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# **REGULATING PRIVATE SPACE VENTURES: ANALYZING INDIA’S LEGAL FRAMEWORK FOR COMMERCIAL SPACE LAUNCHES AND OPERATIONS**

- Ahaana Chowdhry<sup>1</sup>

## **ABSTRACT**

In the dawn of space exploration, what seemed a vast cosmos appeared to be the sole domain of government giants, moved by Cold War rivalries and the thirst for national prestige. The United States and the Soviet Union were locked in a high-stakes race to conquer the final frontier. At the same time, private companies stood on the side lines, perceived as lacking the financial muscle and technological prowess to compete. But with dramatic turns in the last couple of decades, the space industry has moved to another new frontier in its revolution. The entry of private entities into the scene, leading in terms of exploration and commercializing space, is suddenly here. It is a paradigm shift in how we do things regarding the universe, driven by innovation, ambition, and that ever-tingling promise of the stars.

The emergence of private space ventures in India signifies a ground-breaking change in the country's attitude towards space exploration and technological progress. The Indian Space Research Organisation (ISRO) is no longer the only player in the field, as private enterprises are now taking on leadership roles and driving a dynamic transformation in the industry. This transformation has been driven by well-planned government initiatives, particularly the establishment of the “Indian National Space Promotion and Authorisation Centre (IN-SPACe)”, which has paved the way for private innovation and investment, leading to a surge in growth and technological advancements.

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<sup>1</sup> 3rd year student, BBA LLB, Indian Institute of Management (IIM), Rohtak.

Private space companies in India are making a significant impact on the global stage, attracting attention for their advanced technologies and innovative services that are setting new global standards.

With the involvement of private players in satellite development, launch services, and ambitious space exploration projects, India's space infrastructure is being utilised to push the nation to the forefront of the global space race. Nevertheless, this exciting change comes with its fair share of difficulties. The industry requires a strong regulatory framework, increased access to capital, and the development of necessary infrastructure to support its rapid expansion which will further be discussed through this comprehensive study.

## **INDIA'S CURRENT LEGAL FRAMEWORK**

### **SATELLITE COMMUNICATIONS POLICY**

India's satellite communications policy is an exciting combination of aspirations and new ideas that show how strong the country is becoming in the global space field. This strategy is all about using the huge potential of satellite technology to link the whole country, boost the economy, and give millions of people more power.

India is an extensive and varied country. Satellites are what make it possible for people in remote towns to connect to the internet, for people in remote areas to get medical care through telemedicine, and for disaster management teams to get things done quickly. There is no doubt that satellite technology has the power to change things, and the Indian administration is determined to make the most of this potential<sup>2</sup>.

The policy aims to open up the market and encourage participation from the business sector. It also allows government titans like ISRO to work together. India's satellite structures will be changed forever by this relationship. It will encourage new ideas and make sure that satellite bandwidth is used effectively to meet the growing demand for information services.

India's strategy on satellite communications puts the country at the forefront of technology as the digital world grows and connectivity becomes the backbone of the modern economy<sup>3</sup>. By pushing

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<sup>2</sup> Giancarlo Genta, *Private space exploration: A new way for starting a spacefaring society?* Acta Astronautica 1, 4-5 (2014).

<sup>3</sup> INSIGHTS ON INDIA, <https://www.insightsonindia.com/wp-content/uploads/2022/06/Private-Sector-in-Indias-Space-Sector.pdf> last visited Sep. 22, 2024).

for the creation of advanced, high-capacity satellite systems, India is not only following the rules around the world, it's also making them.

India's approach to satellite communications isn't just to continue to grow; it's to pave the way in a world that is changing quickly.

## **REMOTE SENSING DATA POLICY**

An example of India's progressive attitude towards using space for national development and its increasing competence in satellite navigation is the country's Remote Sensing Data Policy. The technology of remote sensing, which collects information from satellites far above the surface of the planet, has just emerged as a revolutionary tool for many industries, including agriculture and city planning, and India is leading the charge.

