

**GOVERNMENT OF INDIA  
DEPARTMENT OF SPACE**

**LOK SABHA**

**UNSTARRED QUESTION NO. 433**

**TO BE ANSWERED ON WEDNESDAY, JULY 24, 2024**

**SPACE EXPLORATION AND TECHNOLOGY DEVELOPMENT**

**433. DR. PRADEEP KUMAR PANIGRAHY:**

**Will the PRIME MINISTER be pleased to state:**

- (a) the manner in which India is positioning itself globally in space exploration and technology development and the details of innovative technologies which are being developed to enhance space capabilities?**
- (b) the details of recent successes and milestones that have been achieved and the manner in which India will leverage them for further advancement;**
- (c) the manner in which collaborations and partnerships are fostering space technology advancements and global contributions;**
- (d) the details of key priorities for future space missions aligned with long-term goals, addressing challenges for sustained growth and success;**
- (e) the manner in which India is promoting innovation and skill development in space technology among youth; and**

- (f) the details of vision for India's role in shaping the future of space technology with strategies in place to realize this vision?**

**ANSWER**

**MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE**

**(DR. JITENDRA SINGH):**

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- a) Indian Space Research Organisation (ISRO) has been at the forefront of space technology and exploration since its inception. Over the years, leveraging its key resources, the organisation has made several strides in space technologies, making India a major player in the global space arena. Current areas of research and broad priority of Indian space programme includes Stage Recovery & Reuse, LOX-Methane Engine, Air breathing/Hybrid Propulsion, Advanced Materials & Manufacturing, Advanced Inertial systems, Low Cost Spacecrafts, Inter-linking of satellite networks, On-Orbit Servicing, Docking, Lunar sample return, Quantum Communication, Electric Propulsion, Advanced Scientific Payloads, Space Based Surveillance, Atomic Clock, Travelling Wave Tube Amplifiers for communication payloads, Technologies for sustained Human space missions viz. Regenerative Life support systems, Rendezvous & Docking, Inflatable habitats, Human factor & Engineering studies etc.**

**Subsequent to the opening of space sector i.e. Space Sector Reforms 2020, participation of Non-Governmental Entities (NGEs) is enhanced significantly and some of the start-up companies are actively ventured into in key space activities viz., launch vehicle building, satellite making, space applications and space situational awareness.**

- b) ISRO/ DOS has recently achieved significant milestones in space exploration, including Chandrayaan-3 mission to the moon, Aditya-L1 mission to study the sun, Small Satellite Launch Vehicle (SSLV) which offers quick, cost-effective satellite launches, Reusable Launch Vehicle-Landing Experiments (RLV-LEX) for demonstrating reusable rocket technology, X-ray Polarimeter Satellite (XPOSAT) for studying cosmic X-rays, Gaganyaan Test Vehicle (TV) which is a step towards India's human space mission etc. Indian space start-ups have also progressed significantly and achieved remarkable milestones viz., Vikram-S, the first-ever suborbital flight launch by an Indian private entity (M/s Skyroot) and Agniban, an advanced sub-orbital flight launch by M/s Agnikul.**
  
- c) International cooperation has been part of Indian space programme since inception. Establishment of Thumba Equatorial Rocket Launching Station (TERLS), conduct of Satellite Instructional Television Experiment (SITE) and Satellite Telecommunication Experiment Project (STEP), launches of**

**Aryabhata, Bhaskara, Ariane Passenger Payload Experiment (APPLE), IRS-IA, IRS-IB satellites, INSAT series of satellites, Missions to Moon, etc., have the components of international cooperation.**

**ISRO is pursuing bilateral and multilateral relations with space agencies and space related bodies with the aim of building and strengthening existing ties between countries; taking up new scientific and technological challenges addressing global challenges like climate change and disaster management and defining international frameworks for exploitation and utilization of outer space for peaceful purposes.**

- d) Key priorities for future space missions include developing human spaceflight capabilities, advanced missions to moon, establishing our own space station, interplanetary missions and enhancing satellite technology for communication, navigation & earth observation. Long-term goals focus on sustainable space infrastructure, space debris management, and fostering international collaborations. Challenges include ensuring cost-effective missions, protecting against space hazards, and developing cutting-edge technology. Addressing these challenges requires investment in research, strengthening public-private partnerships, and international cooperation to share knowledge and resources for sustained growth and success in space exploration.**

**e) India is promoting innovation and skill development in space technology among youth through various initiatives. ISRO/DOS conducts outreach programs like the Young Scientist Programme (YUVIKA) to inspire students with hands-on learning experiences. ISRO also collaborates with universities and educational institutions to integrate space technology into curricula and support student projects. Competitions and hackathons are conducted to encourage creative problem-solving. Additionally, incubation centers provide support for researchers, fostering a culture of innovation and nurturing the next generation of space scientists and engineers.**

**Indian National Space Promotion & Authorization Center (IN-SPACe) has been making various initiatives with an aim to inspire, educate and equip the next generation of space professionals with necessary skills & knowledge to excel in the space sector.**

**Indian Institute of Space Science and Technology (IIST), exclusive Academic wing of Department of Space has been offering high quality education in space science and technology to meet the demands of Indian Space Programme. The institute offers undergraduate, postgraduate, doctoral and post-doctoral programmes in broad areas of space science, technology and applications.**

**f) India's vision for shaping the future of space technology includes becoming a leading player in global space exploration and**

**leveraging space technology for socio-economic benefits. The nation has set the Space Vision 2047, which includes enhancing the India's share in the global space economy at a significant level, Indian Moon landing by 2040 and establishing Bharatiya Antariskha Station by 2035. Towards framing the decadal vision & strategy, a document on 'Decadal Vision for Indian space sector with a focus on space based economy and strategies to achieve the vision' has been generated.**

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