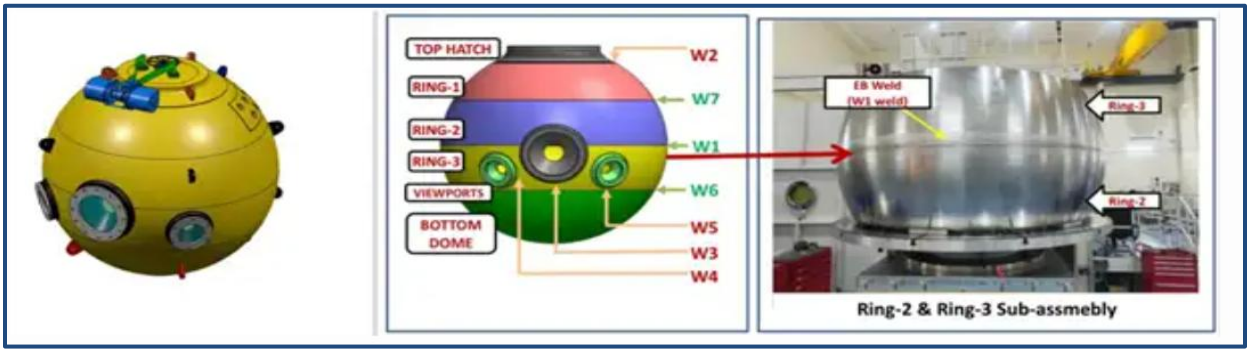
India launched the **Samudrayaan Project**- under the umbrella of Deep Ocean Mission, to work on its first component of deep-sea exploration through a manned submersible.

MATSYA 6000, a self-propelled manned submersible capable of transporting three individuals to depths of up to 6,000 meters beneath the ocean surface is being developed under this project. Equipped with a comprehensive array of scientific instruments and exploration tools, this advanced vehicle will enable extensive deep-sea research. The submersible is built to work for 12 hours of operational period and sustain up to 96 hours in emergency scenarios. It features advance systems like a high-density Li-Po battery, underwater acoustic telephone, drop-weight emergency escape mechanisms, and bio-vests for crew safety and health monitoring.

Source: *Indian Space Research Organisation (ISRO)*

The Technology

- The vehicle is a spherical titanium-alloy vessel (Ti6Al4V - ELI grade) with a diameter of 2260 mm and wall thickness of 80 mm, designed to withstand 600 bar pressure and temperatures as low as -3°C.
- The titanium vessel has been made constructed by a special welding process called high-penetration Electron Beam Welding (EBW) process developed by the Liquid Propulsion Systems Centre (LPSC) of Indian Space Research Organisation (ISRO). Perfection of the process was achieved after 700 trials.
- The welding quality has been further tested by very advanced techniques like a combination of Non-Destructive Evaluation (NDE) methods such as Time-of-Flight Diffraction (TOFD) and Dual Linear Array (DLA) Phased Array Ultrasonic Testing (PAUT)



Source: *Indian Space Research Organisation (ISRO)*

This Human Occupied Vehicle (HOV), is being developed through a collaboration between National Institute of Ocean Technology (NIOT), MoES and Vikram Sarabhai Space Centre (VSSC), ISRO. Significant progress has been achieved so far in this initiative.

The Trials: Voyage of Validation

Matsya was thoroughly tested on land and in water to check how well its systems work together, including power, control, stability, and safety. Another major milestone was achieved through India's first ever deep-sea venture upto depth of 5000 m making it part of elite group of fewer than half a dozen nations.

TESTING AND VALIDATION

Dry and Wet Trials of Matsya 6000

- Matsya underwent **integrated dry tests** across a 500-meter operational range to ensure system integration within its exo-structure.
- Successful wet trials were conducted at **L&T Shipyard, Kattupalli Port, Chennai** (Jan – Feb 2025) assessing **Power and control systems, floatation and stability, human support and safety mechanisms,** forward and reverse motion, n**avigation and communication capabilities**.
- Scientific payloads, including **advanced oceanographic sensors**, were tested to confirm functionality.
- The demonstration phase included **eight dives**:
  - **Five unmanned dives**
  - **Five manned dives**, each rigorously qualified to validate the **life support system's reliability.**

