

**GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 4469
TO BE ANSWERED ON WEDNESDAY, 20THAUGUST, 2025**

DEEP-SEA EXPLORATION

4469. SHRI ANIL YESHWANT DESAI:

Will the Minister of **Earth Sciences** be pleased to state:

- (a) the details on the progress of the country's first manned submersible project for deep-sea exploration;
- (b) the details of contribution and achievement of the aforementioned Mission in harnessing untapped marine resources for sustainable development;
- (c) the details of the technological innovations being developed under the aforementioned Mission;
- (d) the steps taken by the Government to ensure that Indian Scientists receive training for deep-sea exploration; and
- (e) the steps taken by the Government to develop indigenous deep-sea exploration equipment?

ANSWER

THE MINISTER OF STATE (INDEPENDENT CHARGE) FOR
MINISTRY OF SCIENCE AND TECHNOLOGY
AND EARTH SCIENCES
(DR. JITENDRA SINGH)

- (a) The design and integration of the human submersible (MATSYA-6000) to carry three persons to a depth of 6000 meters, completed by the National Institute of Ocean Technology (NIOT), Chennai, under the Ministry of Earth Sciences, as part of the Deep Ocean Mission. The wet harbour trials of MATSYA-6000 were successfully conducted in January-February 2025 at L&T Shipbuilding Facility in Katupalli, near Tamil Nadu.
- (b) MATSYA-6000 is designed to include scientific pay loads to align with India's scientific exploration and observation activities for deep-sea living and non-living resources, including biodiversity and deep-sea minerals.
- (c) The technological innovations developed for MATSYA-6000 include a bio-vest for real-time crew health monitoring, a cognitive digital twin to support during emergency scenarios, an underwater acoustic telephone, human-rated emergency ballast management system capable of operating from the submersible as well as a ship, a welded titanium alloy exo-structure, an 80 mm thick electron beam welded titanium alloy personnel sphere with multi-ring configuration and hydrostatically stable and hydrodynamically efficient subsystems with high density Lithium-Polymer-based main power system for propulsion.

- (d) As part of the Indo-French partnership, NIOT scientists participated in deep-ocean human scientific expeditions onboard the submersible NAUTILE developed by the French marine institute IFREMER in August 2025 and gained operational experience at the deep sea up to 5000 meters depth in the Atlantic Ocean and functional operations.
- (e) The design and development of MATSYA-6000 has been completed by NIOT, Chennai, under the Ministry of Earth Sciences. The realisation of the titanium personnel sphere of MATSYA-6000 has been initiated as an indigenous effort with ISRO. Sub-components such as the base frame and pressure cases are developed with Indian industry partners. The inertial navigation systems and integration with Global Positioning Systems, Doppler Velocity Logs, Depth and Acoustic Positioning Systems and an underwater acoustic telephone are undertaken with DRDO.
