

EXPANDING INDIA'S SHARE IN GLOBAL SPACE ECONOMY

Context:

- ✚ From a modest beginning in the 1960s, India's space programme has grown steadily, achieving significant milestones.
- ✚ These include **Fabrication of satellites, Space-Launch Vehicles**, and a range of associated capabilities.

International Treaty Obligations on Outer Space Activities:

- ✚ Internationally, the outer space activities are governed by relevant chapters of international law in general and by United Nations' (UN) Treaties and principles evolved under **UN Committee on Peaceful Uses of Outer Space (UNCOPUOS)** in particular.
- ✚ The obligations of a State Party under international treaties on outer space activities are expected to be complied/ discharged through national mechanisms, namely domestic space legislations.
- ✚ Basic tenets of treaty obligations, namely, '**bearing International responsibility**' and '**liability for damages caused by space activities and space objects**' are more applicable to a State Party, where space activities are performed by non-governmental/ private sectors.
- ✚ Hence, **non-governmental space activities are required to be licensed/ authorized** and continuously supervised by a State in order to comply with treaty obligations.
- ✚ A few space faring nations such as USA, Russia, Ukraine, Republic of Korea and other nations engaged in space activities, such as, South Africa, United Kingdom, Indonesia, Austria, etc. have formulated domestic space legislations.
- ✚ France has a Space Authorization Act for providing commercial space activities through
- ✚ India is a State Party to major treaties of UN on outer space activities and has been performing space activities in compliance with the obligations of UN Treaties on Outer Space activities under Governmental envelope.

Need for Space Act in India:

- ✚ Over a period, with the logical evolution of space activities in India from conceptual, experimental, operational, commercial and further expansion phases, the demands for space systems, applications and services for national needs and beyond have been rapidly growing.
- ✚ This scenario also encourages the participation of Indian industry and service providers at much higher levels in all round space activities under the technical guidance and authorization of the Government through Department of Space.
- ✚ Further, a few start-up companies too in India are showing interest in engaging in space systems activities. Commercial opportunities in space activities and services, nationally and internationally demand higher order of participations by private sector agencies.
- ✚ This situation demands for a necessary legal environment for orderly performance and growth of the space sector.

The Constitution of India too provides for implementation of international treaty obligations, vide Articles 51 and 253:

- ✚ Though there is a need for national space legislation for supporting the overall growth of the space activities in India. This would encourage enhanced participation of non-governmental/private sector agencies in space activities in India, in compliance with international treaty obligations, which is becoming very relevant today.

Draft Space Activities Bill, 2017:

- ✚ The Government had invited suggestions from the public or stakeholders regarding the draft Space Activities Bill, 2017.
- ✚ The objective of the Space Bill is to facilitate the overall growth of the space activities in India with higher order of participation of public/ non-governmental/ private sector stakeholders.
- ✚ The Bill provides for establishment of a regulatory mechanism through an appropriate body, by the Central Government for the purpose of authorization and licensing of space activities.
- ✚ The provision on liability for damages caused by space activities of licensee, provides for a risk sharing mechanism, by which the central Government may determine the quantum of liability to be borne by the licensee.

The vast opportunity the Space Sector Presents:

A Case of Demand Exceeding Supply:

- ✚ Demand for space-based services in India is far greater than what ISRO can supply.

- ✚ Private sector investment is critical, for which a suitable policy environment needs to be created.
- ✚ There is growing realization that national legislation is needed to ensure overall growth of the space sector.
- ✚ The draft Space Activities Bill introduced in 2017 has lapsed and the government now has an opportunity to give priority to a new Bill that can be welcomed by the private sector, both the larger players and the start-ups alike.

Looking at ISRO's Thrust Areas:

- ✚ Since its establishment in 1969, ISRO has been guided by a set of mission and vision statements covering both the societal objectives and the thrust areas.
- ✚ The first area was of satellite communication, with INSAT and GSAT as the backbones, to address the national needs for telecommunication, broadcasting and broadband infrastructure.
- ✚ Bigger satellites have been built carrying a larger array of transponders.
- ✚ About 200 transponders on Indian satellites provide services linked to areas like telecommunication, telemedicine, television, broadband, radio, disaster management and search and rescue services.
- ✚ A second area of focus was earth observation and using space-based imagery for a slew of national demands, ranging from weather forecasting, disaster management and national resource mapping and planning.
- ✚ These resources cover agriculture and watershed, land resource, and forestry managements. With higher resolution and precise positioning, Geographical Information Systems' applications today cover all aspects of rural and urban development and planning.
- ✚ Beginning with the Indian Remote Sensing (IRS) series in the 1980s, today the RISAT, CARTOSAT and RESOURCESAT series provide wide-field and multi-spectral high-resolution data for land, ocean and atmospheric observations.
- ✚ A third and more recent focus area is satellite-aided navigation.
- ✚ The GPS-aided GEO augmented navigation (GAGAN), which is a joint project between ISRO and Airports Authority of India, augmented the GPS coverage of the region, improving the accuracy and integrity, primarily for civil aviation applications and better air traffic management over Indian airspace.
- ✚ This was followed up with the Indian Regional Navigation Satellite System (IRNSS), which is a system based on seven satellites in geostationary and geosynchronous orbits.

