



Drafting an international legal framework for the regulation of **outer space**

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Forum: The Office of Outer Space Affairs (OOSA)

Issue: Drafting an international legal framework for the regulation of outer space

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Introduction

The future of technology has long been considered as being in space, as seen by books, articles, and movies. Even though it can't cure all the world's problems, space exploration is nevertheless vital for the progress of science in sustainable development. Information gathering on environmental issues like climate change is already made possible by the introduction of satellites into orbit.

Artificial satellites in Earth's orbit provide vital communication signals required for monitoring the planet's ecosystems as well as internet access. These satellites data can be used to promote environmental sustainability, protect ecosystems, and assess the severity of pollution and climate change. Data collection, however, may become more challenging due to advancements like anti-satellite technology (which includes frequency jamming, cyberattacks, or explosives detonated close to satellites).

In a wide range of other situations, including those involving health, space technology can also be used. It allows for the execution of high-risk procedures that would not be possible otherwise. Biological technology like Bio-Monitor and Bio-Analyzer (used to track the health and ensure the safety of astronauts in space) can be employed in rural areas where hospitals are harder to access since health information from those locations may be transmitted to doctors far away. Maternal care is improved by the use of antigravity suit technologies to quickly and economically manage postpartum bleeding. These technological developments enhance global healthcare by facilitating equitable access to life-saving treatment.

The swift growth of the space industry and sector is one of the main challenges that nations now confront when creating rules governing activities in outer space. There is room for development in the areas of anti-satellite technology, planetary colony rules, and closing the gaps left by earlier agreements and resolutions. Legislation is therefore essential to protect the riches of space for future generations.

Definition of key terms

Space exploration

The investigation of celestial structures and phenomena carried out using telescopes, spacecraft, and other instruments.

Sustainable development

A pattern of economic growth in which resources are used to improve the quality of life while preserving the environment for future generations.

Artificial satellites

Man-made objects that are placed in orbit around the Earth to collect data, provide communication signals, and perform other functions.

Environmental sustainability

The responsible use of natural resources to meet the needs of the present without compromising the ability of future generations to meet their own needs.

Anti-satellite technology

Technology used to jam, disable, or destroy satellites in orbit.

Bio-Monitor and Bio-Analyzer

Devices used to track the health and safety of astronauts in space.

Antigravity suit

A suit that simulates a low-gravity environment and is used to manage postpartum bleeding and other medical conditions.

Space industry and sector

The industries and businesses involved in the development and use of space technology.

Outer space

The area beyond the Earth's atmosphere where celestial bodies exist.

Regulation

A set of rules or laws that control and govern a particular activity or industry.

General overview

Former implemented measures

The bulk of laws controlling space have been developed globally, however they are not enforceable in court. The Commercial Space Launch Competitiveness Act of 2015 of the United States, which encourages and regulates private sector space investment, is an example of a national law that a country with a space agency may have. These national laws are typically developed to meet the demands of certain nations by cooperation with nongovernmental organisations (NGOs) involved in space research and activities, such as The Planetary Society or the European Space Foundation. There are now four main treaties in place in terms of international outer space law.

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies

By determining who owns the moon and its resources, the Moon Treaty, also known as the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, seeks to ensure order and



safety on the moon. It reiterates that no nation can assert control of the moon or its resources, much as the Outer Space Rule. It continues by citing specific cases where this law is applicable, including subsurface land ownership. It would be especially essential to this pact if concerns like resource mining in space were taken into account.

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, officially known as the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, reiterates the principles established in previous treaties, such as the prohibition of states claiming celestial bodies as their own. The treaty bans the placement of weapons of mass destruction in space and mandates nations to avoid harming other nations' research and the Earth through the improper use of safety equipment. The treaty requires space activity and planned experiments to be reported to the Secretary-General of the United Nations and the scientific community, promoting transparency and cooperation between nations. Proposed changes to the treaty can be made through recommended amendments, which can be adopted individually by nations and integrated into the treaty when a majority of nations adopt them. The treaty, however, lacks sufficient regulation on military issues in space and clarity on certain provisions, such as avoiding harm to other nations and the Earth, calling for expansion and clarification in a separate treaty or resolution.

Agreement on the Rescue of Astronauts, the Return of Astronauts and Return of Objects Launched into Outer Space

The second formal international agreement is the Rescue Agreement, also referred to as the Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space. It guarantees a speedy return to Earth with all of their equipment, as well as support for astronauts in the event of an emergency landing, an accident, or other severe conditions. It expands on the Treaty's clause on the rules for how states should explore and use space, including the moon and other celestial bodies. In addition, the treaty contains information regarding unforeseeable events. When an astronaut is in difficulties, for instance, the concerned party should contact the launch authority; if that is not possible, the information would be made public. Additionally, the UN Secretary-General should be informed, and all pertinent authorities will be contacted.