The strategy embodies a long-term goal of making data from satellites available to commercial companies, academics, and authorities so that everyone can benefit from it<sup>4</sup>. In doing so, India is preparing the way for a technological revolution in which environmental protection, intelligent farming, and disaster mitigation are all powered by imagery from satellites.

The focus on democratising data is a prominent aspect of India's strategy. In the past, only government entities could access and use satellite photos and data for their own purposes. However, the government is now allowing more people access to the wealth of remote sensing data thanks to the new regulation. This opens the door for educational institutions, digital start-ups, and other businesses to access high-quality satellite data, which might lead to innovative solutions to some of the nation's most serious problems<sup>5</sup>.

Along with an evolution in regulations, this move shows that India is prepared to take the lead in international geopolitics. From tracking the health of crops to preparing for future urbanisation, the capacity to analyse and understand massive volumes of data from space provides unparalleled perspectives. Freedom of access and engagement from the private sector are helping India build an environment where possibilities are endless.

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<sup>4</sup> SARIN LAW, <https://sarinlaw.com/wp-content/uploads/2020/10/Remote-Sensing-Data-Policy.pdf> (last visited Sep. 22, 2024).

<sup>5</sup> Malay Adhikari, Remote Sensing: An Analysis of Policy and Law with Reference to India, INDIA GEOSPATIAL FORUM (Sep. 22, 2024, 11:57 AM), <http://indiageospatialforum.org/2012/proceedings/ppt/Malay%20Adhikari.pdf>.

Data is more available, yet it is still secure and utilised properly thanks to the policy's explicit standards for sharing and using data. To achieve its goals of economic progress and national security through the use of mapping, India must strike this delicate balance between availability and stability<sup>6</sup>.

## SPACE ACTIVITIES BILL

An ambitious move towards improving and standardising India's strategy for space, the Space Activities Bill is poised to revolutionise India's space economy. The purpose of this bill, which is now in the legislative process, is to establish clear rules for all space operations in India, whether they are carried out by the state or independent businesses.

The main goal of the Space Activities Bill is to promote creativity while guaranteeing the safe and sustainable execution of space operations. To ensure that missions to explore the universe and satellite deployments comply with international treaties and serve India's national interests, it seeks to control all of these things. Excitingly, the Bill encourages private sector involvement, which is a big change from the conventional government-dominated approach to space.

The goal of the legislation is to encourage private ventures and creative thinking in the field of space exploration so that India can take the lead in the international space race<sup>7</sup>. Building a thriving space environment is more important than merely launching rockets; it will allow both new and existing businesses to flourish, make contributions to innovative technology, and increase India's presence in space.

On the other hand, the bill guarantees that space activities do not endanger national security or world peace and imposes stringent licensing prerequisites. Fostering development while guaranteeing that all participants maintain rigorous levels of accountability and protection is an intricate dance<sup>8</sup>.

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<sup>6</sup> NALSAR PRO, [https://nalsarpro.org/Portals/23/Day%20%20session%204-%20Mr\\_%20K\\_R\\_%20Sridhara%20Remote%20sensing%20&%20GIS%20LAWS%20%5BAutosaved%5D.pdf](https://nalsarpro.org/Portals/23/Day%20%20session%204-%20Mr_%20K_R_%20Sridhara%20Remote%20sensing%20&%20GIS%20LAWS%20%5BAutosaved%5D.pdf) (last visited Sep. 22, 2024).

<sup>7</sup> Meera Arora, *Indian Space Policy for the Private Sector*, CSIS 1, 5-6 (2021).

<sup>8</sup> Rima Hore, *A CRITIQUE OF THE DRAFT SPACE ACTIVITIES BILL*, 2017, CMR (Sep. 22, 2024, 1:48 PM), <https://www.cmr.edu.in/school-of-legal-studies/journal/wp-content/uploads/2021/03/Article-5-1.pdf>.

The Space Activities Bill is expected to play a pivotal role in India's upcoming space program, opening the door to increased investment, technological advancement, and research in the country's space industry.

