Perspective: New Era in Indian Space Sector

For Prelims: Vikram-S, Prarambh Mission, Indian Space Research Organisation (ISRO), IN-SPACE, NewSpace India Limited (NSIL)

For Mains: Importance of Development in the Space Sector, India's Stand in Global Space Market, Significance of Public-private Partnership

Why in News?

Recently, the country's first privately developed rocket, **Vikram-S** was **successfully launched in a sub-orbital mission** from the Sriharikota spaceport marking a new era in India's space programme.

- The **mission Prarambh marks the beginning of a private venture** into the promising space launch market.

What is Vikram S?

- **Background**: The rocket has been developed by Indian space technology **startup Skyroot Aerospace.** It is **named after** Vikram Sarabhai, **the founder of India's space programme.**
- **Technology Used:** It is a single-stage sub-orbital launch vehicle that would **carry three customer payloads.**
    - Sub-orbital flights are those vehicles that are **travelling slower than the orbital velocity** – meaning it is fast enough to reach outer space but **not fast enough to stay in an orbit around the Earth.**
        - It has been built using **advanced technologies including carbon composite structures and 3D-printed components.**
- **Significance:** It would help test and validate the majority of the technologies in the Vikram series of space launch vehicles.
    - Skyroot has been **working on three different Vikram rocket versions.**
        - The **Vikram-I** can launch with 480 kilograms of payload, whereas the **Vikram-II** is designed to do so with 595 kilos and **Vikram-III** has a 500 km Low Inclination Orbit launch capability with 815 kg.

What is the Prarambh Mission?

- The Prarambh mission is **aimed at carrying three payloads into space**, including a 2.5-kilogram payload that has been **developed by students from several countries.**
- The Prarambh mission and the Vikram-S rocket were developed by the Hyderabad-based startup with extensive support from **Indian Space Research Organisation (ISRO)** and IN-SPACe (Indian National Space Promotion and Authorisation Centre).

Why is Development in the Space Sector Important?

- **Combating Climate-Related Issues:** Enhancing space technology would be beneficial to **strengthen connectivity and combat** climate-related implications through a more secure and effective means.
    - Satellites **provide more accurate information on weather forecasts** and assess (and record) long-term trends in the climate and habitability of a region.
    - Additionally, they can also serve as **real-time monitoring and early-warning solutions against** natural disasters such as earthquakes, tsunamis, floods, wildfires, mining etc.
- **In Terms of Connectivity:** As for connectivity, satellite communication **can reach more remote areas** where conventional networks would require heavy complimenting infrastructure.
    - It is thus argued that investment in this arena would **foster positive carryover effects to other sectors** as well.

Where does India stand in the Global Space Market?

- As of 2021, according to SpaceTech Analytics, **India is the sixth-largest player in the industry internationally having 3.6% of the world's space-tech companies.** U.S. accounts for **56.4% of all companies** in the space-tech ecosystem.
    - **Other major players include** U.K. (6.5%), Canada (5.3%), China (4.7%) and Germany (4.1%).
- The Indian Space Industry was valued at $7 billion in 2019 and aspires to grow to **$50 billion by 2024.** The country's standout feature is its **cost-effectiveness.**
    - India holds the distinction of being the **first country to have reached Mars' orbit in its first attempt** and at $75 million — way **cheaper than Western standards.**

What is the Need for Reforms in the Space Sector?

- **To Increase the Scale of the Sector:**
    - ISRO is centrally funded and its **annual budget is about Rs. 15,000 crore,** and most of this is used in building rockets and satellites.
    - The size of the space economy in India is small. To increase the scale of the sector, **it is imperative for private players to enter the market.**
    - ISRO is planning to share knowledge and technology, such as manufacturing rockets and satellites, to all the private players.
        - The United States, Europe, Russia — all have space industries with big players like Boeing, SpaceX, AirBus, Virgin Galactic, etc.
- **Reforms in Private Players:**
    - There have always been private players in the sector, but this has been entirely in manufacture of parts and sub-systems. There is a **need to provide a fillip to industry to be able to manufacture rockets and satellites.**

What are the Related Initiatives taken?

- IN-SPACE:
    - IN-SPACE was launched to **provide an equal opportunity for private companies** to use Indian space infrastructure.
    - It acts as a **single-point interface between ISRO, and everyone who wants to participate in space-related activities** or use India's space resources.
- NewSpace India Limited (NSIL):
    - Announced in Budget 2019, its **aim is to use research and development carried out by ISRO** over the years for commercial purposes through Indian industry partners.

What is the Significance of Public Private Partnership?

- **Source of Investment:** Private sector's involvement in the long term, as with other commercial sectors, is **believed to help spur investment and expertise** in the realm which is capital-intensive and demands high technology.
- **Fair Competition:** The space sector reforms were made with the intention to provide a **"level playing field"** to private companies in satellites, launches and space-based services.
- **Facilities & Capacities:** The central idea was to bring forth a predictable policy and regulatory environment for the private sector and additionally **provide access to ISRO facilities and assets to improve their capacities.**
- **New Innovations:** Private players can bring in the innovation needed for developing space-based applications and services. Additionally, the demand for these services is soaring worldwide and in India, with satellite data, imageries and space technology being used across most sectors.
    - Moreover, ISRO would have to expand 10x the current level to meet this rising demand. According to industry estimates, **India currently has 40+** start-ups **working on space and satellite projects** and this number is likely to increase.

What can be the Way Forward?

- There is a **need for a new policy that ends ISRO's monopoly of the space sector** in India, by sharing knowledge and technology, such as manufacturing rockets and satellites, with all interested parties.
- With India having one of the best space programs in the world, the move to allow **Foreign Direct Investment (FDI)** in space will make India a bigger player in the global space economy.
    - FDI in space will allow foreign players with a window to venture into the India space domain, this **will contribute to Indian national and foreign reserves, promote technology transfer and research innovations.**
- Further, the introduction of the **Indian Space Activities Bill will give greater clarity to private players** on how to be an integral part of the space sector.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. Consider the following statements: (2016)

The Mangalyaan launched by ISRO

1. is also called the Mars Orbiter Mission
2. made India the second country to have a spacecraft orbit the Mars after USA
3. made India the only country to be successful in making its spacecraft orbit the Mars in its very first attempt

Which of the statements given above is/are correct?

(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Ans: (c)

Mains

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

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