Jus Corpus Law Journal
Open Access Law Journal – Copyright © 2022 – ISSN 2582-7820
Editor-in-Chief – Prof. (Dr.) Rhishikesh Dave; Publisher – Ayush Pandey

Privatisation of Outer Space

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Received 25 July 2022; *Accepted* 25 August 2022; *Published* 27 August 2022

Privatization of space exploration is a new plethora of opportunities. With the help of space technology, it may be possible to protect the Earth's delicate ecosystem and culturally significant locations from the harm that mining and industrialization would otherwise inevitably do. The commercial space industry is currently in its infancy. The government has needs that the private sector can fulfill. Funding these needs enables private businesses to do the research and development necessary to advance their technology to the point where they can profitably satisfy market demands. A federal law from the United States called the Commercial Space Launch Act of 1984[1] was created to encourage private industry's commercialization of space and space technologies. This act of Congress set forth a quest to acquire cutting-edge equipment and services provided by innovative businesses. As a result, a new era of space law has begun, in which both the public and private sectors can participate in managing formerly government-run space operations.

Keywords: *privatization, space exploration, outer space, research, development, commercialization.*

INTRODUCTION

International space law is a relatively new field mostly made up of a mix of norms and treaties. Since its inception, the primary purpose of international space law has been to ensure humanity's unlimited, unobstructed, fair, and egalitarian access to space to sustain peace,

[1] Commercial Space Launch Act 1984

which has fueled sovereign countries' dominance in space exploitation and exploration. Even though human space operations started in the 1950s, efforts to advance space technology and uses have increased to fulfill peoples' aspirations to cross the High Frontier of the skies, air, or space. Following Nicolaus Copernicus' **Derevolutionibusorbiumcoelestium (1543)**, the orbital dynamics were discovered, opening the space travel door.

Outer Space has been a sphere of some of the most remarkable technologies. Sputnik, launched by Russia, and Apollo 11, launched by the United States, served as analogies for geopolitical rivalry. Between Sputnik 1 and the SpaceX Falcon 9, more countries have developed their unique defensive space commands, variegated their space technology, and even displayed potentially catastrophic capabilities to the world. The realm of space has developed into one dominated by more actors - sovereign powers, private entities, or non-traditional actors and is today more congested, disputed, and fiercely competitive than ever.[2]

No longer do we require a telescope to understand the critical significance of space. Although space's geostrategic and economic importance has received much attention, probably the most crucial topic—space governance—has been largely ignored. Multilateral agreements and conventions that were formerly adequate have repeatedly shown ineffectual at regulating international space operations in the current political environment. With celestial resource usage and space militarization issues, the present global space governance framework has hesitated to consider shifting state and industry activities and technology advancements[3]. In order to clinch more robust global space governance and the security and sustainability of space for the foreseeable future, an increasing number of private entities necessitates additional, if not amended, regulatory provisions[4].

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[2] Rajeswari Pillai Rajagopalan, 'Increasing challenges to outer space' (*ORF*, 15 January 2022) <https://www.orfonline.org/expert-speak/increasing-challenges-to-outer-space/> accessed 20 July 2022

[3] Rajeswari Pillai Rajagopalan, 'The Outer Space Treaty' (*CFR*, 23 February 2021) <https://www.cfr.org/report/outer-space-treaty#chapter-title-0-1> accessed 20 July 2022

[4] Sophie Goguichvili, Alan Linenberger & Amber Gillette, 'The Global Legal Landscape of Space: Who Writes the Rules on the Final Frontier?' (*Wilson Center*, 1 October 2021) <https://www.wilsoncenter.org/article/global-legal-landscape-space-who-writes-rules-final-frontier> accessed 19 July 2022

GLOBAL SPACE GOVERNANCE FOR A NEW SPACE ERA

The concept of global space governance refers to a set of international, regional, or national legislation as well as governing agencies and the ways, means, and procedures of managing or regulating space-related matters or activities. The gizmo, institutions and mechanisms, national laws, rules, technical standards and procedures, codes of conduct, and steps to foster confidence among space-faring players are also included[5]. All of these are considered, created, and put into practice at different levels of government. But do these tactics work to prevent governments from testing projectile-firing satellites or dealing with space debris that falls to the earth? Not in my opinion.