## **ISRO INVOLVEMENT**

With its world-shocking inexpensive space expeditions and ground-breaking accomplishments, the Indian Space Research Organisation (ISRO) has recently risen to fame. However, now ISRO is doing something even more thrilling—powering private businesses to unprecedented heights and igniting an uproar in the nation's space sector. ISRO, which was once the only space agency in the country, is now actively supporting a thriving entrepreneurship and privately owned ecosystem. A new era of creative thinking and entrepreneurial endeavour is being propelled by ISRO through the inauguration of its state-of-the-art facilities, the passing on of millennia of knowledge, and the implementation of revolutionary programs such as the Space Entrepreneurship and Enterprise Development (SEED) program.

By partnering with companies like Ananth Technologies on satellite manufacturing and facilitating the development of launch vehicles by entrepreneurs like Skyroot Aerospace as well as Agnikul Cosmos, ISRO is bringing space technology within reach of more people and making lofty ambitions a reality. Space is becoming more readily available as a result of these partnerships, which are also inspiring a new wave of innovative ideas in fields such as data mining, satellite communication applications, and more<sup>9</sup>. The ever-changing connections between commercial enterprises and ISRO are generating a win-win situation. Commercial companies gain access to expertise and worldwide platforms, while ISRO can focus on high-end research and important missions. India is planning more regular launches, better satellite capabilities, and even manned missions, so the realm of possibility is limited.

## **OUTER SPACE TREATY (INDIA)**

Many consider the 1967 Outer Space Treaty, which laid the groundwork for cooperation and benign utilisation of space, to be the "Magna Carta" of space travel. The Outer Space Treaty has opened doors to amazing potential for the nation and served as a roadmap for the country. By directing the “Indian Space Research Organisation (ISRO)” towards peaceful and scientific

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<sup>9</sup> PWC, <https://www.pwc.in/assets/pdfs/research-insights/2020/preparing-to-scale-new-heights.pdf> (last visited Sep. 22, 2024).

endeavours, it has moulded India's space endeavours by guaranteeing that all operations will serve the advantage of mankind. India has been able to launch several historic missions because of its conformity with worldwide norms. These include the daring Mars Orbiter Mission (Mangalyaan) and the highly anticipated Chandrayaan lunar excursions<sup>10</sup>. India has established a track record for space stewardship and ingenuity through its adherence to the treaty's structure which has resulted in partnerships and collaborations with space agencies globally.

Not only that, but the pact also clarifies the intricacies of space legislation, which would assist India's expanding private space sector to compete successfully on a global scale. As private enterprises join ISRO in their mission to discover the ultimate frontier, the Outer Space Treaty serves as an ideal springboard for the country's space aspirations, guaranteeing a future where space exploration is readily available, open, and secure for everyone.

## **CHALLENGES IN REGULATING PRIVATE SPACE VENTURES**

### **LICENSING CHALLENGES**

The absence of Thorough Domestic Regulation: India is devoid of a distinct, coherent legal structure that would simplify the authorisation of private space pursuits. “The Space Activities Bill”, which is currently in draft form, contains numerous ambiguities, including the specific requirements for licensing and legal regulations.

International Treaty responsibilities: India is subject to stringent standards that mandate the state to be held accountable for space-related activities undertaken by its private companies, as a subscriber to the “Outer Space Treaty (OST)” as well as other global treaties. The licensing process is further complicated by the necessity of meticulous regulation and supervision to guarantee that private businesses comply with these global standards. For instance, the OST mandates that a state be accountable for losses caused by objects from space, which has resulted in India being cautious when granting licenses to private entities.

Bureaucratic Obstacles and Official Monopoly: “The Indian Space Research Organisation (ISRO)” has long enjoyed an almost complete grip on space activities, and adjusting to an approach

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<sup>10</sup> IDSA, [https://idsa.in/system/files/book/book\\_50years-outer-space-treaty-tracing\\_avlele.pdf](https://idsa.in/system/files/book/book_50years-outer-space-treaty-tracing_avlele.pdf) (last visited Sep. 22, 2024).

that supports private actors is a gradual process. “The Indian National Space Promotion and Authorisation Centre (IN-SPACe)” is a positive development; however, there are apprehensions regarding the speed at which permits can be executed<sup>11</sup>. The private sector's involvement is further impeded by bureaucratic failures, including protracted authorisation procedures, risk evaluations, and operational authorisation.

