

## India's Need to Have Stakes in Space Tech

### Why in news?

India's pursuit of space technologies particularly its endeavour with the Gaganyaan mission holds significant implications for various aspects of Indian science.

### Why India need to have stakes in space technology?

- **Global interest in space**- Over 600 individuals from 50 countries have travelled to space highlighting the global interest in space exploration.
- **Novelty of human spaceflight**- Despite the number of people who have been space, executing a human spaceflight remains a rare achievement for individual countries.

*Only three countries have executed human spaceflight missions namely United States, Russia and China*

- **Moon exploration**- There is a renewed focus on lunar exploration for resource extraction and potential colonization, leading to an anticipated surge in human spaceflight missions.
- **Strategic importance**- India aims to be an active participant in this new era of space exploration to secure access to emerging technologies and resources, which are vital for future economic growth.
- **Access novel tech**- By actively engaging in space missions, India ensure that it remains at the forefront of technological innovation and maintains its strategic autonomy.
- **Foster spin off technologies**- Space programs often lead to the development of [spin-off technologies](#) with applications beyond space exploration including significant medical advancements like MRI, heart implants and water filtration systems.
- **Cross-sectoral benefits**- The benefits of space exploration extend beyond the realm of space science and technology, impacting various sectors such as healthcare, agriculture, telecommunications, and environmental conservation.
- **Enhance S&T ecosystem**- India's space endeavours can catalyse the development of robust science and technology ecosystem in India fostering collaboration between academia, industry and government institutions.
- **Cryogenic technology denial**- In the 1990s, the US denied India access to cryogenic technology, essential for rocket propulsion, which delayed India's space program by nearly two decades.
- **Need technological independence**- India-US civilian nuclear deal aimed to facilitate access to certain technologies, it did not completely eliminate India's dependence on foreign technologies.
- **Nuclear test sanctions**- Following *India's nuclear tests in 1998*, economic sanctions

led to ban on basic components like transistors and semiconductors.

- **Pandemic challenges-** COVID-19 revealed India's heavy reliance on imports for essential medical supplies which made India to prioritize the development of domestic capabilities to manufacture essential medical supplies, including vaccines.
- **Self-reliance-** COVID-19 revealed India's heavy dependence on imports for essential medicines, this made India to identify defence, space, communication, and energy as priority areas for indigenization and capacity building.
- **Indigenization-** This would reduce India's dependence on foreign nationals and safeguard its strategic interests.

### **What are the new S&T programs announced by India that could foster India's stakes in space program?**

- **National Green Hydrogen Mission-** It was launched in 2023 to make India a hub for production and export of Green Hydrogen.
- **National Quantum Computing Mission-** It allows Indian scientists to develop indigenous technology, systems, devices, and materials required to propel research and development in quantum technology.
- **IndiaAI mission-** It will establish a comprehensive ecosystem catalyzing AI innovation through strategic programs and partnerships across the public and private sectors.
- **National Deep Tech Startups Policy-** It is strategically formulated to stimulate innovation, spur economic growth, and promote societal development through the effective utilization of deep tech research-driven innovations.
- **LIGO India-** It aims to improve the detectors' collective ability to pinpoint sources of gravitational waves in the sky, India is the part of LIGO program.
- **Square Kilometre Array-** India has been involved in the SKA project right from its inception in the 1990s which will be the world's biggest and most advanced radio telescope ever constructed.
- **Promote research-** [Interim budget, 2024](#) has announced the setting up of Rs 1 lakh crore fund to provide long-term low-cost or zero-interest loans for research and development.
- **Deep tech in defence scheme-** It aims at bolstering deep tech in the defence sector which was announced during interim budget.

### **What lies ahead?**

- The scientific community has welcomed these initiatives, recognizing their potential to stimulate research and innovation in India.
- However, it also emphasizes that these efforts represent only a fraction of the structural reforms, India needs to significantly improve the quality and quantity of scientific output.

### **References**

1. [Indian Express- Impact of Gaganyaan's success for Indian science](#)
2. [PIB- IndiaAI mission](#)



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