

Outer Space Treaty and Laws Related to Commercial Space Travel

Abstract

A wide range of international and state treaties, laws, and guidelines regulating space-related activities fall under the purview of space law. These include data exchange, environmental protection, exploration, accountability for damages, weapons control, rescue operations, and ethical and technological issues. Space law is part of a complex legal framework that is interwoven with administrative law, intellectual property law, insurance law, weapons control law, environmental law, criminal law, and commercial law. This study conducts a thorough analysis of the changing field of space law. The link between international law and space law, the legal framework governing commercial space operations, and new developments in case law are important fields of study. This study aims to pinpoint legal gaps and suggest areas for improvement by analyzing a number of international covenants and treaties. On October 4, 1957, Sputnik I was launched, signaling the start of a new age that would see both the militarization of space and the growth of human inventiveness. Our grasp of space, solar phenomena, planetary conditions, and the Earth itself has been completely transformed by satellite technology. Space activities must comply with existing rules, especially those embodied in UN resolutions and treaties, as new spacecraft equipped with cutting-edge technology continue to be deployed to solve global concerns. The necessity of upholding international cooperation and peace is central to the discussion of space law. Any advancements that pose a challenge to these fundamental ideas need to be closely examined. This research aims to evaluate the present and future consequences of emergent space systems by placing their behavior within this framework. In the end, the research of space law and technology on a global scale must prioritize maintaining peace and using space resources fairly.

Introduction

The distance between Earth and other celestial bodies, known as outer space, presents particular legal difficulties. The Kármán Line, which separates aeronautics from astronautics at a height of 100 km, was created by the Fédération Aéronautique Internationale in spite of the lack of a clear border separating Earth's atmosphere from space. People who travel more over 80 kilometers are considered astronauts in the US.

The body of rules regulating space-related activities is known as space law, and it consists of a combination of national and international laws as well as traditions that regulate human behavior in space. Significant scientific advancements in nations like the USSR, Germany, and the USA marked the precursor to the contemporary era of space exploration, and it culminated in the momentous launch of Sputnik in 1957—the first satellite in history. This accomplishment inspired other fruitful studies that probed this uncharted realm.

But the emergence of the space era also brought with it geopolitical tensions, especially between the US and the USSR. The United States acted quickly to counter Sputnik's perceived danger to technical superiority and national security, passing the National Aeronautics and Space Act in 1958 and creating the National Aeronautics and Space Administration (NASA). The first manned space mission by Yuri Gagarin in April 1961 and the famous moonwalk by

Neil Armstrong in 1969 highlighted the need for legal frameworks to control space operations and minimize misunderstandings and bad behavior.

The creation of space law followed quickly in reaction to the quick developments in space technology. The world community moved quickly after the October 1957 launch of Sputnik. The Committee on Peaceful Uses of Outer Space (COPUOS) was established by Resolution 1472 (XIV), which was adopted by the United Nations (UN) on December 12, 1959. The UN subsequently passed Resolution 1721 on December 20, 1961, which outlined two fundamental legal principles that apply to space: first, that space and celestial bodies are subject to international law, including the UN Charter; and second, that space and celestial bodies are open for exploration and use by all states in accordance with international law, without being subject to national appropriation.

The Space Law Treaties

Five international treaties were negotiated and drafted by UNCOPUOS, the principal international body involved in the development of international space law. Following the resolutions that outlined the rights and responsibilities of the States in the exploration of outer space, the Member States of the United Nations adopted conventions and treaties.