The Convention on International Liability for Damage Caused by Space Objects

Liability for damages and damages to man-made space objects is the main focus of the Convention on International Liability for Damage Caused by Space Objects. It claims that nations that launch objects into space are only accountable for damage done to people or objects in space if it was due to their negligence. Therefore, no government will be held accountable for harm done to a spacecraft by parties other than the country that launched it. Each nation that causes damage will be held liable for the portion of the damage that they each caused.

Current situation

We are currently facing a major challenge in the area of international space law. The Outer Space Treaty, which was established in 1967, has not been updated to reflect the advancements in society and new technologies. This has resulted in new challenges in space legislation, as the use of anti-satellite technology by countries like China, Russia, and India, as well as the rise of private spaceflight companies like SpaceX and Blue Origin, highlights the need for updated regulations. However, international law has not been able to keep pace with these developments, leading to potential issues such as overcrowding and increased space debris.

The invention, testing, and use of anti-satellite technology by some countries have raised concerns for other nations, as it creates a potential threat to their satellites and other space assets. Meanwhile, private spaceflight companies are not regulated by any specific international laws, as these laws were written before the existence of private spaceflight companies. Article Six of the Outer Space Treaty states that responsibility for any destruction of another nation's property falls on the nation, regardless of whether the private sector is involved. America's National Aeronautics and Space Administration (NASA) foresees the possibility of similar partnerships between other nations and their private space sectors, to increase accountability.

In addition, technological companies are seeking to use space as a platform for their business and technological advancements. Some companies have already signed contracts with governmental agencies to manufacture goods in space and facilitate the construction of spacecraft. While these developments are significant to the progression of human space activity, they highlight the need for updated international law to regulate the usage of space. If space usage continues to increase without regulation, the threat of overcrowding emerges, which could lead to increased space debris, especially smaller pieces, which pose a significant risk to other satellites and man-made space objects if left unaddressed.

In conclusion, we must address the lack of development in international space law to ensure the safe and regulated usage of space. This will involve updating the Outer Space Treaty and creating new regulations to keep pace with advancements in society and new technologies, to prevent overcrowding and protect other satellites and man-made space objects from potential threats.

Civilians in space

The increasing trend of space tourism raises concerns about potential negative environmental impact and added space debris. As space tourism becomes more accessible, the need for regulations to address its benefits and drawbacks becomes more pressing. The absence of proper regulations could pose challenges in ensuring the safety and stability of future space colonies. It is important for nations to carefully consider these issues and develop laws accordingly.

Asteroids mining

The Canadian government predicts that asteroid mining could become a reality in the near future. While asteroid mining holds great potential for the extraction of valuable minerals, it is crucial to consider its potential impact on the environment. It is imperative that a responsible and sustainable approach to asteroid mining is taken to prevent unsustainable resource extraction and harm to Earth's ecosystem.



One of the key concerns surrounding asteroid mining is the issue of ownership and responsibility. Currently, celestial objects cannot be owned by any nation, but the mining of these objects will require clear territorial boundaries to avoid legal disputes. It is important for countries and companies to be held accountable for any harm caused by their actions in space, and the definition of harm and the consequences of such actions must be thoroughly discussed and determined. To ensure that asteroid mining is conducted in an ethical and responsible manner, it is necessary to address these issues and establish clear guidelines for ownership and responsibility.

Militarization of space

The militarization of space is becoming a growing concern as countries develop new military technologies and capabilities. Some fear an impending Arms Race as countries test offensive weaponry in space. The increasing militarization can heighten tensions, decrease access to space, and potentially lead to devastating consequences. There is currently minimal legislative infrastructure to address militarization in space, and existing treaties do not place restrictions on small-scale weapons. To ensure peace in outer space, the nuances of space militarization must be addressed and addressed through proper legislation.

Specificity of Legislation

In addition to the vagueness of space laws, the absence of an enforcement mechanism is also a major challenge. The international community has not established a system of courts or tribunals to enforce space law, meaning that disputes can only be resolved through diplomatic channels. This lack of enforcement makes it difficult to ensure compliance with international agreements and can lead to the violation of legal obligations. To address this issue, there is a need for the creation of a new legal mechanism, such as a space court, that can effectively enforce space laws. This would provide a way to resolve disputes and ensure compliance with international agreements. Furthermore, it would increase transparency and accountability in outer space activities. To achieve a peaceful and sustainable use of outer space, it is imperative that the international community addresses these challenges and develops a clear and enforceable set of space laws.

Space debris

Space debris refers to man-made objects left in space, including dead satellites and small particles. Currently, there are around 3,000 dead satellites in space, but small debris such as paint flecks will remain indefinitely. While there are UN regulations suggesting the removal of dead satellites after 25 years, this is not enforceable. The accumulation of small debris will eventually lead to the Kessler syndrome, where increasing collisions of debris will render Earth's orbit unusable. To mitigate the effects of space debris, regulations must be enforced, and comprehensive measures must be taken to prevent its accumulation.