Source: *Ministry of Earth Sciences (MoES)*

5,000 m Dive: India's Deep-Sea Breakthrough

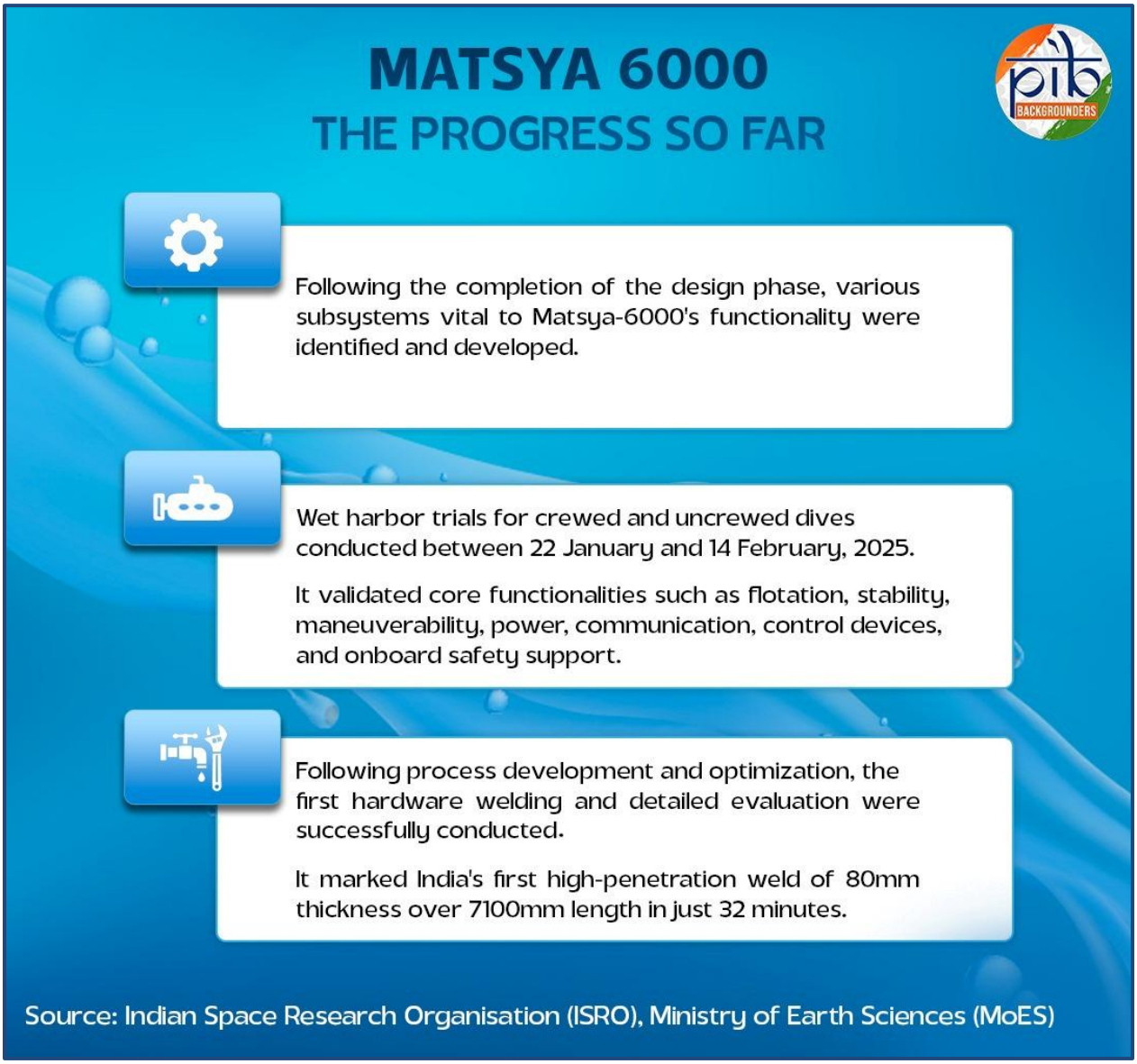
- The expedition was conducted on **August 5 and 6, 2025** in collaboration with **IFREMER** - the French marine research institute. It took place in the Atlantic Ocean aboard IFREMER's submersible *Nautile.*

- Indian aquanauts – Senior Scientist Shri **Raju Ramesh and Cdr. Jatinder Pal Singh** (Retd) from **NIOT, Chennai** completed their inaugural **seven-hour** deep sea dives, collecting **vital data and observation** before resurfacing safely.

