



## ASSESSING INDIAN SPACE LAW IN INTERNATIONAL CONTEXT

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### Introduction

India's relationship with space dates back to the Vedic age. Ancient Indian's interest in astronomy was an extension of their religious beliefs. In modern times, Indian's tryst with space began in the early 1960s when the first rocket was launched under the guidance of Dr Vikram Sarabhai<sup>1</sup>. Since then, the country's advancement in the space sector has put it on the path towards becoming a space superpower.

ISRO is the crown jewel of India's space program, its success stories revolve around its ability to develop its own satellites, launching systems and ground control technology to put Indian and foreign satellites into space on a commercial basis. Moreover, the Indian Space Research Organisation does it at a fraction of the cost of its competitors, making it a perfect fit for a developing country like India. Owing to the success stories of the ISRO, one might assume that India would soon surpass other nations in the bid for space supremacy, however, this is far from the truth. India still seems to be a step behind its competitors. The reason for this predicament is the lack of a legislative framework for the space sector in the country. Today, all major nations have developed comprehensive domestic space

laws. Such legislations provide greater clarity to the relationship between the private sector and the public sector, govern the launch and operation of spacecrafts, regulate the design and manufacturing of space technology and govern space exploration and research. Such nations are able to successfully commercialise their resources and are able to safeguard themselves from the loopholes in international space law.

This article will highlight briefly recent developments in India's space program, assess the role of the private entities in the space sector, illustrate the fields of the Space sector, summarise the international legal framework governing space before exploring the existing legislations relating to space activities in India.

### Development of space sector in India

Ancient Indians' interest in astronomy was an extension of their religious and social beliefs. There is extensive information related to astronomy in the Vedic texts, Jain literature and the Siddhantas. In India, the study of space as a science was pursued in the form of astrology and astronomy as early as 3000 BC<sup>2</sup>. Principles like gravity and the shape of earth were propounded by Ancient Indian Scientists long before the western world.

In the modern times, India's tryst with space began in 1960s. Dr. Vikram Sarabhai, the Founding Director of Physical Research Laboratory, presented a paper to the government outlining the need to harness the

<sup>1</sup> Mehmood Pracha, *Indian space law and policy a private sector perspective*, Workshop on Capacity Building in Space Law, 2002.

<sup>2</sup>*Id.* at 1.



country's space technology to address India's developmental challenges. Subsequently, the central government started investing in Space science and technologies. By the end of the decade the Thumba Equatorial Rocket Launching Station was set up and a US-supplied rocket, carrying a French payload was successfully launched into orbit. Later, in 1969 the Indian Space Research Organisation (ISRO) was set up.<sup>3</sup>

It is interesting to note that the space sector administrative model is similar to that used for atomic energy. However, unlike the atomic energy sector, the space sector does not have an established legislative framework. In the absence of a specific law the ISRO has been guided by a set of Mission and Vision statements<sup>4</sup> that declare the use of space technology for societal and national development needs and not for strategic or security objectives. This however has changed in the recent years as space activities have expanded to include defence applications under the purview of the Ministry of Defence and a new range of civilian commercial applications driven by startups in various areas.<sup>5</sup>

India's space programme has grown exponentially. Its achievements include the design and development of a series of launch vehicles, satellites and related technologies for earth observation, telecommunication and broadband, navigation, meteorology and space science; applications for societal

development; R & D in space sciences; and most recently, planetary exploration.

ISRO, in February 2017 launched 104 satellites from single payload on a commercial basis. It also launched a lunar orbiter in 2008, successfully carried out an Anti Satellite weapon's test and plans to launch the first state-of-the-art agile Earth observation satellite later this year. Most notably, ISRO put an orbiter around Mars on its very first attempt.

#### Use of Indian space sector for national developmental needs

ISRO's Mission and Vision statements cover both the societal objectives of the country's space programme and the thrust areas that have evolved periodically over time. ISRO's first major project, the Satellite Instructional Television Experiment (SITE), was undertaken in 1975-76 by leasing an US satellite for one year and using it for educational outreach to 2,400 villages covering five million people<sup>6</sup>. This experiment demonstrated the potential of satellite technology as an effective mass communication tool.

The SITE experiment paved the way for effective satellite communication in the country. The Indian National Satellite system and the GSAT serves as the backbone for the country's communication, broadcasting and broadband infrastructure. Today, 200

<sup>3</sup>*Id.* at 1.

