

Space Commerce: Amazonia I Launched by ISRO

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India's Polar Satellite Launch Vehicle PSLV-C51 successfully launched Amazonia-1 along with 18 co-passenger satellites on February 28, 2021 from Satish Dhawan Space Centre SHAR, Sriharikota. With this a new chapter has begun in India's space history.

In news: India has launched Brazil's Amazonia-1 and 18 other satellites into orbit

Placing it in syllabus: Science & Technology

Dimensions

- Importance of the Satellite
- What is Space Commerce?
- Potential of India
- Initiatives of ISRO
- Importance for India
- Hurdles

Content:

Importance of the Satellite:

- Amazonia-1 is an important mission for Brazil which also marks beginning of a new era for satellite development in the country
- Amazonia-1 is the optical earth observation satellite of National Institute for Space Research (INPE).
- This satellite will provide remote sensing data to users for monitoring deforestation in the Amazon region and analysis of diversified agriculture across the Brazilian territory.
- The main reason for this is the satellite's infrared

capabilities that will allow it to view past the thick clouds of the forest.

- PSLV-C51/Amazonia-1 is the **first dedicated commercial mission** of NewSpace India Limited (NSIL), a Government of India company under the Department of Space.
- The primary satellite on this mission was a foreign satellite (Amazonia-I). There were 18 co-passenger satellites onboard PSLV-C51 including four from IN-SPACE and fourteen from NSIL.
- This is not the first time that NSIL has organised a launch of foreign satellites aboard an Indian Space Research Organisation (ISRO) launch vehicle.
- However, the **primary satellites** aboard earlier missions **were Indian satellites** – the RISAT-2BRI and the EOS-01 – with smaller satellites from several other countries

What is Space Commerce?

- Space Commerce or Commercial use of space is the provision of goods or services of commercial value by using equipment sent into Earth orbit or outer space.
- This phenomenon – aka Space Economy (or New Space Economy) – is accelerating cross-sector innovation processes combining the most advanced space and digital technologies to develop a broad portfolio of space-based services.
- Examples of the commercial use of space include satellite navigation, satellite television and commercial satellite imagery.
- Operators of such services typically contract the manufacturing of satellites and their launch to private or public companies, which form an integral part of the space economy.
- Some commercial ventures have long-term plans to exploit natural resources originating outside Earth, for example asteroid mining.

- Space tourism, currently an exceptional activity, could also be an area of future growth, as new businesses strive to reduce the costs and risks of human spaceflight.

Dimensions of Space Commerce include:

- **Private spaceflight:** Commercial launch providers typically place private and government satellites into low Earth orbit (LEO) and geosynchronous Earth orbit (GEO). Several companies such as SpaceX and Blue Origin are currently developing new Reusable Launch Vehicle (RLV) designs.
- **Satellites and Equipment Leasing:** includes activities such as commercial satellite and ground equipment manufacturing, transponder leasing, etc
- **Subscription Satellite Services:** Services like Direct to Home (DTH), satellite radio and communications etc
- **Satellite imagery:** Satellite imaging companies sell images by licensing them to governments and businesses such as Apple Maps and Google Maps.
- **Satellite navigation:** Sat-nav system is a system that uses satellites to provide autonomous geo-spatial positioning.
- **Space tourism:** Space tourism is human space travel for recreational purposes. To date, orbital space tourism has been performed only by the Russian Space Agency.
- **Commercial recovery of space resources:** is the exploitation of raw materials from asteroids, comets and other space objects, including near-Earth objects. Minerals and volatiles could be mined then used in space for in-situ utilization (e.g. construction materials and rocket propellant) or taken back to Earth.

Potential of India:

- India's space program stands out as one of the most cost-effective in the world.

- India has earned worldwide recognition for launching lunar probes, building satellites, ferrying foreign satellites up and has even succeeded in reaching Mars.
- India has two operational launch vehicles: Geosynchronous Satellite Launch Vehicle (GSLV) and Polar Satellite Launch Vehicle (PSLV).
- With the ISRO undertaking the development of cutting-edge technologies and interplanetary exploratory missions, there is a tremendous scope in contributions to the realization of operational missions and new areas such as satellite navigation.

Initiatives of ISRO:

Antrix Corporation Limited:

- **Antrix Corporation Limited**, the commercial and marketing arm of the Department of Space has undertaken many initiatives for the global marketing of space products and services.
- Antrix has continued to expand its market base ever since its inception in 1992.

New Space India Limited (NSIL):

- NewSpace India Limited (NSIL), incorporated on 6 March 2019 (under the Companies Act, 2013) is a wholly owned Government of India company, under the administrative control of Department of Space (DOS)
- NSIL is responsible for enabling industries in India to upgrade high-tech manufacturing bases for the Indian Space Programme.
- NSIL is the commercial arm of Indian Space Research Organisation (ISRO) with the primary responsibility of enabling Indian industries to take up high technology space related activities.
- It is also responsible for promotion and commercial exploitation of the products and services emanating from

the Indian space programme.

