

Space commercialization

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Source : *The Hindu*

Manifest pedagogy:

Space commercialisation is one aspect which was left untapped until the last few years. After successful stint of ISRO as a scientific body it is now accelerating its activities as a commercial body. This is a very important topic for Mains.

In news: ISRO arm NSIL has begun search for PSLV makers

Placing it in syllabus: Space commercialisation by India (explicitly mentioned)

Static dimensions: Role of Antrix Corporation

Current dimensions:

- Establishment of NSIL
- Outsourcing of PSLV
- ISRO's space commercialisation plan and its impact

Content: NewSpace India Ltd (NSIL), the new public sector space business company have launched a formal search for industry consortia which can regularly manufacture and deliver entire PSLV satellite launch vehicles for the Indian Space Research Organisation (ISRO).

Role of Antrix Corporation:

- Antrix Corporation Limited (ACL), Bengaluru is a **wholly owned Government of India Company** under the administrative control of the Department of Space.
- Was incorporated as a private limited company owned by the Government of India in September 1992 as a **Marketing arm of ISRO for promotion and commercial exploitation of space products**, technical consultancy services and

transfer of technologies developed by ISRO.

- Another major objective is to facilitate development of space related industrial capabilities in India.
- Antrix **markets space products and services to global customers.**
- It is committed to configuring a cost-effective, advanced and reliable solution for every space programme related need.
- Antrix optimizes the space systems keeping in view the specific customer objectives.
- It plays a pivotal role in delivering space systems and services that meet the expectations of leading global organizations.
- With fully equipped state-of-the-art facilities, it provides end-to-end solution for many of the space products, ranging from
 - – supply of hardware and software including simple subsystems to a complex spacecraft;
 - – for varied applications covering communications;
 - – earth observation and scientific missions;
 - – space related service including remote sensing data service;
 - – Transponder lease service;
 - – Launch services through the operational launch vehicles (PSLV and GSLV);
 - – Mission support services;
 - – socially relevant services such as telemedicine and tele education;
 - – a host of consultancy and training services.

Establishment of NewSpace India Limited(NSIL):

- In March, 2019, Cabinet cleared the establishment of a private institution, the Newspace India Limited (NSIL), under the Department of Space.
- The move is in line with New Delhi's ongoing efforts to build out the commercial aspect of its space program.

- The 10-point agenda in central government's **Vision 2030** included making India "the launchpad of the world and placing an Indian astronaut in space by 2022."
- NSIL has been set up with a paid-up capital of around \$1 million.
- It will function under the directorship of Radhakrishnan Durairaj and Suma Devaki Ram, ISRO directors of launch services and operations respectively.
- They also serve on the management team of Antrix.
- NSIL is the **second commercial arm of the ISRO after the Antrix Corporation.**
- The **major goal for the NSIL will be to facilitate the transfer of ISRO technologies to private industries as well as aid in marketing space-based products and spin-off technologies.**
- According to official reports, in order to facilitate transfer of technology, NSIL will take license from ISRO before sub-licensing them to the commercial players.
- The technology transfer envisaged through the NSIL will include **India's small satellite program**, the Small Satellite Launch Vehicle (**SSLV**) program and the Polar Satellite Launch Vehicle (**PSLV**).
- This would mean that **services including launching of satellites can be undertaken by private entities once the license is procured by the NSIL.**
- Hence NSIL will essentially become the connecting link for ISRO with commercial players to aid in technology transfer for a fee.
- **Antrix will handle ISRO's commercial deals for satellites and launch vehicles with foreign customers whereas NSIL will deal with capacity building of local industry for space manufacturing**

NSIL recently got its **first customer – an American space rideshare company, Spaceflight**. The American firm has **bought payload slot on** the first commercial launch of ISRO's newest rocket **SSLV**. The first flight of SSLV is slated to take place

from the Satish Dhawan Space Centre later in 2019.

Spaceflight is a rideshare company that provides launch and mission services to its customers using rockets of different agencies. It has executed nine missions with ISRO, sending over 100 spacecrafts to orbit aboard its launch vehicles. In April, 2019 ISRO launched 21 satellites for Spaceflight in its PSLV C-45 mission.

Outsourcing of PSLV:

The ISRO had decided to transfer the PSLV rocket to the private sector more than a decade ago, though this had not yet been accomplished. A January 2019 notice on the ISRO website had already shortlisted ten domestic industries for the technology transfer with regard to **lithium-ion cell technology**.

Now NSIL has called a pre-bid meeting of potential parties on August 26, 2019. It will initially outsource five PSLVs – Indian rockets that can lift light payloads to ‘low earth orbits’ some 600 km in space. Upon successful and satisfactory completion of realisation of 5 PSLVs, NSIL/ISRO will enhance the scope to 12 PSLVs per annum under a separate contract.