The contemporary system of global space governance was developed in the 1960s and 1970s and had a strong foundation in balancing the then-dominant political ideologies, interests, and concerns of the Cold War era. States, mainly Western nations, intensified their interest in developing new aviation vehicles, radio transmission devices, and computing technology for military use during World War II[6]. These researchers helped the US and the Soviet Union develop their space capabilities to become global space powers. As a result, increasing space capabilities also became a national policy objective[7]. Nevertheless, today, 77 countries allege to have space agencies, and only 16 are capable of orbital launch. Unfortunately, it implies that low-to-middle income nations were mostly excluded from drafting the regulations that have been in effect for almost fifty years[8]. Additionally, the five United Nations (U.N.) space treaties that serve as the basis for international space governance were created in their respective eras, which explains their emphasis on avoiding the military and colonization of space.

The shifting power dynamics have made space a disputed and competitive arena. Many new and old hazards, such as space debris, colonization of space, radio frequency interference, and

[5] Rajeswari Pillai Rajagopalan, 'Space Governance' (*Oxford University Press,* 28 August 2018) <https://oxfordre.com/planetaryscience/view/10.1093/acrefore/9780190647926.001.0001/acrefore-9780190647926-e-107> accessed on 21 July 2022
[6] Rajeswari Pillai Rajagopalan (n 2)
[7] *Ibid*
[8] Sophie Goguichvili, Alan Linenberger & Amber Gillette (n 4)

a potential space weapons race, pose challenges to safe and secure access to outer space[9]. There are a few fundamental agreements and laws that govern space operations. However, they have become too broad to help stop the present trend that may eventually render space inaccessible.

THE UN AND THE GLOBAL SPACE GOVERNANCE FOUNDATION

Beginning in 1958, the US entered into bilateral agreements with other countries on a case-by-case basis to address specific space-related issues. The topics discussed were satellites, research studies, human flight, and data collection. The US Representative to the United Nations recommended that an ad hoc **Committee on the Peaceful Uses of Outer Space** be established shortly after the Soviet Union launched the very first artificial satellite. In 1959, **COPUOS** was established as an independent entity[10]. Discussed by COPUOS and its 95 member states are, among other things, the management of space debris, the exploitation of space resources, the standardization of small satellites, the nuclearization of outer space, and risks posed by asteroids. The two COPUOS subcommittees contribute to these initiatives- The scientific and Technical sub-committee and the Legal sub-committee.

The five UN space treaties constitute the crux of space law. All governments are granted the freedom to enter, explore, and exploit space by the Outer Space Treaty, which established that it belongs to all people (United Nations, 1967, articles I(2) and I(3))[11]. Several fundamental principles, such as international cooperation in space, non-appropriation of space (United Nations, 1967, article II), peaceful uses of space, and non-interference with other people's use of space (United Nations, 1967, Article III, *etc.*)[12], are now a part of customary international law. These five treaties take an open stance, permitting private and/or commercial space operations while being adopted at a very early stage of the space era when sovereign governments-controlled space activities. According to the Outer Space Treaty, state and private organizations may engage in space operations (United Nations, 1967, Article VI). The state will be held accountable for the actions of non-governmental organizations by

[9] Rajeswari Pillai Rajagopalan (n 2)
[10] Sophie Goguichvili, Alan Linenberger & Amber Gillette (n 4)
[11] Rajeswari Pillai Rajagopalan (n 3)
[12] Rajeswari Pillai Rajagopalan (n 2)

authorization and ongoing oversight (United Nations, 1967, Article VI).[13]The Rescue Agreement (1968)[14], the second fundamental space treaty, mandates that States take action to save astronauts and help them return to their launching state in the case of an accident, distress situation, or emergency landing. It also mandates that States help to launch states recover space objects that return to Earth from outside their native launch state.