<sup>4</sup>*Vision and Mission Statements*, Department of Space, ISRO, Government of India.

<sup>5</sup>Rakesh Sood, *An Indian space law: Long overdue*, ORF ONLINE

[https://www.orfonline.org/research/indian-space-law-long-overdue-54867/#\\_edn1](https://www.orfonline.org/research/indian-space-law-long-overdue-54867/#_edn1) ( March,31, 2020, 10:04 AM ).

<sup>6</sup>*Communication Satellites*, Department of Space, ISRO, Government of India.



transponders on Indian satellites provide services in the fields of telecommunication, tele-medicine, tele-education, TV, broadband, radio, disaster management, and search & rescue missions<sup>7</sup>.

A second area of focus of the ISRO is Earth observation and using space-based imagery for various areas, ranging from weather forecasting, disaster management, and national resource mapping and planning. It provides wide-field and multispectral high-resolution visual data for land, ocean and atmospheric observations. These resources have expanded the scope of application of Geospatial Information Systems (GIS)<sup>8</sup>.

A more recent area of focus of the ISRO is satellite-aided navigation. GAGAN is a joint project between ISRO and the Airports Authority of India. GPS Aided Geo Augmented Navigation or GAGAN augments the GPS coverage of the region, improving the accuracy and integrity, mainly for civil aviation applications and better air traffic management over Indian airspace<sup>9</sup>. ISRO has also started to undertake more ambitious exploration projects, most notable of which have been the Chandrayaan and the Mangalyaan mission. A manned space mission named Gaganyaan is also planned for its first test flight in 2021. These missions are not only technology demonstration missions but also meant to expand the frontiers of human knowledge in atmospheric and space sciences.

Much of these missions are dependent on mastering launch vehicle technology. ISRO has developed and refined the Polar SLV as its workhorse for placing satellites in low earth orbits. With the growth of the small satellite sector globally, PSLV is a preferred launch vehicle on account of its competitive cost and reliability.

As a responsible nuclear powered state India's interest in using its space capabilities for defence and security has been growing. While some of the earlier remote sensing satellites acquired high-resolution imagery for defence forces, there was growing interest in having dedicated defence satellites for secure communications as well as other potential military applications.

As defence services have begun to call for increased space-based assets to assist in surveillance, communications, navigation and intelligence, the natural corollary is ensuring protection and resilience of these space-based assets, especially in the context of escalating tensions. Some nations are also actively pursuing counter-space capabilities such as ASAT i.e. anti satellite missiles and have created an integrated High command for space which could deceive, disrupt or degrade an adversary's space capabilities. India has also successfully carried out a kinetic kill ASAT test and set up of a tri-service Defence Space Agency to assess space-based threats and make strategies for

<sup>7</sup>Id at 5.

<sup>8</sup>Earth Observation Satellites, Department of Space, ISRO, Government of India.

<sup>9</sup>Satellite Navigation, Department of Space, ISRO, Government of India.



protecting Indian interests and assets in space<sup>10</sup>.

### Privatisation of Space sector

The private sector race into space has been going on for quite some time now, with Elon Musk's Space X pioneering reusable launch technology, Richard Branson's vision of putting civilians and tourists into space and even Bangalore based Team Indus recently taking up the Google challenge of putting a rover on the moon<sup>11</sup>.

As technology increasingly enables and empowers private companies to provide space related services on a commercial basis, more and more private entities are getting in the sector. While it is telecommunications and geo-mapping services today, tomorrow, it could be far more exotic activities, that were once the exclusive domain of science fiction.

Today, the space industry is valued at US\$350 billion and with a annual growth rate of 5.6 percent, it is expected to surpass the US\$500 billion mark by 2025. Despite ISRO's impressive technical capabilities and recent success, India's share is estimated at US\$7 billion, merely two percent of the global market<sup>12</sup>.

India's space market has been largely been regulated, scrutinised and funded by the government of india and is under the direct control of the Prime Minister's Office. This extreme control of India's space market has

been detrimental to its growth. Even through the ISRO has made huge strides in space technology, India still lags behind its competitors due to the lack of involvement of private entities in the space sector. Countries like U.S., Russia, China and France have successfully privatised their space market and integrated public and private entities thereby yielding exponential returns. This is due to a strong legal framework regarding the space activities in these countries. For example The U.S. Commercial Space Launch Competitiveness Act of 2015 allows the citizens of the USA to "engage in the commercial exploration and exploitation of space resources". This law, among others, have enabled the likes of Elon Musk's Space X and Jeff Bezos' Blue Origin to take the driving seat in space technology. On the other hand, Indian Indian space market is still in a transition phases from being a controlled sector to an open sector.

