Commercialization in India's Space Sector

Why in news?

In order to secure strategic autonomy in its access to outer space, it's high time for India to tap the potential of private players in space sector.

What is commercialization of space sector in India?

- Commercialization in India's space sector refers to the increasing involvement of private companies in space activities.
- It is enabled by policy changes that allow them to develop and launch satellites, provide space-based services, and compete in the global market.
- **Antrix Corporation Limited (ACL)** – It was established in 1992 is a wholly owned Government of India Company under the administrative control of the ***Department of Space***.
- It is the Marketing arm of ISRO *for promotion and commercial exploitation of space products*, technical consultancy services and transfer of technologies developed by ISRO.
- **NewSpace India Limited (NSIL)** – It is *established in 2019* as a public sector undertaking of the Government of India.
- To spearhead *commercialization of space products including production of launch vehicles, transfer to technologies and marketing* of space products.
- **In-space** – It was *established in 2020* and functions as an *autonomous agency* in Department of Space (DOS).
- It acts as a ***single window agency*** for all space sector activities of private entities.
- **Emerging space startups** – Several private space companies have emerged in India, including Skyroot Aerospace, Agnikul Cosmos, Pixxel and Bellatrix Aerospace.

Evolution of the Indian Space Program

• The journey of India's space program began in the 1960s with the formation of the ***Indian National Committee for Space Research (INCOSPAR)*** under the guidance of Dr. Vikram Sarabhai.
• The launch of ***Aryabhata in 1975*** marked India's first satellite.
• **Development of launch vehicle (1980's)** – The SLV-3 successfully launched the *Rohini satellite*, making India a space-faring nation.
• **1990's –** Development of the PSLV (Polar Satellite Launch Vehicle) and GSLV (Geosynchronous Satellite Launch Vehicle) paved the way for reliable satellite launches.
• **Chandrayaan-1 (2008**) – India's *first lunar mission*, confirmed the presence of water molecules on the Moon.
• **Mangalyaan (2014) –** The Mars Orbiter Mission, made India the first country to reach Mars orbit on its maiden attempt.
• **Chandrayaan-3 (2023)** – *Successful soft landing* on the Moon's South Pole cemented India's status as a global space power.
• India is preparing for the Gaganyaan mission, first human spaceflight.
• Development of ***reusable and heavy-lift rockets*** like the Next Generation Launch Vehicle (NGLV).

What is the importance of commercialization of the space sector?

- **Developing reusable & heavy lift capability rockets** – As India is still depend on foreign nation in launching heavy satellites, there is a need for indigenous reusable and heavy lift capability rockets.
- For instance, GSAT-N2 is a communication satellite built by ISRO was launched on SpaceX's Falcon 9 rocket.
- **Economic growth –** India's space industry, valued at approximately ***7 billion USD,*** has the potential to grow exponentially through increased private sector participation.
- **Global competitiveness –** India's cost-effective launch capabilities, demonstrated by missions like Chandrayaan-3 and Mangalyaan, make it an *attractive destination for international satellite launches*.
- Expanding these services commercially *can enhance India's share in the 440* billion USD in global space economy.
- **Job Creation and Skill Development** – The growth of private space firms will *create jobs* in aerospace engineering, satellite design, and data analytics.
- **Strategic independence** – Commercialization reduces reliance on foreign providers for satellite services and technologies, *strengthening India's autonomy in critical areas such as communication, navigation, and defense.*
- **Increased innovation** – Partnerships between ISRO and private firms can *expedite the development of advanced technologies* like reusable rockets and small satellite launchers.
- **Infrastructure development through PPP**– Commercialization encourages the development of state-of-the-art facilities, such as satellite assembly units and launch pads, through public-private partnerships (PPP).
- **Increased FDI inflows** – Commercialization will increase foreign direct investment (FDI) inflows in the space sector.
- India now permits ***up to 100% FDI in space sectors*** like satellite manufacturing and operation, satellite data products, and ground segment and user segment.

What are the measures needed?

- **Strengthen policy framework** – The government must implement further supportive policies to encourage private sector involvement.
- **Providing milestone-based funding mechanisms** – It can reduce risks on private players as funding will be provided only after they meet certain objectives at every stage.
- It will *ensure accountability and reduce cost overruns*.
- **Leveraging the private industrial base** – In parallel to developing the NGLV, the Department of Space can give out contracts for reusable, heavy-lift rockets to capable private players to foster competition and capacity-building.
- **Promote global collaboration** – Indian companies should be encouraged to explore partnerships with global firms for technology transfer and co-development of advanced systems.
- This can accelerate the development of indigenous capabilities.
- **Develop infrastructure** – Investment in testing facilities, launch pads, and research centers is crucial.
- Shared infrastructure can reduce entry barriers for startups and smaller firms.
- **Focus on education and training** – Building a skilled workforce is essential.
- Universities and research institutions must align their curricula with the needs of the space industry to ensure a steady pipeline of talent.
- **Public-private partnerships** – ISRO's expertise can complement the agility and innovation of private firms through well-structured collaborations.
- Joint ventures can address complex challenges and accelerate project timelines.

Quick facts
• **Next Generation Launch Vehicle (NGLV)** – It is designed to have a maximum payload capability of 30 tonnes to Low Earth Orbit. • **Project duration** – It is targeted to complete the development phase in 8 years from 2024. • **Significance** – NGLV will have 3 times the present payload capability compared to LVM3. • It will also have reusability resulting in low-cost access to space and modular green propulsion systems. • The development of NGLV will enable the launch of human spaceflight missions to Bharatiya Antariksh Station, Lunar/inter-planetary exploration missions and communication & earth observation satellite constellations to Low Earth Orbit.

Reference

[The Hindu | Deepening India's Steps as a Key Space-Faring Nation]

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