1. The 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (The Outer Space Treaty)¹.

Known as the Magna Carta of Space the Outer Space Treaty of 1967 is a historic agreement that enumerates the objectives of human space exploration. The treaty's preamble emphasizes the use of space for the benefit of all people outlining a vision based on their common interests. The primary goal of this is to foster mutual understanding and goodwill among states and it highlights the significance of fostering broad international collaboration in the fields of science and law related to space research. The main principle of the treaty is that sending WMDs into orbit around celestial bodies is prohibited. This significant paragraph demonstrates a commitment to preserving space for peaceful uses and shielding it from the catastrophic effects of armed conflict. By mandating that space be used exclusively for peaceful purposes the agreement seeks to stop the cosmos from becoming a weapon and lessen the possibility of violence occurring outside of Earth's borders. In addition the Outer Space Treaty establishes a system of accountability for damage caused by space objects on Earth. It delineates the legal responsibilities of both the launching state and the state from which the item is launched holding them both legally liable for any harm the object causes. This assignment of responsibility serves as a motivator for responsible behavior in space operations by mandating that countries take reasonable precautions in the planning and execution of space missions to lessen the possibility of harm to Earth and its inhabitants. A fundamental tenet of the Outer Space Treaty is the declaration that space is beyond national borders. By expressly prohibiting claims of sovereignty over celestial bodies and attempts to impose ownership through usage occupancy or any other means the convention emphasizes the idea of mankind's shared inheritance. Because it forbids its exploitation and commercialization space remains a shared resource for the benefit of present and future generations. All of the countries participating in space exploration and utilization have their goals and objectives enshrined in the Outer Space Treaty which essentially serves as an international charter. Its provisions reflect a conscious effort to draft legislation that upholds the rule of law fosters cooperation and encourages the just and responsible use of space resources. As demonstrated by the 105 countries that have ratified the Outer Space Treaty's provisions as of March 2017 it is a fundamental component of international space law. Notwithstanding widespread support the agreement nevertheless finds it challenging to adapt to the shifting dynamics of space exploration and utilization. As space

¹ "S. Bhatt, Legal Controls of Outer Space 7 (1973, S. Chand and Company)."

operations continue to expand and diversify it is imperative that the treaty's terms be reviewed and strengthened in order to address new issues and safeguard the interests of all parties.

2. The 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (The Rescue Agreement).

A full explanation of the concepts stated in Article V of the 1967 Outer Space Treaty² can be found in the agreement under examination. Essentially this agreement stipulates that astronauts must receive complete assistance in the event of issues accidents or emergencies while in space. Additionally it mandates that crews and spacecraft return to their launch country as quickly as feasible. A key component of the agreement is the declaration that the state whose registry a space object is launched into space maintains jurisdiction and control over the object and its crew for the period of their existence in space. This proclamation highlights the value of state sovereignty and preserves the launching states sovereignty over its space assets. Furthermore the agreement delineates the obligations and entitlements of countries in the event that space objects are discovered in regions devoid of sovereign territory on the high seas or on the territory of another state. The state that the space objects belong to in such circumstances has the right to be informed of their discovery and to have the people and the objects safely returned to their home states. An important point is that the launching state has to pay for the means of allowing its space assets and personnel to return home. As of March 2017 95 countries had ratified the agreement indicating how well-liked and respected it is among other countries. It is clear from this broad consensus that clear regulations and guidelines are necessary to regulate space operations and ensure the security and well-being of astronauts and spaceflight participants³. As a result as of March 2017 95 countries had ratified the agreement indicating how well-liked and respected it is across the globe. This broad consensus emphasizes the significance of establishing clear guidelines and protocols to regulate space operations and ensure the security and well-being of spaceflight participants and astronauts.

3. The 1972 Convention on International Liability for Damage Caused by Space Objects (The Liability Convention)

The provisions of Article VII of the Outer Space Treaty are thoroughly clarified by the Liability Convention and some elements of Article VI further support them. As a result of space objects under their control or jurisdiction states are severely liable under this treaty for any harm they cause in space or on Earth⁴. Interestingly this accountability lasts through a force majeure ensuring that governments continue to answer for the results of their space operations in spite of unanticipated circumstances⁵. Joint culpability is required by the Culpability Convention in cases where damage is caused by the actions of two or more independently launching countries. This implies that each person is accountable for the damage they have contributed in proportion to their involvement. It is possible to escape accountability though provided that the launch is conducted in accordance with recognized principles of international law such as the UN Charter and the Outer Space Treaty. The primary objective of the Liability Convention is to establish a fair and just system for compensating damages resulting from space operations. Unlike traditional legal systems the agreement eliminates the need for the exhaustion of local remedies which simplifies the process for affected parties to seek redress. This structures cornerstone is the establishment of a Claims Commission whose duty it is to adjudicate claims and guarantee that the injured parties obtain just compensation as soon as possible⁶. As of March 2017 94 countries had ratified the Liability Convention indicating its significance in creating the legal

² Article 4 of the Rescue Agreement, 1968.