The development of Antrix Corporation, the commercial arm of ISRO and the launching of 104 foreign satellites on a commercial basis gives evidence that the country is moving in the right direction. India is ushering in an era of privatization and commercialization of space activities. It is trying to monologise on its impressive capabilities to build satellites and offer launch services from indigenously designed and tested workhorse of ISRO, the Polar Satellite Launching Vehicle.

ISRO/Antrix through its GAGAN programme is trying to get into the navigation

<sup>10</sup>Kai Schultz, *NASA Says Debris From India's Anti satellite Test Puts Space Station at Risk*, NY TIMES, April 04, 2019 at 12.

<sup>11</sup>Akshar nath, *Space Law in India*, LEGAL SERVICES INDIA ( Mar, 30, 2020) ,

<http://www.legalservicesindia.com/law/article/9/4/Space-Laws-in-India>.

<sup>12</sup>*Id.* at 5.



market dominated by Google Maps, through India is still a relative beginner in this field it has great potential to expand. However, with HD services and 5G on the rise, ISRO/Antrix will have to depend on leasing foreign transponders, until India's private sector comes in. Moreover, recent developments in artificial intelligence and big data analytics has led to the emergence of vast new range of space sector activities driving the space sector to a more business and services-oriented approach using end-to-end efficiency concepts. Various new space entrepreneurship have emerged in India with almost two dozen startups in areas such as crop insurance, infrastructure monitoring, watershed development, flood monitoring and forecasting, forest fires and asset mapping. However they're yet to take off due to unclear regulations and the outdated vendor-supplier model<sup>13</sup>.

A suitable policy environment is required to manage these activities and ensure the overall growth of the space sector. The draft Space Activities Bill introduced in 2017 has lapsed, giving the legislature the opportunity to focus on a new bill that will be welcomed by the private sector, both the larger players and startups alike. Recently India has taken baby steps towards better domestic laws and opening up the space sector to private entities. In 2018 ISRO under its technology transfer policy, outsourced satellite manufacturing to a private sector enterprise for the first time. This was done to promote the 'Make in India' campaign, ISRO has also

signed a contract with an Indian start-up to launch a spacecraft to the moon<sup>14</sup>.

### International Space Law

The international system has a plethora of space laws regulating transactions and disputed between nations relating to the space sector. The principle of using space in good faith for peaceful purposes forms the bedrock of the international legal regime. The existing international legal framework is a broad statement of principle and it does not address particular nuanced legal questions related to specific activities.

Following the launch of the first satellite, Sputnik, into orbit in 1957, the United Nations established its Committee on the Peaceful Uses of Outer Space (COPUOUS) and created two different sub-committees: a scientific and technical committee; and a legal committee. The UN Office of Outer Space Affairs essentially serves as a secretariat for the COPUOUS and maintains the register of objects launched into space, amongst other things. COPUOUS has been instrumental in formulating five international treaties regarding space, namely The Outer Space Treaty (1967), Rescue Agreement (1968), Liability Convention (1972), Registration Convention (1974) and Moon Agreement (1979).<sup>15</sup>

The Outer Space Treaty broadly, forms the basis of international space law, with 109 ratifications and 23 signatories. It prevents states from putting weapons of mass destruction into space or installing them on

<sup>13</sup>Surendra Kumar Yadav, *International Space Law Applicability in Indian Perspective*, 6 International Journal of Science and Research, 14 (2013).

<sup>14</sup>India's Space Policy, Department of Space, ISRO, Government of India.

<sup>15</sup> *Id.* at 1.



any celestial body, it however does not prevent the putting of conventional weapons into space like Anti Satellite Weapons systems. It limits use of the moon for peaceful purposes. It also prevents states from making territorial claims on the moon and other such celestial bodies and maintains that space shall be free for the use and exploration by all nations. The Outer Space Treaty makes a launching state internationally liable for damage to another State Party, its own natural or juridical person on earth, air and outer space, if its space object or component or debris causes damage.

The Rescue Agreement, 1968 as provided in the article V of the Outer Space Treaty requires signatory states to provide all possible assistance to recover space objects and astronauts that may come down within its territory, at the cost of the state that launched it.