**Overlap of Legislative Organs:** The Department of Space's (DoS) role in laws and regulations, in conjunction with the dual supervision of ISRO and IN-SPACe, can result in misunderstanding for businesses pursuing licensing. The procedure for obtaining licenses is challenging to navigate due to the overlap of jurisdiction among multiple government agencies<sup>12</sup>.

**Commercial Survival and Risk Distribution:** Companies are significantly burdened by the substantial hazards associated with space activities, including possible mishaps, satellite destruction, and crashes, from a business standpoint. The business viability of private space operations may be impacted by the fact that the licensing structure has not yet completely addressed mechanisms for risk-sharing among government agencies and the private sector.

## **LIABILITY CHALLENGES**

Liability issues are predominantly a result of the "Outer Space Treaty (OST) of 1967" and the "Liability Convention of 1972" in the realm of commercial space endeavours. These treaties establish global liability for destruction brought about by objects in space among states. This raises substantial safety issues for private entities.

**State Obligation:** The state is fully responsible under international legislation, regardless of how a private company generates destruction. This changes the regulatory landscape for countries such as India, in which private space projects are gaining traction. The Indian government needs to strike a delicate equilibrium between promoting development and assuring adherence to global conventions.

**International repairs:** The Liability Convention differentiates between destruction that occurs on Earth as well as in space. Damage to vehicles in motion or on Earth is subject to complete responsibility, while destruction in space is subject to fault-based culpability. This presents a dual

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<sup>11</sup> Vijay Narayan Shukla, Arijita Sinha Roy, *COMPREHENDING LEGAL ASPECTS OF OUTER SPACE*, 3 CENJOWS 239, 242 (2024).

<sup>12</sup> PWC, <https://www.pwc.in/assets/pdfs/research-insights/2020/preparing-to-scale-new-heights.pdf> (last visited Sep. 22, 2024).



challenge for private space business owners: they must guarantee the safety of what they do and have the ability to withstand possible international disputes in the event that their belongings cause damage<sup>13</sup>.

**Monetary and Insurance Cracks:** Private companies may encounter difficulty in securing sufficient insurance coverage to address the possible exorbitant risks linked to space activities. In order to facilitate private sector expansion and mitigate danger, Indian regulations must resolve these financial deficiencies.

**Administrative supervision:** The regulatory system in India is currently inadequate. The "Space Activities Bill", which has not yet been implemented, seeks to lay out the government's responsibility by proposing a system of permits for private organisations. Nevertheless, the absence of a finalised structure impedes development and creates ambiguity for the private sector. To guarantee that the goals of both the state and business owners remain equitable, the measure must include comprehensive recommendations for liability distribution, insurance specifications, and risk prevention.

## **IPR PROTECTION**

The multinational dimension of space endeavours presents special obstacles to the preservation of "Intellectual Property Rights (IPR)" in the field of space law. There is uncertainty when deciding which nation's regulations govern when a new technology or idea is produced or implemented in outer space, as space is outside the purview of one particular nation.

Primary Obstacles:

1. **Ambiguity Regarding Legislation:** It is ambiguous which nation's intellectual property rights (IPR) laws regulate actions, as missions in space encompass several states.
2. **Technology exchange:** In space endeavours, confidential information is frequently exchanged among private actors and authorities across frontiers. This raises the possibility of an unauthorised exchange of technology, as a commercial entity's discovery in space may not be afforded an equal level of protection by a patent as it would be on Earth. The

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<sup>13</sup> Roman Zykov, *LIABILITY FOR DAMAGE CAUSED BY SPACE OBJECTS*, MANSORS (Sep. 22, 2024, 4:36 PM), <https://mansors.com/blog/liability-for-damage-caused-by-space-objects>.

current worldwide structure presents a challenge in guaranteeing the safeguarding of such innovations across frontiers<sup>14</sup>.