The **Convention on International Liability for Damage Caused by Space Objects**, also known as the **Liability Convention** (1972)[15], is the third fundamental U.N. space treaty. It specifies Launching States' responsibility for damage caused by their space objects on Earth or in space and the processes for resolving claims for damages endured. It implies that states are still in charge of any space assets deployed from their territory and that these same states would also be accountable for any damages in the event of a mishap. Regardless of who caused the incident—whether it was a private actor or a State-space agency—claims against damage or destruction are pursued by a state against a state under the Liability Convention. Most national legal documents allow one person or business to file a lawsuit against another person or industry.[16] However, concerning international space law, the Liability Convention ruled that governments are ultimately in charge, even if a private actor is to blame for an occurrence. **The Department of Defense's global Space Surveillance Network (SSN)[17]** sensors monitor more than 27,000 bits of orbital debris, sometimes known as space trash. There are a lot more pieces of debris in the near-Earth space environment that are too tiny to track but big enough to endanger robotic and human spaceflight operations. The Launching States' responsibility for harm done by their space objects, whether on Earth or in space, is outlined in the Liability Convention. The potential risk to all spacecraft, including the International Space

[13] 'Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies' (*United Nations Office for Outer Space Affairs*) <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html> accessed 21 July 2022

[14] *Ibid*

[15] *Ibid*

[16] Sophie Goguichvili, Alan Linenberger & Amber Gillette (n 4)

[17] 'Space Debris and Human Spacecraft' (*NASA*, 26 May 2021) <https://www.nasa.gov/mission_pages/station/news/orbital_debris.html> accessed 19 July 2022

Station and other ships with people on board like SpaceX's Crew Dragon, is growing due to the growing population of space junk.[18]

Cooperation and responsibility-sharing between NASA and the DoD are vital in defining the satellite environment, including orbital debris. With a diameter of only two inches in low-Earth orbit and one meter in geosynchronous orbit, discrete objects are tracked by the DoD's Space Surveillance Network. NASA has established a set of long-standing standards to determine whether the prospect of such a comparative approach justifies evasive action or other safety measures to protect the International Space Station and its crew. Given the spacecraft's flat, rectangular design, these standards depict the spacecraft as enclosed in a pizza box. The International Space Station lies in the centre of the vehicle, around 2.5 miles deep, 30 miles wide, and 30 miles long. When forecasts show that any tracked object will approach close enough to cause worry and the tracking data's accuracy is deemed sufficient, Mission Control centres in Houston and Moscow collaborate to establish a reasonable plan of action.

The registration of space objects is the objective of the fourth convention, "**Convention on Registration of Objects Launched into Outer Space**[19]," commonly termed the Registration Convention (1976). The Registration Convention mandates that launching States keep a registry of their space objects and provide the U.N. with information on the objects they launch into space, strengthening Article VIII of the OST[20], which deals with the registration and jurisdictional aspects of launched outer space objects. Since no State could ever be held liable for an occurrence without the registration of space objects, this treaty is crucial from the perspective of both the Rescue Agreement and the Liability Convention. Therefore, it aims to establish the State whose property it was, as well as the State's obligation and recompense for any harm or destruction.

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[18] *Ibid*

[19] 'Convention on Registration of Objects Launched into Outer Space' (*United Nations Office for Outer Space Affairs*) <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introregistration-convention.html> accessed 18 July 2022

[20] *Ibid*

The **Moon Treaty (1984**),[21] also known as "The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies," has received little support from Member countries despite its reaffirmation and expansion of Outer Space Treaty provisions in the context of appropriating, exploring, and using the Moon's resources. According to the Moon Treaty, all nations must utilize the Moon "exclusively for peaceful purposes," and any use of force, threats of force, or other hostile actions are forbidden on the moon. Additionally, it forbids the development of military facilities, installations, and fortifications, the testing of any weaponry, and the execution of military manoeuvres on the Moon in addition to the deployment or use of WMD.