The Liability Convention, 1972 makes the launching state liable to pay compensation for damages caused by its space components and debris on the surface of Earth or to aircraft. It makes the state liable for damage due to its faults in space. Where two or more states work together, they are jointly and severally liable.

The Registration Convention, 1974 requires the nations to provide information about the orbit of each object it puts into space, in addition to the general function of the space object. The states launching objects and astronauts in space are also required to maintain a register and documentation of the launches.

The Moon Agreement, 1979 reaffirms that the celestial bodies should be used exclusively for peaceful purposes and that

their environment should not be disturbed. It states that moon and other celestial body are the common heritage of mankind and no country should try to assert claim on it.

It is to be well noted that India is a signatory of the Outer Space Treaty which forms the main corpus of international law on outer space, in accordance with the article 51 of the constitution of India.

India has also been actively participating and extending support to a variety of International forums such as United Nations Committee on Peaceful Uses of Outer Space, International Council of Scientific Unions, and International Astronautical Federation etc. in shaping global space and law policy. Even though India is a member to all these treaties it still has no comprehensive legislation on space related matters. India's space sector has been under the control of the government which did not necessitate the need for a comprehensive space laws in India. But, as India takes a leap towards privatisation it becomes imperative for India to have a dedicated space law.

### **India falling victim to loopholes in International Space law**

The lack of domestic space laws in the country has resulted in India being a victim of loopholes in international treaties. In 2017, the nation found itself in the midst of an International dispute with Japan regarding the fall of space debris from an ISRO satellite



retracing back to earth on a Japanese fishing village<sup>16</sup>.

With India being a signatory to the Convention on International Liability for Damage Caused by Space Objects (1972), India is absolutely liable and obligated to compensate for damage caused by its space objects on the surface of Earth or to aircraft and liable for damage due to its faults in space. Therefore, Japan demanded that India pay for the destruction caused by its space junk. However, with no national space law and policy to ensure protection of its specific interest or to limit liability in cases of damage, India could not calculate the quantum of damages owed or protect its interest, allowing Japan to exploit this loophole to extract funds from India that exceeded the actual amount of damage resulting in huge financial loss to the country. Had there been a holistic legislation in place, the said loss could have been prevented entirely. The non-existence of national laws does not absolve liability under this convention. States ideally should have national laws to ensure that their specific interests are protected while entering into a contract with any other international entity in areas which involve collaborative space R&D and also to limit liability in case of damage.

The development of such law becomes important for India, now more than ever as the country recently successfully conducting an Anti Satellite Weapons test leading to 400 new pieces of space debris in the lower orbit

of the earth<sup>17</sup>. Moreover, the rockets berating on the launch pad damaging payloads from multiple counties and debris from commercial launching to foreign satellites also makes India accountable to any accidents that happen. Therefore, India has to make a space law governing the issue to space debris if it wants to prevent the sequel of the 2017 incident.

### Existing space laws in India

India is emerging as a serious player in the international commercial space market.

The country is developing at a great pace in the space sector. India needs a comprehensive space legislation to keep pace with its growing needs, the failure of which shall lead to financial losses as well as brain drain to the country. Due to the growing demand of the space sector, important issues such as of control, safety, authorisation, agreements and dispute resolution mechanisms for space related activities needs to be addressed. Laws governing contract, transfer of property, stamp duty, registration, licensing and intellectual property also need to be revised to bring space related issues into the purview of domestic laws.

The regulatory framework for space activities in India is defined by a combination of policies, procedures and guidelines of the Government. The salient ones include: a policy framework for satellite communications in India (SATCOM)<sup>18</sup>; Remote Sensing Data Policy, 2011<sup>19</sup>; and the technology transfer policy of ISRO. Owing to

<sup>16</sup>David Dickson, *What India's Anti Satellite Test means for Space Debris*, SKY AND TELESCOPE (Mar, 15, 2020, 4:00PM), <https://skyandtelescope.org/astronomy-news/what-indias-anti-satellite-test-means-for-space-debris/>.

<sup>17</sup>*Id.* at 11.

<sup>18</sup>*Id.* at 16.

<sup>19</sup>*Id.* at 16.



these developments, currently, provisions for participation of private satellite systems are permitted but there is no legal lacuna to protect the operator and the government when liability arises in the case of damage. Moreover, India has a comprehensive remote sensing national policy but there is no national law.