³ "Article 5.5 of the Rescue Agreement, 1968."

⁴ Francis Lyall & Paul B. Larsen, *Space Law- A Treatise* 37 (2009, Routledge).

⁵ Article 4 of the Liability Convention, 1972.

⁶ Article 18 of the Liability Convention, 1972.

framework that governs space operations. The convention lowers risks promotes responsible behavior and safeguards the interests of all parties involved in space exploration and utilization by providing a robust framework for addressing liability issues arising from space activities.

4. The 1975 Convention on Registration of Objects Launched into Outer Space (The Registration Convention).

Like previous international accords the conventions roots are in the Outer Space Treaty which forms the basis for much of its expansion especially when it comes to extending the ideas presented in Article VIII. The necessity of having a dependable system in place for spacecraft registration is strongly stressed by the convention. Such a mechanism is critical to maintaining accountability in space activities and is crucial for detecting ships that cause harm. Furthermore one of the most important ways to lessen the possibility of a WMD being secretly launched into orbit is to establish a comprehensive and open system for vessel registration. By providing a means of observation and monitoring space operations it enhances transparency and fosters confidence among governments regarding the peaceful utilization of space. All parties are required by the conventions requirements to keep a registry with comprehensive details on their space activities. In addition the UN keeps a unified registry that promotes global collaboration and coordination in space administration. The treaty was approved by 63 nations as of March 2017 demonstrating the widespread understanding of the value of spacecraft registration in fostering law-abiding and peaceful space operations.

5. The 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (The Moon Treaty).

The Moon Agreement acknowledges the significant contribution of Earth's natural satellite to space exploration in its prologue. The agreement aims to encourage government collaboration in their exploration of the Moon and other celestial bodies while trying to prevent the Moon from turning into a hot spot for global conflict. A fair and peaceful international order in space is a step closer to being realized thanks to this agreement which recognizes the potential benefits of using natural resources on the Moon and other celestial bodies. As of March 2017 17 countries had ratified the Moon Agreement indicating its growing significance in the realm of space governance. In addition the General Assembly has approved four statements that the Committee on the Peaceful Uses of Outer Space (COPUOS) has taken a long time to consider. A few space-related declarations that are covered by these statements are the following: direct television broadcasting (1982) remote sensing of earth resources (1986) use of nuclear power sources in space (1992) and cooperation for the benefit of all states (1999)⁷. Despite the numerous agreements and treaties that govern space activity there are still a lot of unresolved concerns and issues that need to be addressed. Resolving these issues is crucial to the effective and long-term management of space resources and operations as well as to promoting peace cooperation and equitable access to the benefits of space exploration⁸.

Emerging Technologies and Commercial Space Ventures

The rapid advancement of technology has sparked the development of new approaches to space exploration and use. These developments are not only transforming India's space program but also changing the country's legal and regulatory environment. The emergence of novel technologies and the growth of commercial space companies present a multitude of legal and regulatory challenges as well as opportunities for cooperation and economic growth in the

⁷ Zeldine Niamh O'Brien, Liability for Inquiry, Loss or Damage to the Space Tourist, 47th Colloquium for the International Institute of Space Law, 2004

⁸ Mike Wall, First Space Tourist: How a U.S. Millionaire Bought a Ticket to Orbit, Private Spaceflight, (September 4, 2017), <https://www.space.com/11492-space-tourism-pioneerdenistito.html>, (Last Accessed on 15th April, 2024).

space industry. Small satellites, often known as nanosatellites or CubeSats, are one of the most innovative developments in space research. These small spacecrafts, usually only a few kg in weight, offer affordable options for a wide range of uses, including communication, scientific research, and Earth observation. Due to their small size and low launch costs, they have made space more accessible to a wider range of organizations, including startups, academic institutions, and private businesses.