PSLV is ISRO’s workhorse to put light payloads to space & has had 46 successful launches since 1994, the latest being in April 2019. It **can put 1750-kg payloads/spacecraft to polar orbits 600 km away** and **1450-kg payloads to sub-geosynchronous orbits of around 1500 km**.

HAL, L&T, Godrej Aerospace, MTAR and hundreds of small and big companies supply various PSLV parts. It has launched nearly 300 mostly small foreign satellites till date. The four-stage PSLV is needed to place both Indian remote sensing satellites and small satellites of foreign customers to space.

ISRO’s space commercialisation plan and its impact:

India have private stakes in space exploration. As per the Make in India initiative, **FDI of up to 74%** is allowed in the 'establishment and operation of satellites, subject to the sectoral guidelines of the Department of Space/ISRO, under the government route.

A **separate "space law"** is being readied, which will soon be with the Indian cabinet for its approval. It will manage all aspects of the regulation of space ventures and will "also have provisions related to the accountability of manufacturers for its space components."

The ISRO has a proven track record in launching small satellites with the success of the PSLV. The development of the SSLV (technology transfer through NSIL) will give India a further boost in this segment. **SSLV will offer an even more cost-effective option than the existing PSLV.** SSLV can also be assembled in 3-4 days as against the 40 days for a normal size rocket.

The **SSLVs will carry payloads between 300-500 kgs to Low Earth Orbit** (A low Earth orbit (LEO) is an orbit around Earth with an altitude above the Earth's surface of 2,000 kilometres (1,200 mi), and an orbital period between about 84 and 127 minutes).

The PSLV is capable of launching satellites in 1100-1600 kg class into Sun Synchronous Orbit. NSIL has been tasked with production of the rocket in collaboration with private players. The first SSLV mission will deploy commercial spacecraft in two different orbital planes.

SSLV is **perfectly suited for launching multiple microsatellites at a time and supports multiple orbital drop-offs.** It is designed for the **launch-on-demand concept** with very quick turn-around capability in between launches.

Impact of commercialising the space arena:

New Businesses : By announcing Private-Public Partnership (PPP) plans, the Indian government is making it easier for the private industry to enter the space arena. Further, the global NewSpace movement has given a push to the Indian private space sector as well. **NewSpace**, is a global phenomenon where space entrepreneurs are developing products and services which are focused on spaceflight by using private funding e.g SpaceX, OneWeb and PlanetLabs companies.

NewSpace has inspired many entrepreneurs in India as well and has led to the establishment of several innovative startups like Team Indus, Earth2orbit, Astrome Technologies, SatSure etc. E.g. In 2017 the Bangalore based Team Indus launched a rover which could be landed on the Moon and beam back images and videos. This invention paved the way for India's entry into **Google Lunar XPRIZE** competition.

More Innovation: **Dhruva Space**, a Bangalore based **start-up became the first in India to design and manufacture satellites**. They have claimed that they have the capacity to manufacture at least 10-12 satellites annually. There are many like these in our country who could be a big helping hand for the ISRO. So, rather than being competitors, the private industry should be seen as allies to ISRO.

India is becoming the brainchild of innovative ideas and not merely importing them. Now as ISRO plans to privatize their basic and well-established technologies, they can focus on the R&D of newer technologies and more cutting-edge missions. And leave the basic operations for the new space players.

Additional Employment: As the space sector expands with bigger projects and missions, more people will be required to get the job done. The current strength of ISRO is around 16,000 people, which is clearly not enough to achieve the set objectives and missions planned by ISRO. Further, there have been reports of scientists not willing to work for the state-owned organisation. The result is brain drain of Indian

talent.

Commercialising and privatising, will bring in the much needed fresh ideas and perspective which will suit the younger generation. This will also channelize employment via the growing number of new space companies and startups. And will bring back many scientists and engineers, who flew overseas due to the lack of growth in the Indian space sector.

ISRO's approach to privatization and commercial engagements has come a long way, driven by the need to stay competitive at a time when there are fast emerging competitors including China and foreign commercial players who have been eyeing the global commercial space. ISRO's opening to bring commercial entities into India's space trajectory is likely to have several spin-off benefits for national security purposes.

Indian scientists have contributed largely to the astronomy and space sector globally. But, when it comes to **promoting education in this sector**, we are lagging far behind. At present, there are very few universities offering postgraduate courses in the field and a handful number of colleges offering undergraduate courses. More programmes in this field could pave way for more budding and young scientists and engineers.

These advancements have led to a stage where it's economically viable to extend the private sector's reach into the space sector not only for telecommunications and scientific purposes, but also for defence purposes. This would greatly boost India's defence and would make it a major force to be reckoned with.