The Remote Sensing Data Policy, 2001 had provisions relating to acquisition, distribution and National security. It was revised in 2011 and restrictions on supply of satellite data up to 1m resolution were lifted. The 2011 policy also established National Remote Sensing Centre as the central authority to acquire and disseminate satellite remote sensing data in India for development purposes. This process however is highly regulated by the central government which has the right to impose control when issues of national security and/or international obligations and/or foreign policies arise. This policy has failed to evolve and thus has limited effectiveness. As technology develops, the need and demand increases for higher resolution data and therefore there is need for a comprehensive space policy which can coordinate national and foreign satellite data.

Another major policy of the of the Indian Space Research Organisation is the technology transfer policy<sup>20</sup> which is aimed at increasing the participation and investment from private parties in the space sector by outsourcing the manufacturing of satellite components, space radars, rocket engines and other components to local as well as foreign

companies. This policy is a welcome step in the right direction but it is not sufficient in its own.

The current legal lacuna related to space would run fine as of now, but there is a need to enact a specific law. The current practice followed need to be re-examined particularly with respect to Article 51 of the Constitution. The national space law be balanced according to the industry and should be able to deal with the present and future developments in the field. It should address legal issues connected to launch services, satellite telecommunications, data processing and distribution, satellite navigational systems and intellectual property rights (IPR) regime and transfer of technology. It should also provide rules regarding funding, safety, insurance, licensing, Liability, Responsibility, Dispute resolution, Protection of environment and International cooperation. A comprehensive national policy shall allow ISRO to focus its entire manpower on R&D thereby opening better avenues for the country in outer space.

In 2017, the government tried to form such a comprehensive national policy. The draft Space Activities bill<sup>21</sup> was presented and discussed in Parliament. It was said to promote, support, and regulate space activities in India by allowing private and non-governmental agencies to involve themselves in space sector under the guidance of the Department of Space of the government of India. Prima facie the bill was quite general and encompassing, similar to most of the initial regulatory attempts to get

<sup>20</sup>*Id.* at 16.

<sup>21</sup> Adarsh Pandit, *Draft Space Activities Bill*, PSR INDIA ( Mar, 29, 2020, 11:20 PM

[http://www.prsindia.org/sites/default/files/bill\\_files/Draft%20Space%20Activities%20Bill%202017.pdf](http://www.prsindia.org/sites/default/files/bill_files/Draft%20Space%20Activities%20Bill%202017.pdf).



to grips with technological advancements and the changes they brings in the society. The Bill takes the off-the-shelf model law solution prepared by the International Law Association, with local customisation in the Indian context. It has a limited scope to police acquisition, publication and distribution of geospatial information of India to a certain extent, though it acknowledges that the private sector will play a crucial role in the future use of space to develop and enhance human communications and other scientific endeavours, it still provides a great deal of discretion to the state to control access to space..The draft Space Activities Bill introduced in 2017 has lapsed, giving government the opportunity to focus on a new bill that will be welcomed by the private sector, both the larger players and startups alike.

### Conclusion

India's space technology is well developed and has shown incredible promise. However, Indian space sector needs to orient itself for a quantum jump in technological growth, adopt organisational models and collaborative strategies if India aims to achieve 10 percent of the global space economy by 2030. India must play an important role in creating a working conducive legal environment in the field of space, for balancing both public and private interests and for responding to evolving international environment.

ISRO is best placed to concentrate on this challenge. It must shed some of its activities and focus on what it can do best with its limited budgets. It may need to cut the umbilical link with Antrix to avoid conflicts of interest while letting MoD look after the

military dimensions of space technologies. Moreover, ISRO should harness the potential of the vibrant startup culture is emerging in India by using the incubator approach used by both the US space agency NASA and the European Space Agency. ISRO needs to continue developing Tier-1 vendors and original equipment manufacturers. The commercialisation of the tried and tested PSLV launch technology and the newly made small satellite launch vehicle (SSLV) to send Indian and foreign satellites into low earth orbital are welcome steps in the right direction.

A suitable policy environment is required to manage these activities and ensure the overall growth of the space sector. Special care needs to taken to ensure that the government doesn't overly regulate the sector and adequate consideration is given to issues like intellectual property rights. The new space regimen should be permission enough so as to improve foreign direct investment which would help make India a hub for the international space activity. The lapse of the Space Activities Bill 2017 has given the government the opportunity to focus on a new bill that will address the above mentioned issues.

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