

THE RECENTLY LAUNCHED INDIAN SPACE PROJECTS

Bharatiya Anthariksh Station (BAS): Our own space station for Scientific research is to be established with the launch of its first module in 2028.

The union cabinet has approved the building of the first unit of the Bharatiya Anthariksh Station by extending the scope of the Gaganyaan program. The Gaganyaan Programme has been revised to include the scope of development and precursor missions for BAS, factoring in one additional uncrewed mission and additional hardware requirement for the ongoing Gaganyaan Programme. Now, the human spaceflight technology development and demonstration program has eight missions, which will be completed by December 2028 by launching the first unit of BAS-1.

The Gaganyaan Programme, approved in December 2018, envisages undertaking human spaceflight to Low Earth Orbit (LEO) and laying the foundation of technologies needed for an Indian human space exploration programme in the long run. The vision for space in the Amrit Kaal envisages, among other things, the creation of an operational Bharatiya Anthariksh Station by 2035 and an Indian Crewed Lunar Mission by 2040.

The Gaganyaan Programme is not just a mission, but a national effort that will be led by ISRO in collaboration with industry, academia, and other national agencies. This collective effort will be instrumental in implementing the programme through the established project management mechanism within ISRO. The goal is to develop and demonstrate critical technologies for long-duration human space

missions, with ISRO planning to undertake four missions under the ongoing Gaganyaan programme by 2026.

The establishment of the Bharatiya Anthariksh Station will not only enhance India's technological capabilities for human space missions but also bring significant economic benefits. This national space-based facility will boost microgravity-based scientific research and technology development activities, leading to technological spin-offs and encouraging innovations in critical areas of research and development. The increased industrial participation and economic activity in the human space programme will create more employment opportunities, especially in niche high-technology areas in space and allied sectors.

Further, the development of a **Next Generation Launch Vehicle (NGLV)** has also been approved. It will be a significant step towards the Government's vision of establishing & operating the Bharatiya Anthariksh Station and developing capability for Indian Crewed Landing on the Moon by 2040. NGLV will have three times the present payload capability, at 1.5 times the cost compared to LVM3, and will also have reusability, resulting in low-cost access to space and modular green propulsion systems.

The goals of the Indian space programme during the Amrit Kaal require a new generation of human-rated launch vehicles with high payload capability and reusability. Hence, the development of the Next Generation Launch Vehicle (NGLV) has been taken up, and it is designed to have a maximum payload capability of 30 tonnes to Low Earth Orbit, which also has a reusable first stage. Currently, India has achieved self-reliance in space transportation systems to launch satellites up to 10 tonnes to Low Earth Orbit (LEO) and four tonnes to Geo-Synchronous

Transfer Orbit (GTO) through the currently operational PSLV, GSLV, LVM3 & SSLV launch vehicles.

The NGLV development project will be implemented with maximal participation from the Indian industry, which is also expected to invest in the manufacturing capacity at the outset, thereby allowing a seamless transition to the operational phase after the development. NGLV will be demonstrated with three development flights (D1, D2 & D3) with a target of 96 months (8 years) to complete the development phase. The development of NGLV will enable national & commercial missions, including the launch of human spaceflight missions to Bharatiya Anthariksh Station, Lunar/inter-planetary exploration missions along with communication & earth observation satellite constellations to Low Earth Orbit that will benefit the entire space ecosystem in the country. This project will boost the Indian space ecosystem regarding capability and capacity.