3. Patent Compliance in Space: Although multiple nations have patent regulations, implementing those regulations for ideas produced in outer space is a difficult task. The geographic scope of patents is usually limited to the boundaries of the nations on Earth, and the "Outer Space Treaty (OST) of 1967" fails to specifically address IPR, resulting in a lack of legal framework in outer space.
4. International Partnership: The management of intellectual property rights across various legal administrations is a challenge due to the frequent partnerships between organisations in numerous nations that are involved in space endeavours<sup>15</sup>. Identifying the rightful owner of patents, technology, or data that is shared among stakeholders is a substantial challenge.

## SPACE DEBRIS MANAGEMENT ISSUES

The challenge of "space debris management" poses special difficulties for Intellectual Property Rights (IPR) in space law. It is imperative to guarantee adequate security of these innovations as private endeavours build novel debris removal strategies. The primary obstacles consist of:

1. International Partnership and Technology Distribution: The elimination of space debris frequently necessitates multinational partnerships, which may result in the movement of unauthorised technology across frontiers. This generates worries regarding the protection of proprietary gadgets and methodologies.
2. Jurisdictional Uncertainty: The enforcement of intellectual property rights (IPR) protections for advancements or inventions that are utilised in space is complicated by the fact that space is a universal resource. It is unclear which country's intellectual property rights (IPR) laws are applicable when an innovation is utilised or developed in space. The enforcement of intellectual property rights laws across frontiers is further complicated by the frequent involvement of international players in the clean-up of space debris<sup>16</sup>.
3. The absence of Legislative precedents: At present, space law, which encompasses conventions such as the "Outer Space Treaty (OST)" and "Liability Convention", fails to specifically address IPR protection for space-related operations, such as debris handling.

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<sup>14</sup> Ritesh Mehra, *INTELLECTUAL PROPERTY PROTECTION IN OUTER SPACE – AN OVERVIEW*, 2 ILI 144, 148-149 (2019).

<sup>15</sup> Ritesh Mehra, *INTELLECTUAL PROPERTY PROTECTION IN OUTER SPACE – AN OVERVIEW*, 2 ILI 144, 148-149 (2019).

<sup>16</sup> Ditipriya Dutta Chowdhury, *The Conundrum of Space Debris and Its Sustainable Remediation by Polluter Pays Principle*, 7 NUJS JRS 99, 102-105 (2019).

This results in private endeavours lacking distinct regulations to guarantee the protection of their creations.

4. Patenting Innovations for a Global Economy: In order to guarantee safeguarding, space debris management solutions must be patentable across several countries. Nevertheless, the multinational scope of space operations and the space ecosystem present challenges in the uniform execution of national laws governing patents.

## COMPARATIVE ANALYSIS WITH OTHER COUNTRIES

### USA

The United States is a universal forerunner in the governance and advancement of private space endeavours. The legal structure that promotes private organisations involved in commercial space operations is comprehensive and has been developed through a mixture of government laws, policies, and administrative bodies. The extensive character of U.S. space legislation is underscored by a contrast to India's growing legal system, especially in its ability to promote private industry participation while simultaneously safeguarding national objectives.

Legal Structure in the United States: The U.S. space industry is governed by a widely recognised legislative structure, which is predominantly influenced by the significant regulations:

1. "The Commercial Space Launch Act of 1984 (CSLA)": By establishing a licensing framework for commercial takes this act established the groundwork for private industry involvement in space operations. It granted the "Federal Aviation Administration (FAA)" legislative jurisdiction to ensure the safety of take-off and return activities, while simultaneously reducing the danger to public welfare and property. It also promotes commercial space launch endeavours by establishing explicit criteria for security, responsibility, and authorisation.
2. "The U.S. Commercial Space Launch Competitiveness Act (CSLCA) of 2015": By awarding rights of ownership over commodities obtained from cosmic objects such as asteroids, the CSLCA provided assistance to private businesses. This act promoted investing in space extraction and other commercial ventures, as well as creativity.<sup>17</sup> This act established a significant standard by verifying that private companies may own

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<sup>17</sup> John S. Goehring, *U.S. Commercial Space Regulation: The Rule of Three*, 13 JNSLP 337, 338-346 (2024).

commodities acquired in space, thereby strengthening the U.S.'s business-friendly policy towards space.