The Indian Space Research Organization (ISRO) has been instrumental in helping India's space aspirations integrate tiny satellite technologies, primarily through the establishment of the Indian National Space Promotion and Authorization Centre (IN-SPACe)⁹. IN-SPACe was created in 2020 to operate as a regulatory agency and facilitate the simplified process of getting permits, authorizations, and approvals while also bringing in the private sector for space operations. This legislative framework supports the particular needs of small satellite operators and creates an environment that encourages innovation and start-ups in the space sector. The introduction of reusable launch vehicles is another game-changing breakthrough that is upending the space industry (RLVs). RLVs promise significant launch cost savings and represent a paradigm change in space transportation because of their reusable and recuperable design. The creation and implementation of RLVs has promise for democratizing space access, thus reducing entry barriers for commercial space enterprises and enabling wider involvement in space exploration activities.

The commercial space industry in India is growing and includes a wide range of operations, from space tourism and satellite manufacture and launch services to space-based services including communication and Earth observation. These projects, which are being led by both local and foreign organizations, mark the beginning of a new age in space trade by bringing energy and creativity to the field. The involvement of private entities in the space sector presents new challenges to the legal and regulatory landscape, requiring the development of regulations that achieve a careful equilibrium between promoting innovation, guaranteeing safety, and protecting private interests. With efforts like "New Space India Limited" (NSIL), a commercial subsidiary of ISRO tasked with encouraging collaboration with private firms and easing the transfer of ISRO's capabilities to the private sector, the Indian government has aggressively welcomed this paradigm change.

The need of having a strong legal framework that tackles a wide range of relevant problems, such as licensing, spectrum allocation, liability, intellectual property rights, and space debris mitigation, is highlighted by the growth of innovative technologies and the increase in commercial space endeavors. The Indian government is actively developing policies and regulations that ensure both the growth of the commercial space sector and compliance with international obligations and standards. This is done through ISRO and regulatory bodies like IN-SPACe in response to these imperatives. The dynamic field of space law in India demands flexibility in response to the opportunities and difficulties posed by new technology and the expanding commercial space industry. India is positioned to leverage the potential of these achievements, create a supportive regulatory framework, and harness the transformational force of space exploration to fuel economic growth, scientific discoveries, and innovation.

Challenges and Future Perspectives

At this critical moment, India's space program faces several obstacles but also has great potential for future expansion and to contribute to global space exploration and usage. These difficulties are varied and include operational difficulties, technological barriers, and legal and

⁹ "Sridharan, S. (2017). Small Satellites: Regulatory Challenges and Policy Considerations for India. Observer Research Foundation."

regulatory nuances. However, India is capable of overcoming these challenges and securing a bright future for its space program if it adopts a proactive and strategic foresight approach.

One of the main obstacles facing India's space activities is the rapid improvement of technology in the space industry. India has to make an effort to be at the forefront of innovation as emerging technologies continue to advance quickly. Only then can it make sure that its space capabilities and infrastructure stay competitive and relevant in the global arena. This calls for ongoing R&D expenditures, the formation of strategic alliances with national and international players, and the constant modernization of its technological capabilities to stay up with changing market trends¹⁰.