The five space treaties established a strong foundation for international cooperation in peaceful space applications. However, given the period in which these five treaties were formed, it is comprehensible that legal matters connected to space commercialization were not their primary regulatory goals for them. The question of space commercialization is one that attorneys and scientists in the field are focusing on more and more[22]. With space commercialization already established, the UNGA adopted three significant resolutions governing particular facets of space activities, comprising the use of artificial earth satellites for international direct television broadcasting (UN Resolution. 37/92, 1982), remote sensing activities (UN Resolution. 41/65, 1986), and the use of nuclear power sources in space (UN Resolution. 47/68, 1992)[23].

THE ONGOING SPACE COMMERCIALIZATION PROCESS

The zero-gravity environment in space makes for ideal conditions for scientific research, with the ability to commercialize the findings. Entrepreneurs have always been drawn to abundant natural resources because of the potential for financial gain. Space launch activities, direct

[21] 'Agreement Governing the Activities of States on the Moon and Other Celestial Bodies' (*United Nations Office for Outer Space Affairs*) <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/intromoon-agreement.html> accessed 18 July 2022

[22] Yun Zhao, 'Space Commercialization and the Development of Space Law' (*Oxford University Press,* 30 July 2018) Oxford University Press <https://oxfordre.com/planetaryscience/view/10.1093/acrefore/9780190647926.001.0001/acrefore-9780190647926-e-42#acrefore-9780190647926-e-42-div1-2> accessed 18 July 2022

[23] Sophie Goguichvili, Alan Linenberger & Amber Gillette (n 4)

satellite broadcasting, remote sensing, telecommunications, space tourism, space mining, small satellites, and space digitization are just a few examples of the diverse commercial space activities that can be developed.[24]

Space travel is no longer just a pipe fantasy; Dennis Tito's successful journey to the International Space Station paved the way for other people to travel to space as tourists. With a new re-entry mechanism, Virgin Galactic's SpaceShipTwo has safely completed its maiden test flight, opening the door for commercial space travel[25]. In addition, the successful reuse of the New Shepard booster and the trouble-free return of a passenger compartment carried out by the US Company Blue Origin also demonstrated that going to space for regular people would soon become a reality. SpaceX carried out these experiments in December 2015; its most recent success was in 2018. The US space industry was heavily promoted for commercialization by the Reagan administration, who also made a solid effort to support the private sector. In President Reagan's opinion, doing so would not only encourage domestic technical innovation and increase American high-tech output but would also provide the US with possibilities to compete with Europe and Japan.[26]

The most significant way to illustrate how space commercialization has developed is through using satellites, which were first developed for public and military objectives. Navigation, remote sensing, and telecommunications are satellites' principal applications. First, the International Telecommunication Satellite Body (INTELSAT) was created as an intergovernmental organization and deployed the first worldwide commercial satellite communications system in 1965[27]. The commercialization of telecommunications services has therefore been going on for more than 50 years. In 2001, INTELSAT underwent additional restructuring and changed its legal status to a private corporation. Other companies involved in the telecommunications sector, such as the International Maritime Satellite Organization

[24] Yun Zhao (n 22)
[25] *Ibid*
[26] Rajeswari Pillai Rajagopalan (n 2)
[27] *Ibid*

and the European Telecommunications Satellite Organization, underwent this privatization procedure (INMARSAT).[28]

Second, nations no longer have a monopoly on distant sensing. Even those public or semi-public organizations that operate remote sensing satellites are selling the data they collect. Several commercial companies, such as Quick Bird in the US and Rapid Eye in Germany, are already present in the remote sensing industry and sell goods and services to private organizations or nations that do not have access to their remote sensing resources. Thirdly, two other new systems, GALILEO (European Space Agency) and BeiDou are being welcomed to the navigation industry, which GPS and GLONASS have long dominated. According to the European Global Navigation Satellite Systems Agency (2016), access to additional data from navigation satellites is already available for commercial usage.[29]

The satellite launch industry has been working to lower costs and risks associated with satellites while simultaneously quickening the development cycle during the 2000s and 2010s due to the ongoing development of satellite technology and related applications[30]. Since it may easily be networked and perform a single devoted activity, the tiny satellite is becoming more common in this context. Commercialization of space is developing far more quickly than anticipated. These commercial operations have grown quickly and successfully over the past two decades, and there is now a considerably broader spectrum of space players, including small businesses and entrepreneurs, which necessitates the creation of particular regulations to control these commercial activities and organizations. The licensing of small satellites owned by private entities, the regulation of radio frequencies and orbits, the international and national registration of satellites, the assignment of responsibility and liability between governmental and private entities, and many other new legal issues have emerged for which there are no ready and straightforward solutions[31]. Additionally, the environment in space is threatened by growing commercial space operations; yet, there are no enforceable rules to address the issue, which is mainly brought on by space debris.

