NEW SPACE: ON ISRO'S FIRST DEDICATED COMMERCIAL MISSION

(GS-3: Achievements of Indians in science & technology; indigenization of technology and developing new technology, awareness in the fields of IT, Space technology.)

Context:

- With the launch of Brazil's Amazonia-1 satellite last week from Sriharikota, a new chapter has begun in India's space history.
- The satellite was the first dedicated commercial mission of NewSpace India Limited, a two-year-old commercial arm of the Department of Space.

Foreign satellite launched by ISRO:

This is not the first time that NSIL has organized a launch of foreign satellites aboard an Indian Space Research Organisation (ISRO) launch vehicle.

- The organisation has had launches last November as well as in December 2019.
- However, the primary satellites aboard both these missions were Indian satellites — the RISAT-2BRI and the EOS-01 — with smaller satellites from several other countries, as well as India, piggybacking on them.
- The Amazonia mission also saw 18 other satellites being launched and was the first fully commercial mission.
- India has so far launched 342 foreign satellites from 34 countries using its Polar Satellite Launch Vehicle platform and many of them have involved ISRO's first commercial entity, the Antrix Corporation.

About PSLV:

- Polar Satellite Launch Vehicle (PSLV) is the third generation launch vehicle of India.
- It is the first Indian launch vehicle to be equipped with liquid stages.

- After its first successful launch in October 1994, PSLV emerged as the reliable and versatile workhorse launch vehicle of India
- Besides, the vehicle successfully launched two spacecraft – Chandrayaan-1 in 2008 and Mars Orbiter Spacecraft in 2013 – that later traveled to Moon and Mars respectively
- It comes in the category of medium-lift launchers with a reach up to various orbits, including the Geo Synchronous Transfer Orbit, Lower Earth Orbit, and Polar Sun Synchronous Orbit.

Description:

PSLV has a four-stage system comprising a combination of solid and liquid-fuelled rocket stages.

- The first stage at the very bottom is solid fuelled having six strap-on solid rocket boosters wrapped around it.
- Second stage is liquid fuelled whereas the third stage has a solid fuelled rocket motor.
- At the fourth stage, the launcher uses a liquid propellant to boost in the outer space.

NewSpace 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 the commercial arm of Indian Space Research Organisation (ISRO)
- Its primary responsibility is to enable 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.
- To satisfy the needs of its customers, NSIL draws upon the proven heritage of the Indian Space Program and ISRO's vast experience in diverse branches of Space Technology.

The major business areas of NSIL include:

- Production of Polar Satellite Launch Vehicle (PSLV) and Small Satellite Launch Vehicle (SSLV) through industry;
- Production and marketing of space-based services, including launch services and space-based applications like transponder leasing, remote sensing and mission support services;
- Building of Satellites (both Communication and Earth Observation) as per user requirements.

- Transfer of technology developed by ISRO centres/ units and constituent institutions of Dept. of Space;
- Marketing spin off technologies and products/ services emanating out of ISRO activities
- Consultancy services

About Indian National Space Promotion and Authorization Centre (IN-SPACe):

- IN-SPACe will act as an arm of the Indian Space Research Organisation (ISRO). IN-SPACe will provide "a level playing field" to private companies in the country's space programmes
- IN-SPACe is to be established as a single window nodal agency, with its own cadre, which will permit and oversee the following activities of NGPEs.
- Space activities including building of launch vehicles and satellites and providing space based services as per the definition of space activities.
- Sharing of space infrastructure and premises under the control of ISRO with due considerations to on-going activities.
- Establishment of temporary facilities within premises under ISRO control based on safety norms and feasibility assessment
- Establishment of new space infrastructure and facilities, by NGPEs, in pursuance of space activities based on safety norms and other statutory guidelines and necessary clearances.
- Initiation of launch campaign and launch, based on readiness of launch vehicle and spacecraft systems, ground and user segment.
- Building, operation and control of spacecraft for registration as Indian Satellite by NGPEs and all the associated infrastructure for the same.
- Usage of spacecraft data and rolling out of space based services and all the associated infrastructure for the same.
- IN-SPACe will draw up an integrated launch manifest considering the requirements for ISRO, NSIL and NGPEs based on priorities and readiness level.
- IN-SPACe will work out a suitable mechanism for promotion & hand holding, sharing of technology and expertise to encourage participation of NGPEs in space activities.
- In order to carry out the space activities, capital-intensive, high technology facilities will be required by NGPEs. These facilities, spread across various ISRO Centres, shall be permitted for use by NGPEs.
- IN-SPACe will work out a suitable mechanism to offer sharing of technology, expertise and facilities on free of cost wherever feasible or at reasonable cost basis to promote NGPEs.
- IN-SPACe will act as an autonomous body, under DOS, as a single window nodal agency for enabling and regulating space activities and usage of ISRO facilities by NGPEs.

- IN-SPACe will also permit establishment of facilities, within ISRO premises, based on safety norms and feasibility assessment.
- The marketing, sharing and dissemination of remote sensing data shall be governed by Remote sensing policy. Each application requiring examination as per new policy will be examined and permitted by IN-SPACE factoring legal and security aspects.
- The decision of IN-SPACe shall be final and binding on all stakeholders including ISRO. NGPEs will not be required to seek separate permission from ISRO.
- The architecture of IN-SPACe is a multi-disciplinary review and assessment mechanism comprising of four Directorates for Technical, Legal, Safety & Security, Monitoring& Promotion and will assist IN-SPACe in carrying out its functions.

Private players in Indian space programmes:

- Until now there was limited participation from private industries in India's space sector.
- It was restricted mainly to the manufacturing and fabrication of rockets and satellites.
- Indian industry accounts for a mere 3% in the rising $360-billion global space market.
- Rockets and satellite launch accounts for just 2% of it.
- Programmes like satellite-based services and ground-based system control the rest of the market.
- Indian private companies were unable to compete because their roles have been limited mainly to supply component and sub-systems.
- Even they lack resources and technology to handle independent space programmes the way companies like SpaceX in the US have been doing.
- ISRO alone can't cater to the rising demand for space-based applications and services within India as it's growing rapidly.

Way forward:

- Focus needs to be shifted to aid space start-ups reach out to rural India and facilitate more recruits from India's young to facilitate careers in space applications and sciences.
- ISRO will focus more on research and development activities, new technologies, exploration missions and human spaceflight programm.
- Right now a lot of ISRO's resources are being consumed by routine activities, which is causing a delay in its strategic objectives.
- So many private companies across the world are engaged with space activities like launching weather and communication satellites.

- If private companies take over these activities, organisations like ISRO and NASA can more focus on space exploration by carrying out scientific missions.