- ✚ It provides accurate positioning service, covering a region extending to 1,500 km beyond Indian borders, with accuracy greater than 20 metres; higher accuracy positioning is available to the security agencies for their use.
- ✚ In 2016, the system was renamed NavIC (Navigation with Indian Constellation).

Ambitious Space Missions being undertaken by ISRO:

- ✚ With growing confidence, ISRO has also started to undertake more ambitious space science and exploration missions.
- ✚ The most notable of these have been the Chandrayaan and the Mangalyaan missions, with a manned space mission, Gaganyaan, planned for its first test flight in 2021.
- ✚ These missions are not just for technology demonstration but also for expanding the frontiers of knowledge in space sciences.
- ✚ Experts have opined that none of this would have been possible without mastering the launch-vehicle technology.
- ✚ Beginning with the Satellite Launch Vehicle (SLV) and the Augmented Satellite Launch Vehicle (ASLV), ISRO has developed and refined the Polar Satellite Launch Vehicle (PSLV).

Taking a Look at the PSLV and the GSLV:

- ✚ It is important to note that the PSLV is India's workhorse for placing satellites in low earth and sun synchronous orbits.
- ✚ As a matter of fact, with 46 successful missions, the PSLV has an enviable record.
- ✚ The Geosynchronous Satellite Launch Vehicle (GSLV) programme is still developing with its MkIII variant, having undertaken three missions, and is capable of carrying a 3.5 MT payload into a geostationary orbit.
- ✚ In comparison, the French Ariane 5 has undertaken more than 100 launch missions and carries a 5 MT payload, with an Ariane 6 in the pipeline for 2020.
- ✚ Over the years, ISRO built a strong association with the industry, particularly with Public Sector Undertakings (PSUs) like Hindustan Aeronautics Limited, Mishra Dhatu Nigam Limited and Bharat Electronics Limited and large private sector entities like Larsen and Toubro, Godrej and Walchandnagar Industries. However, most of the private sector players are Tier-2/Tier-3 vendors, providing components and services.
- ✚ In contrast, the Assembly, Integration and Testing (AIT) role is restricted to ISRO, which set up Antrix, a private limited company, in 1992 as its commercial arm to market its products and services and interface with the private sector in transfer of technology partnerships.

Valuing the Global Space Industry:

- ✦ The value of the global space industry is estimated to be \$350 billion and is likely to exceed \$550 billion by 2025.
- ✦ Despite ISRO's impressive capabilities, India's share is estimated at \$7 billion (just 2% of the global market) covering broadband and Direct-to-Home television (accounting for two-thirds of the share), satellite imagery and navigation.
- ✦ Already, over a third of transponders used for Indian services are leased from foreign satellites and this proportion will rise as the demand grows.
- ✦ It is important to note that the developments in Artificial Intelligence (AI) and big data analytics has led to the emergence of 'New Space' a disruptive dynamic based on using end-to-end efficiency concepts.
- ✦ A parallel is how the independent app developers, given access to the Android and Apple platforms, revolutionised smartphone usage.
- ✦ New Space entrepreneurship has emerged in India with about two dozen start-ups who are not enamoured of the traditional vendor/supplier model but see value in exploring end-to-end services in the Business-to-Business and Business-to-Consumer segments.
- ✦ However, these start-ups have yet to take off in the absence of regulatory clarity

Taking a look at 'New Space' start-ups:

- ✦ The New Space start-ups discern a synergy with government's flagship programmes like Digital India, Start-Up India, Skill India and schemes like Smart Cities Mission.
- ✦ They see a role as a data-app builder between the data seller (ISRO/Antrix) and the end user, taking advantage of the talent pool, innovation competence and technology know-how.
- ✦ They need an enabling ecosystem, a culture of accelerators, incubators, Venture Capitalists and mentors that exists in cities like Bengaluru which is where most New Space start-ups have mushroomed.
- ✦ Equally, clear rules and regulations are essential. ISRO can learn from its 1997 SatCom policy which neither attracted any FDI in the sector nor a single licensee.
- ✦ A similar situation exists with the Remote Sensing Data Policy of 2001, amended in 2011, which too has failed to attract a single application.
- ✦ The 2017 draft Bill raised more questions because it sought to retain the dominant role of ISRO/Antrix as operator, licensor, rule-maker and service provider.

Another Revolution in the Pipeline:

- ✦ Another revolution under way is the small satellite revolution.
- ✦ Globally, 17,000 small satellites are expected to be launched between now and 2030.

- ✚ ISRO is developing a small satellite launch vehicle (SSLV) expected to be ready in 2019.
- ✚ It is a prime candidate, along with the proven PSLV, to be farmed out to the private sector.
- ✚ This requires giving it responsibility for Assembly, Integration and Testing (AIT) activities.

Conclusion:

- ✚ ISRO launched the idea of Village Resource Centres to work in collaboration with local panchayats and NGOs but only 460 pilots have begun.
- ✚ Expanding this for rural areas is a formidable challenge but has the potential to transform rural India if properly conceived as a part of the India Stack and the Jan Dhan Yojana.
- ✚ With the Ministry of Defence now setting up a Defence Space Agency and a Defence Space Research Organisation, ISRO should actively embrace an exclusively civilian identity.
- ✚ A new Space law for India should aim at facilitating the growth of India's share of global space economy to 10% within a decade.
- ✚ This requires a new kind of partnership between ISRO, the established private sector and the New Space entrepreneurs.