The growing problem of space debris is another enormous obstacle for India's space program. The growth of trash in Earth's orbit puts operating satellites and spacecraft at serious risk, endangering the sustainability and safety of space exploration. India has to take the lead in reducing space debris by actively participating in initiatives like responsible space operations, tracking and monitoring space debris with other countries, and using best practices for satellite design. Furthermore, when India increases its space operations and welcomes more private sector engagement, protecting the safety and security of space assets becomes increasingly important. Building strong systems for permission, licensing, and regulatory supervision is essential to reducing risks and promoting a stable and safe operating environment in space. Simultaneously, India's growing space program has substantial business and economic prospects. To fully capitalize on these prospects, commercial space endeavors must be integrated into the institutional structure with careful planning and policy formulation. India has to establish an environment that supports innovation, encourages entrepreneurship, and draws capital to the space industry. Important steps in this approach include enabling technology transfer from the Indian Space Research Organization (ISRO) to commercial organizations, streamlining regulatory processes, and offering favorable incentives for private sector engagement¹¹.

With its eyes on the future, India's space program has enormous potential for international cooperation, national growth, and scientific discovery. Prospects for the future include a wide range of audacious projects, such as deep space travel, Mars missions, lunar exploration, and the creation of cutting-edge satellite systems for navigation, communication, and Earth observation. These endeavors hold the potential to not only broaden India's scientific knowledge base but also foster innovation and improve the nation's reputation internationally in the space sector. India has to take a holistic strategy that includes legislative and regulatory changes, technical improvements, capacity building efforts, and strategic alliances in order to achieve its goals and overcome the obstacles that lie ahead. To ensure the long-term viability and expansion of India's space program, the country must prioritize sustainable practices, engage the private sector, collaborate internationally, and capitalize on its capabilities in research and development. India can establish itself as a major force in the international space community by adopting a comprehensive strategy and taking advantage of the opportunities given by the changing space landscape.

Conclusion

Since its start, India's space program has seen an incredible journey, developing into a vibrant and ambitious organization on the international scene. India's space activities are a testament to its dedication to peaceful and responsible space exploration and exploitation. They are

¹⁰ "Vijayan, R. (2021). Space Sustainability: Legal and Policy Perspectives for India. Observer Research Foundation."

¹¹ "Government of India. (2020). Notification: Indian National Space Promotion and Authorization Centre (IN-SPACe). Department of Space."

grounded in past successes, supported by strong domestic law, and driven by active involvement in international treaties and accords. An account of India's space program's past sheds light on the nation's development from early space exploration efforts to its current position as a spacefaring nation. India has accomplished a number of noteworthy firsts, including as the successful launch of spacecraft, lunar missions, and interplanetary exploration projects. India's technological strength and commitment to scientific research and national development are demonstrated by these accomplishments.

India's space operations are anchored by its domestic space legislation, which offers a framework for international conformity while taking into account the particular requirements and difficulties faced by the nation. The Space Activities Act of 2017 has played a pivotal role in enabling the private sector's involvement and supporting commercial space endeavors, thus promoting innovation and propelling economic expansion in the space sector.

India's participation in international treaties and accords is indicative of its dedication to international space governance and collaboration. India has demonstrated its commitment to the responsible and peaceful use of space, as well as its willingness to uphold international norms and obligations, by ratifying important treaties like the Outer Space Treaty, the Rescue Agreement, the Liability Convention, and the Registration Convention. The Indian Space Research Organization (ISRO), which is in charge of the program and is supported by other government agencies, provides the institutional framework for space exploration that guarantees efficient planning, development, and execution of space missions. These institutions work in concert to drive India's space program forward by influencing policy, developing technology, and facilitating scientific breakthroughs.

The advent of novel technology and the growth of commercial space operations portend potential advantages and obstacles for India. The space environment is changing as a result of the deployment of tiny satellites, reusable launchers, and the encouragement of private sector involvement in space operations. India has to balance leveraging the economic potential and creativity brought about by commercial space operations with navigating issues relating to technology breakthroughs, space debris, safety, and regulations.

Therefore, India's space program has a bright future ahead of it. India is well-positioned to make significant contributions to international space exploration, scientific research, and socioeconomic development because of its strong institutional framework, unwavering adherence to international treaties, proactive engagement in emerging technologies, and support for commercial space ventures. India can build on its achievements and progress its space program to new heights by embracing obstacles head-on, encouraging cooperation, and keeping a laser-like concentration on scientific growth.