[28] Yun Zhao (n 22)
[29] Rajeswari Pillai Rajagopalan (n 2)
[30] *Ibid*
[31] Yun Zhao (n 22)

More than 10,000 mass-produced tiny satellites will operate in low Earth orbit as part of SpaceX's Starlink constellation, enabling worldwide Internet connectivity. It aims to bridge the digital gap and provide everyone access to medical and virtual education services[32]. More than 3,000 microsatellites from Amazon's Project Kuiper have gotten certification from the US Federal Communications Commission. Eighty Thousands of these satellites may be in orbit in ten years as opposed to fewer than 3,000 at this time. Companies like Planet, Spire Global, and Icey are collecting and analyzing data from orbital vantage points to provide new insights into weather forecasting, global logistics, agricultural harvesting, and disaster response. High-tech manufacturers could find space to be appealing as well. For entrepreneurs, a brand-new, exciting platform is becoming available. However, what is technically possible is not quickly accomplished—realizing space's potential faces various difficulties.

As of October 2021, twelve country space agencies have signed bilateral agreements with NASA to set up the fundamental guidelines for commercial lunar mining. The parties only concur to respect one another's lunar mining endeavors. Space agencies agree on mining operation guidelines, including adequate safety zones, through the Artemis Accords. A significant component of NASA's Artemis program, the Gateway, will be a space station that NASA plans to construct in the Moon's orbit. As part of their new relationship, NASA and SpaceX have entrusted SpaceX with delivering supplies and cargo to the Gateway. The first business given the task of supplying the Gateway with the resources it needs to conduct scientific research is SpaceX, which has been sending cargo to the International Space Station for over ten years.[33]Land ownership and territory are two of the most crucial aspects of space law. The Treaty prohibits private organizations from possessing territory on the moon. However, it has not stopped for-profit organizations from considering mining asteroids and

[32] *Ibid*

[33] R. Deplano, 'The Artemis Accords: Evolution Or Revolution In International Space Law?' (2021) 70 International and Comparative Law Quarterly, 799

extracting resources from distant worlds. Even though nations could not own asteroids, they may be by private companies.[34]

Kessler syndrome, in which two space objects collide, might cause a cascade chain of events. Given the speed at which space objects move, even a little collision between two objects might start a chain reaction that causes a catastrophic accumulation of space debris. The fact that several participants have ambitious ambitions to construct sizable constellations in low Earth orbit over the next few years suggests that, despite these risks, the population of space will continue to increase. Around 2,000 of SpaceX's Starlink satellites have been launched during the past few years. Kuiper Systems, an Amazon company, also aims to offer internet access from orbit, competing with SpaceX.

CONCLUSION

Satellite utilization and space activities naturally lead to space commercialization and privatization due to the dual-use nature of satellites and space technology. Since space is getting closer to our everyday lives, space commercialization appears to be an unstoppable trend for advancing space operations. The conventional commercial launch sector will see more rivalry, while the private sector is home to many major CubeSat participants. The growth of the new economic sectors, such as human spaceflight, space energy, the use of space stations, and space mining, will be rapid. The benefits of the resources multiply, ideally in an equalizing way, as more public and private organizations can use space. A more crowded market environment caused by more access to space also increases the need for efficient regulatory systems to distribute limited resources. As a result, the next major hurdle is thought to be upgrading the laws and governance systems for space trade globally.

[34]Arwa Mahdavi, 'Privatising the moon may sound like a crazy idea but the sky's no limit for avarice' (*The Guardian*) <https://www.theguardian.com/science/2022/feb/17/privatising-moon-economists-advocate> accessed 25 July 2022