3. “Federal Communications Commission (FCC) and National Oceanic and Atmospheric Administration (NOAA)”: The FCC is responsible for the regulation of satellite connectivity and the assignment of orbital positions and bandwidth, whereas the NOAA is responsible for granting permits for remote sensing activities, including Earth monitoring satellites. These government agencies guarantee that private space endeavours adhere to sustainability and transmission norms, thereby facilitating private engagement and the management of national assets.
4. “National Aeronautics and Space Administration (NASA) Partnerships”: The Commercial Crew Program and Commercial Lunar Payload Services of NASA are examples of how public-private alliances are employed to encourage private enterprises. The profitable participation of private organisations in manned spaceflight and lunar research has been facilitated by arrangements with corporations such as Blue Origin and SpaceX<sup>18</sup>.

When compared to the laws and regulations of India:

1. Licensing and Regulation: At present, India does not have a complete licensing system that is comparable to the CSLA in the United States. Private space enterprises in India function despite the apparent regulation that exists in the U.S. up until the recommended Space Activities Bill (2017) is implemented. The 2023 Space Program of India is a positive expansion, as it promotes private involvement and collaborations with the “Indian Space Research Organisation (ISRO)”. However, it does not have the comprehensive licensing and accountability structure that is present in the United States.
2. Culpability and Insurance: In contrast to the United States, where the liability limit is clearly stated, India's liability regime is less precise. The Indian government undertakes major accountability for its public space initiatives; however, private space initiatives lack similar protection from the law according to a national liability framework.
3. Property Rights: The legislative structure of India does not contain any formal regulations involving private possession of space materials, which is in stark contradiction to the U.S.'s standing on space material possession. India's stance remains consistent with worldwide agreements that prohibit the national exploitation of space elements.

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<sup>18</sup> Alyssa Goessler, *The Private Sector's Assessment of U.S. Space Policy and Law*, AEROSPACE CSIS (Sep. 19, 2024, 3:11 PM), <https://aerospace.csis.org/the-private-sectors-assessment-of-u-s-space-policy-and-law/>.

4. **Public-Private Partnerships:** Although NASA has been extensively involved in public-private collaborations through initiatives such as the Commercial Crew Program, India's collaborations with the commercial industry, including Skyroot Aerospace and Agnikul Cosmos, are currently in the early phases. Despite ISRO's collaboration with corporations, the breadth and scope of these alliances are still not equivalent to those in the United States.

## EUROPEAN UNION

With an eye on commercial space endeavours in particular, the European Union (EU) has established an extensive legal framework for operations in space. Several essential elements define this structure:

1. **Regulatory Guidelines:** “The Outer Space Treaty (1967) and the Registration Convention (1976)” are two worldwide agreements that mainly control EU space legislation. These accords lay out the basic concepts for space research and utilization. The European Union Space Programme and the European Space Agency (ESA) are two vehicles via which the EU has imposed its individual rules on the space industry.
2. “The European Space Agency (ESA)” is an important Compliance Body since it coordinates space operations among its member states. It offers financial support for a number of space projects and makes teamwork easier. In order to encourage the private utilization of space data and manage safety concerns, the European Union also formed the “European Union Agency for the Space Programme (EUSPA)”.
3. The European Union (EU) promotes industrial involvement in space operations via regulations that foster creativity and rivalry, which in turn supports business launches. To guarantee the fulfilment of security and sustainability laws and to balance up the competition for private firms, the legal framework is in place<sup>19</sup>.
4. Businesses in the private sector are required by the European Union to secure specific permissions before they can launch satellites or engage in any other kind of space activity. In order to safeguard personnel and other entities from possible harm, these permits make sure that safety measures are followed and that liability coverage is required.