- NSIL will carry out the following roles and functions as part of its mandate viz.
 - (i) Small Satellite technology transfer to industry, wherein NSIL will obtain license from DOS/ISRO and sub-license it to Industries;
 - (ii) Manufacture of Small Satellite Launch Vehicle (SSLV) in collaboration with Private Sector;
 - (iii) Productionisation of Polar Satellite Launch Vehicle (PSLV) through Indian Industry;
 - (iv) Productionisation and marketing of Space based products and services, including launch and application;
 - (v) Transfer of technology developed by ISRO Centres and constituent units of DOS;
 - (vi) Marketing spin-off technologies and products/services, both in India and abroad; etc

Launch Vehicles:

- **Satellite Launch Vehicle (SLV):** SLV's first successful launch took place in 1980; SLV-3 from Sriharikota Range (SHAR).
- **Augmented Satellite Launch Vehicle (ASLV):** Designed to augment payload capacity, the first launch test of ASLV was held in 1987, and three others followed in 1988, 1992 and 1994. 10
- **Polar Satellite Launch Vehicle (PSLV):** The third generation launch vehicle of India, PSLV was successfully launched in 1994 for the first time.
- **Geosynchronous Satellite Launch Vehicle (GSLV):** The largest launch vehicle developed by India, GSLV was first launched in 2001.

Space Science Program:

The Department of Space implements space programs

and promotes research activities at the following facilities:

- Physical Research Laboratory (PRL)
- National Atmospheric Research Laboratory (NARL)
- North Eastern Space Applications Centre (NE-SAG)
- Semi-Conductor Laboratory (SCL)
- Indian Institute of Space Science and Technology (IIST)

International Cooperation:

- ISRO is also a participant of the various conventions and conferences organized by the globally acclaimed space organizations such as: International Astronautical Federation (IAF), International Academy of Astronautics (IAA), International Institute of Space Law (IISL), Committee on Earth Observation Satellites (CEOS) etc
- India has signed various cooperative agreements and Memoranda of Understanding (MoU) with other countries and organizations as an initiative to expand its international outreach.
- The areas of cooperation are mainly concerned with remote sensing of the earth, airborne synthetic aperture radar, maritime domain awareness, satellite communication, launch services, space exploration, space law and capacity building.

Satellite Communication Policy:

- A policy framework for Satellite Communication in India had been approved by the Government in 1997.
- The norms, guidelines and procedures for implementation of the Policy Framework for Satellite Communications in India, were approved by the government in the year 2000.
- The aim of the policy is to build capability and develop the country in the area of satellites. To fulfill the purpose, the INSAT program plays an important role.

- It is managed by the INSAT Coordination Committee (ICC) with technical support from its Technical Advisory Group (TAG).

Remote Sensing:

- In 2011, India adopted the Remote Sensing Data (RSD) Policy.
- The nodal agency for all actions under the policy is the Department of Space (DoS) of the Government of India.
- The National Remote Sensing Centre (NRSC) of ISRO/ DoS is consigned with the authority to obtain and circulate all satellite remote sensing data in India, both from Indian and foreign satellites.
- Antrix Corporation Ltd. will be accountable for grant of license for acquisition/ distribution of IRS data outside India.

Draft SpaceCom Policy- 2020:

- Department of Space published “Draft- Spacecom Policy-2020”.
- The policy aims to meet the growing demand of space based communication requirements of the nation.
- This will boost Government’s initiatives towards Self Reliant India (Atma Nirbhar Bharat) that will drive focus on “ease of doing business” and encourage healthy competitiveness in the growth of the national economy.

Importance for India:

- India’s move from dependency to self-sufficiency in terms of its launching adeptness could make it the world’s launch pad.
- Space commerce can promote the ‘Make in India’ campaign. Outsourced satellite manufacturing to a private sector enterprise can boost economic development.
- The cost-effective space programmes have attracted other

nations and multinational units to enter into formal agreements with India to support them in their respective space projects and carry out satellite launches for them.

- For better or for worse, 'space' has become integral to 21st century warfare.
- For India to be at the vanguard of an innovation and technology-driven new international order commercialisation of space research and development programmes is necessary

Hurdles:

- **Low level of outsourcing:** In India, only government entities have a hold over the space sector, the Indian Space Research Organisation (ISRO). Outsourcing only involves a certain degree of supply and manufacture of components by some commercial industries.
- **Lack of laws for space related issues:** The advent of commercialisation, thus, calls for revising of domestic laws, such as, the laws of contract, transfer of property, stamp duty, registration, insurance and most importantly, intellectual property rights, to contemplate space related issues.
- **Concern over space debris:** India finds itself at the centre of an international dispute over the fall of debris from an Indian satellite on a Japanese village, which was retracing back to Earth. with no national space law and policy, it is tough for India to determine the quantum of damages owed. Additionally, legislation would also help to assess and decide responsibility in the event of space debris collision with objects suspended in outer space
- **Limited launch capacity:** The global trend is to move away from the intermediate class of satellites to the Heavy (4200 – 5400 Kg) or Very Heavy class (>5400 Kg) of satellites. With masses of about 2300 Kg (GSLV launch)

and 3300 Kg (foreign launch) Indian Communications satellites currently fall into either the medium class category (< 2500 Kg) or the Intermediate class category (2500 -4200 Kg).

- **International Competition:** India will be competing with SpaceX and other companies with competitively priced launches. They will also be able to provide utmost reliability with quality PSLV and GSLV vehicles. So, it's time that India won't stay much behind the competition in the space department.

Mould your thought: Give a brief account of India's achievement in space commerce. Also identify the opportunities and threats of this sector for India.

Approach to the answer:

- Introduction
- Define Space commerce
- List the achievements of India in Space Commerce
- Mention the advantages
- Discuss the hurdles
- Conclusion