Timeline of key events

December 13, 1958 - The United Nations General Assembly adopted the resolution "Question of the Peaceful Use of Outer Space" which established a legislative committee named the "Committee on the Peaceful Uses of Outer Space" (COPUOS) to encourage international cooperation through information sharing.

May 6, 1959 - COPUOS held its first meeting, attended by 13 out of 18 nations. This marked the first step towards regulating outer space for peaceful purposes and maintaining close contact with governmental and non-governmental space-related organizations.

December 12, 1959 - COPUOS was established as a permanent committee, enabling it to continue its work in space legislation for an extended period.

September 25, 1961 - U.S. President John F. Kennedy delivered a speech on the rule of law in outer space, where he emphasized that the exploration of outer space should not be driven by imperialistic and sovereign claims.

December 20, 1961 - the United Nations General Assembly adopted the resolution "International Cooperation in the Peaceful Uses of Outer Space". This resolution tasked COPUOS with studying and reporting any legal problems arising from the exploration of outer space, and recommended the development of meteorological and telecommunications technology to reflect current space research.

December 13, 1963 - the United Nations General Assembly adopted the "Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space", which was the first document to detail the specifics of space regulation. This resolution included nine principles, ranging from equality in space exploration to providing assistance to astronauts.

January 27, 1967 - the "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies," also known as the Outer Space Treaty, was opened for signatures. This treaty provides a basic framework for international space law and entered into force on October 10, 1967. As of 2021, 111 countries are party to the treaty, while 23 have signed it but have not yet ratified it.

December 18, 1979 - the "Agreement Governing the Activities of States on the Moon and Other Celestial Bodies" was opened for signatures. This agreement, which entered into force on July 11, 1984, reiterates points from previous resolutions and provides guidelines for harvesting natural resources on celestial objects.

January 11, 2007 - China destroyed an obsolete satellite with a ballistic missile, creating over 3,000 fragments of space debris.

December 22, 2007 - COPUOS adopted the Space Debris Mitigation Guidelines, a set of non-binding recommendations to address the dangers posed by space debris.

March 2, 2021 - Japanese billionaire Yusaku Maezawa announced an invitation for members of the public to join him on a circumlunar trip aboard a SpaceX spacecraft. This event highlights the growing interest and excitement for space tourism.

Major parties involved

China and Russia

The People's Republic of China and the Russian Federation have established a joint effort to construct a Lunar Research Station that will host a human crew. This partnership is expected to persist and continue into the future. Additionally, both nations are currently in the process of developing weaponry for use in outer space. For China, having the ability to utilize outer space for military purposes is advantageous in the event of potential contingencies in the Taiwan Strait. As a result, China initiated an anti-satellite weapons test in 2007, which drew international criticism and marked the first such test since the United States' test in the mid-1980s. The collaboration between China and Russia, along with their allies, aims to maintain their independence and ability to create weaponry without facing challenges.

USA and Allies

The United States has a strategic objective to enhance space safety, stability, and security while maintaining its national security advantages and promoting its space industrial base. In response to the development of space weaponry by China and Russia, the United States aims to increase its defensive capabilities in space and maintain the option to use weaponry in the future. The US space sector includes a large number of growing companies, which the US seeks to encourage economic development and public-private partnerships. However, the US is also wary of potential risks associated with the private space industry, such as space debris and overcrowding in low Earth orbit. Possible countries that may ally with the US include Germany, which has a significant investment in the private space sector, Japan, which has shifted its focus to space defence, and India, which has also increased its focus on space defence, as demonstrated by its anti-satellite test in March 2019.

Countries with Developed Space Programs and Frameworks

Nations included in this classification are New Zealand, Australia, France, and the United Kingdom. It is probable that these countries will endorse the advancement of space laws aimed at mitigating actions that could potentially damage the celestial environment (such as generating space debris) and encourage measures to prohibit the militarization of space. As an illustration, the United Kingdom has taken the lead in drafting a treaty prohibiting Kinetic Anti-Satellite (ASAT) Testing. Furthermore, France has established a national framework for space defence to address concerns relating to militarization.

Possible solution

International collaboration is essential in regulating outer space activities to ensure global peace and security. The United Nations can serve as a platform for nations to discuss space-related matters and share their experiences and expertise in developing space legislation. Developed nations can provide recommendations to nations with less developed space legislation, to help them establish their own effective laws and regulations. For instance, the United States, with its extensive space legislation, can offer guidance to other countries on how to regulate the private space sector effectively and balance economic growth with peaceful space exploration. Ultimately, each country should have the autonomy to assess and adopt these recommendations based on their specific needs and circumstances.



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