- The NIOT team gained hands-on experience on –

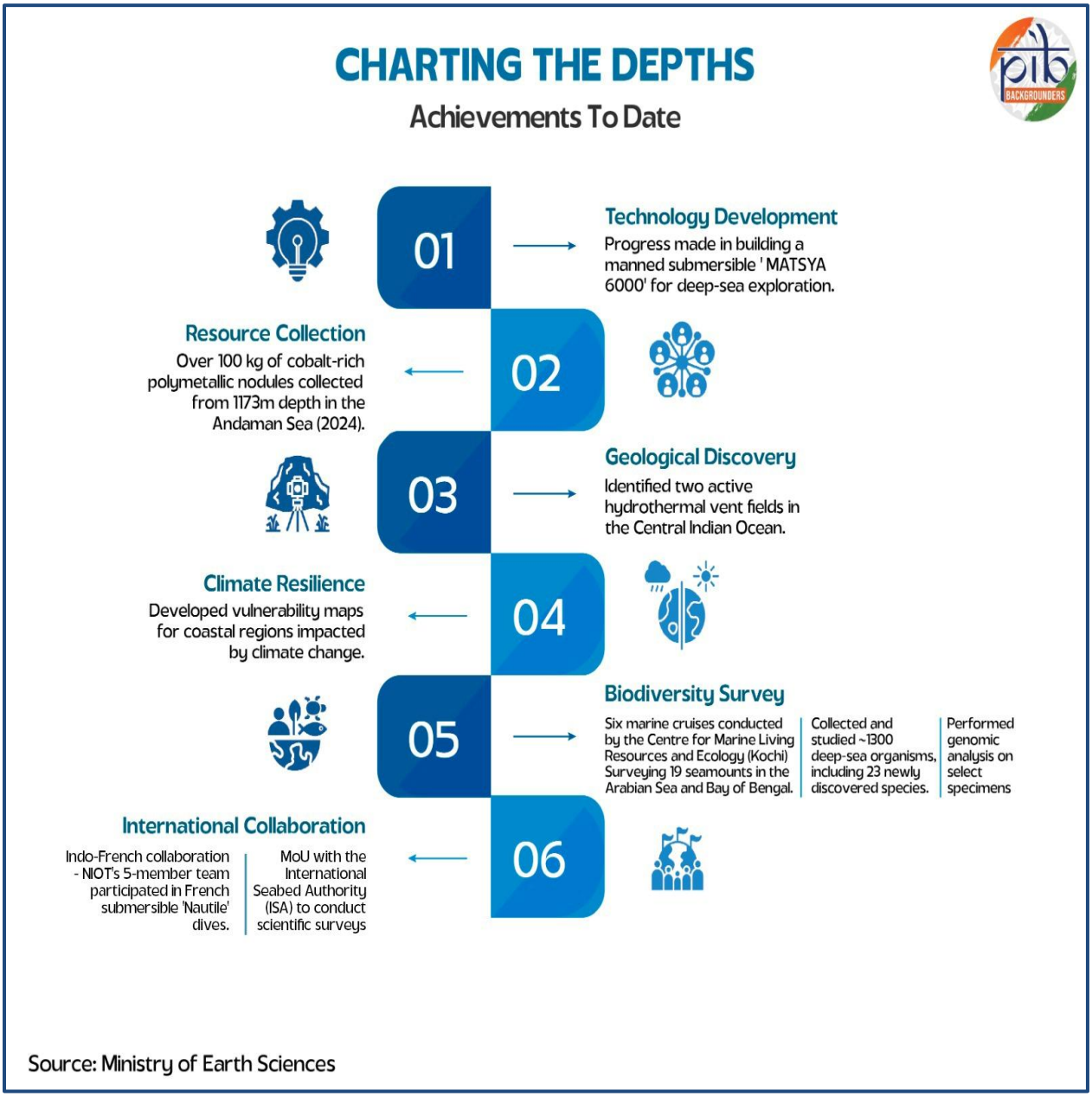
  - Pre-dive preparation and piloting operations.
  - habitability and buoyancy management.
  - Manipulator-based interventions like flag placement and sample collection.
  - Deployment and retrieval during four dives.
  - Trajectory tracking.
  - Onboard system management.
  - Operating acoustic communication.
  - Overall dive planning and execution of operational procedures.

This Indo-French research expedition supports **'MATSYA – 6000'** development highlighting milestones like realisation and testing of the titanium hull, syntactic foam, VBS, and drop-weight mechanism, open ocean testing of subsystems and certification, shallow water demonstration up to 500 meters by early 2026, research vessel augmentation with LARS, integration and deep-water tests by mid-2027 and scientific explorations using MATSYA-6000 during 2027–28.



Deep Ocean Mission: Story Till Now

India has made notable strides in developing indigenous deep-sea technologies, including vehicles and pressure-resistant materials, with successful trials already in progress. In December 2022, the Ocean Mineral Explorer (OMe 6000), an autonomous vehicle, explored mineral-rich zones at a depth of 5,271 meters in the Central Indian Ocean Basin Polymetallic Manganese Nodule (PMN) site. Using the research vessel *SagarNidhi*, it surveyed 14 sq. km and mapped a detailed 1 km × 0.5 km area to assess polymetallic nodule distribution and deep-sea biodiversity, laying the groundwork for future exploration and resource mapping.



Conclusion

The Deep Ocean Mission, with its pioneering Samudrayaan Project, marks a transformative leap in India's scientific and strategic capabilities. By venturing into the depths of the ocean, India is not only unlocking vast reserves of minerals, biodiversity, and energy, but also positioning itself among the few nations with advanced deep-sea exploration technology as enshrined in Prime Minister's vision of '*Samudra Manthan*'. The development of a manned submersible reflects India's growing expertise in marine engineering and innovation. This initiative supports key pillars of the Blue Economy and also fosters indigenous technology, boosts marine-based industries, and creates new opportunities for research, enterprise, and employment. The Deep Ocean Mission is not just a dive into the unknown - it's a bold stride toward a resilient, resource-rich, and future-ready India.

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