Expanding Space for Space Proficiency

This editorial is based on *"India must expand its space capacities"* ***which was published in Hindustan Times on 25/10/2022. It underlines the need of India's Space proficiency for balancing the global power equation.***

For Prelims: Geneva Conference on Disarmament, Weaponization of Space, Defence Expo 2022, Launch Vehicle Mark-3, OneWeb, SAMVAD, Antrix, BeiDou, National Agricultural Drought Assessment and Monitoring System, AzaadiSAT.

For Mains: Recent Developments in India's Space Sector, Current Challenges Related to Space Technology, Applications of Space Technology.

The Indian Space Sector **has been globally recognised for building cost-effective satellites,** and taking foreign satellites to space. Currently, India constitutes **2-3% of the global space economy** and is expected to enhance its share to **more than 10% by 2030.**

As part of **India's commitment to the** Geneva Conference on Disarmament, the country continues to advocate **peaceful and civilian use of outer space** and oppose any **weaponization of space** capabilities or programs.

But as **commercialization is advancing in space,** it is more challenging for India to remain a major player. Therefore, it is the **right time to turn the corner** and rethink India's presence in the space domain.

What are Recent Developments in India's Space Sector?

- **Defence Space Agency:** India has recently set up its Defence Space Agency **(DSA)** supported by the **Defence Space Research Organisation (DSRO)** that has the mandate to create weapons to **"degrade, disrupt, destroy or deceive an** adversary's space capability".
    - Also, the Indian Prime Minister launched the **Defence Space Mission** at the **Defence Expo 2022, Gandhinagar.**
- **Expanding Satellite Manufacturing Capabilities:** India's satellite-manufacturing opportunity will reach **USD 3.2 billion by the year 2025** (in 2020 it was USD 2.1 billion)
    - Recently, on its maiden commercial flight, India's heavy-lift rocket **GSLV Mk-III** (renamed for this mission as **Launch Vehicle Mark-3**) successfully placed all **36 satellites** of the **UK-based company- OneWeb** into the intended orbits.
- **IN-SPACe: Indian National Space Promotion and Authorisation Centre** (IN-SPACe) is launched to provide a level playing field for private companies to use Indian space infrastructure.
    - This platform serves as an interface between the **Indian Space Research Organisation** (ISRO) and those who wish to use India's space resources or participate in space-related activities.
- **SAMVAD Program:** To encourage and **nurture space research** among young minds, ISRO launched its **Student Outreach Program called** SAMVAD at its Bengaluru facility.

What are the Current Challenges Related to Space Technology?

- **Inadequate Private Sector Opportunity:** In India, the **Department of Space (DoS)** sits under the Prime Minister's Office and **directly controls the ISRO. ISRO** also has a commercial arm- **Antrix** that promotes **ISRO's space products** and technologies to an international customer base.
    - The **government therefore plays the dual role of regulator and commercial executor,** which has led to **significant bottlenecks in the participation of the private sector.**
        - Also, due to this the **private sector remains concerned about sharing its** intellectual property with the government.
- **Lack of Regulations on Commercialisation:** The commercialization of outer space is accelerating due to the development of private satellite expeditions for **Internet services (Starlink-SpaceX)** and for **space tourism (concept of Jeff Bezos).**
    - It is possible that if **no regulatory framework is put in place, rising commercialisation will lead to monopolisation** in the future.
- **Rising Space Debris:** As outer space expeditions increase, **more** space debris **will accumulate.** Because objects orbit Earth at such high speeds, even a small piece of space debris can damage a spacecraft.
    - Space Debris can also lead to **ozone depletion.**
- **China's Space Leap:** Compared to other countries, the Chinese space industry has grown rapidly. It has successfully launched its own navigation system, **BeiDou.**
- It is very likely that **China's Belt Road Initiative (BRI)** members will contribute to or join the Chinese space sector, solidifying China's global position.

How Space Technology Can be Further Harnessed?

- **Smart Farming Using Space-based Tech:** India can harness its space research potential by developing remote sensing satellites that provide key data for **monitoring soil, drought and crop development.**
    - Rainfall assessments from satellites can help farmers plan the timing and amount of irrigation they will need for their crops.
        - Also, through satellite based monitoring, early warning systems can be developed to save the farms from pest attack.
    - **National Agricultural Drought Assessment and Monitoring System (NADAMS)** and **Geo-tagging** of infrastructure and assets created under **Rashtriya Krishi Vikas Yojana** are good steps in this direction.
- **Replicating Space4Women in India: Space4Women** is a United Nations Office for Outer Space Affairs (UNOOSA) project that promotes **gender equality and women's empowerment in the space sector.**
    - It would be beneficial to **initiate space awareness programmes at the rural level in India,** and **College-ISRO Internship corridors** can be built specifically for female students **to introduce them to the possibility of stretching their wagon beyond earth.**
        - AzaadiSAT**, made** by **750 schoolgirls** from India is a firm step in this direction.
- **Connecting Hospitals, Saving Lives:** India can harness satellite communication technology in the field of **"telemedicine"**, connecting **specialty hospitals in India's major cities to hundreds of hospitals in rural and remote areas of the country,** and provide primary accurate healthcare at doorsteps in rural areas.
- **Developing Self Defence Capacities:** In light of the fact that **space has evolved into a fourth battlefield,** India needs to enhance its space capabilities through adequate research and development.
    - **KALI (Kilo Ampere Linear Injector)** is being designed as a potential response to any incoming missiles whose objective would be to disrupt the country's peace.
    - **Proficiencies in space** will also enable militaries to configure a blanket of power that **any movement above treetops will be spotted and eliminated.**
        - Space proficiency will also be a **crucial determinant of the pecking order in the global power calculus.** Hence, a truly **"Vikasit Bharat"** will have to be a **space power.**

- **Technological Intervention for Cleaner Space:** Technologies like self-eating rockets, **self-vanishing satellites and robotic arms to catch space debris** can make India an **explorer cum problem solver** in the space arena.
- **India Towards Potential Space Market Hub:** India can take advantage of the local market conditions **(talent pool, low labour costs, engineering services)** to replicate the **cost-competitive world-class products and services for the space market.**
- **Establishing A Permanent Presence in Space:** The time has come for India to rethink its space presence, and in line **ISRO has undertaken manned space flight** as a key focus area, beginning with the upcoming **Gaganyan mission.**
- India should take the initiative to **cooperate with international bodies** and plan for a **planetary defence program in the long term.**

Drishti Mains Question:

Highlighting India's recent initiatives in the space sector, explain how commercialisation of space technology is

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q.1 In the context of space technology, what is "Bhuvan", recently in the news? (2010)

(a) A mini satellite launched by ISRO for promoting the distance education in India

(b) The name given to the next Moon Impact Probe, for Chandrayaan-II

(c) A geoportal of ISRO with 3D imaging capabilities of India

(d) A space telescope developed by India

Ans: (c)

Mains

Q.1 What is India's plan to have its own space station and how will it benefit our space programme? (2019)

Q.2 Discuss India's achievements in the field of Space Science and Technology. How the application of this technology helped India in its socio-economic development? (2016)