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<sup>19</sup> Frans G. Von Der Dunk, *The European Union and Space—Space for Competition?* 1 IISL, 4-9 (2018).

## CHINA

Despite China's considerable progress in space research, the nation's legislative structure regarding space remains in the early stages of development. Some important factors are:

1. The absence of all-encompassing laws: A thorough national space legislation has not been enacted by China as of yet. On the contrary, it has passed two minimal regulations, namely the "Measures for the Administration of Registration of Objects Launched into Outer Space" (2001) and the "Interim Measures on the Administration of Licensing the Project of Launching Civil Space" (2002). The main focus of this legislation is on certification and licensing, rather than establishing a strong legal basis for more extensive space operations.
2. Legal Power: SASTIND, China's civil space system, is in charge of everything from license and certification to the initiative's overall direction and execution. Governing space operations is also a responsibility of the "Chinese National Space Administration (CNSA)"<sup>20</sup>.
3. Worldwide Debts: "The Outer Space Treaty (1967) and the Liability Convention (1972)" are two of four important international space accords to which China is a signatory. China is bound by these agreements to conform to civilian utilization of space, register space debris, and pay for harm resulting from its space operations.
4. All space missions sent from China are currently required to be listed with SASTIND before 60 days of launch, as part of the registration and licensing process. Private companies may feel uneasy about the licensing procedure because regulators have a lot of leeway to decide how to proceed.
5. Rising Legal Guidelines: To tackle the increasing complexity of China's space endeavours, there are continuing debates about creating a more thorough national space law<sup>21</sup>. Greater private sector involvement and better adherence to global commitments are the goals of this proposed law.

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<sup>20</sup> Pooja B, *China's space ventures: Investigating power dynamics and the impact on global influence*, 9 IJNRD 92, 94-98 (2024).

<sup>21</sup> Qian Jiwei, Liu Bojian, CHINA'S SPACE INDUSTRY: BACKGROUND, RECENT DEVELOPMENTS AND CHALLENGES, 1571 NUS 1, 4-7 (2020).

## **CONCLUSION: INDIA'S NEED OF THE HOUR FOR SPACE REGULATIONS**

As India aspires to become a major participant in the worldwide space sector, the necessity for strong and thorough space legislation was never higher.

To govern and encourage commercial involvement in space endeavours, India needs complete national space legislation, which it does not yet have. Businesses are hesitant to spend money or innovate in the face of regulatory uncertainty caused by a lack of specific laws. India would be able to fulfil its commitments under agreements such as the Outer Space Treaty and the Liability Convention if it had an explicit legal structure that dealt with licensing, responsibility, and security issues in a way that was consistent with global standards. Canada and Germany are only two examples of nations that have shown even in nations with less developed space programs, strong space legislation can help create a booming commercial space industry.

If India wants to improve its space capacity, it must form public-private partnerships (PPPs). A step in the right direction towards cooperation has been the latest attempt by the government to welcome private companies into the space industry. Enhancing innovation and boosting effectiveness in space-related operations can be achieved by combining the qualities of private firms with those of state agencies like ISRO in India. Simpler partnerships, capital, and an innovation-friendly atmosphere can be achieved through the establishment of explicit laws and regulations for PPPs.

Sustainability needs to be at the centre of India's space policy as the country increases its space presence. Concerns about particles from space and the rightful utilization of space commodities are heightened by the proliferation of satellites. To prevent business ventures from jeopardizing space's durability for centuries to come, India should amend its space regulations to incorporate ecological principles. Part of this is making sure that private companies follow the rules when it comes to managing satellites at the end of their lives.

If India wants to join the ranks of the world's leading space exploration nations, it must first establish an extensive legal structure to deal with the specific issues that arise from business space operations. To build a favourable climate that draws investment and accords with worldwide standards of excellence, India can establish particular legislation, develop public-private partnerships, and prioritize sustainability. In addition to guaranteeing that India's space endeavours

are carried out properly and sustainably, this proactive plan would also strengthen the country's standing in the international space sphere.