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The International Space Law Regime

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Current modern-day technologies that guide the global economy and our society are heavily reliant on aerospace technology. Anything from weather forecasting, satellite navigation systems and GPS, and long-distance communication critically rely on space infrastructure. Critical and emergency services during a natural disaster rely heavily on satellites to ensure adequate response and rescue. With how prominent outer space technology has become in our everyday lives it has become increasingly important to be learned in the field of international space law. Given new endeavours that are launched to harvest the potential of outer space and ever-increasing talks of new space missions, present international space law is being placed under intense scrutiny. It should be noted that the most major international legal documents in the field of space law were formed in the last century, and with the current pace of space-driven technologies, many of these laws have become ancient and irrelevant in the face of the current space era. This paper conveys an analysis of existing international space law and aims to put up important issues pertinent to the area.

Keywords: *space, law, gps.*

INTRODUCTION

"That's one small step for man. One giant leap for mankind."

-Neil Armstrong

Neil Armstrong was overwhelmed when he took his first steps on the Moon. This was a landmark event in the whole human race, which opened a completely new realm for us to explore and we didn't disappoint. With time, more feathers were added inspiring more and more discoveries. The USSR then launched Sputnik in 1957, and this historic event is often seen as the iconic start of space travel. In January 1958, the United States launched Explorer I. Since then, several countries like China, India, and the EU have joined the group of countries that have had their presence in space.

The pursuit of space exploration carries with it the rights and responsibilities that result from space activity. The laws governing intellectual property are then discussed to determine how and who might gain from space. It is through Intellectual Property Rights that the governments allow the creators to benefit from their work. Its purpose is to provide economic incentives for innovation, R&D, and growth. Just because an innovation occurs outside the limits of a country does not mean the creator cannot claim rights to it. The IP Law guarantees the author monopolistic rights, whereas the Space Law claims space is the "domain of all mankind." The IP Law protects the author's ownership rights over his or her creations, whereas the Space Law aims to advance global cooperation and goodwill. The existing legal framework for IP problems in outer space has to be reevaluated because the two regimes' subjects are different. About problems involving intellectual property outside of Earth's orbit, this dissertation discusses both international intellectual property law and international space law. It primarily focuses on patent concerns that are still unresolved in joint venture programs and on various copyright patterns that need to be consistent to address IP rights breaches on a single platform to safeguard intellectual property.

INTERNATIONAL SPACE LAW REGIME (ISLR)

United Nations General Assembly Resolution 1148 (1957)[1]

[1] 'Committee on the Peaceful Uses of Outer Space The Committee' *(United Nations Office for Outer Space Affairs)* <https://www.unoosa.org/oosa/en/ourwork/copuos/index.html> accessed 25 September 2022

The 'Peaceful Uses of Outer Space resolution was approved by the UN General Assembly in 1959. (UNCOPUOS) resolution. In 1957, a resolution to this effect was passed. The Legal Sub Committee (LSC) and the Scientific and Technical Sub Committee are two of the many subcommittees that make up the overall committee (STSC). The Legal and Technical Subcommittees of the Space Commission (LSC and STSC) assess each request for space activities that a member state submits to the General Assembly, and the outcomes of such evaluations are subsequently communicated to the General Assembly.

The Outer Space Treaty (1967)

The Outer Space Treaty says that space belongs to everyone and must be used with cooperation and understanding between countries. It has seventeen articles. Article I (the "Benefit Clause") says that all member nations are permitted to explore space, independent of their economic or scientific development. Article II (Non-Appropriation Principle) states that a government cannot claim dominion over outer space, the moon, or other celestial bodies, utilise them for military purposes, or occupy them in any other manner." All space operations must be carried out in conformity with international law and in a way that promotes and defends the objectives of international cooperation and mutual respect, according to Article III (International Law is the Most Important Thing).

Article VI (the "Liability Clause") makes it quite clear that all national operations in space, whether done by the government or private entities, are subject to international accountability on the part of States parties. In addition, it will ensure that these activities comply with the remaining provisions of the treaty, and if non-governmental organizations are involved, the appropriate state parties will be required to authorize and monitor them. When an international organisation conducts an activity in space, both the international organisation and the States Parties to the Treaty that are a member of that organisation are accountable for making sure the treaty is upheld.

A State Party is held liable under the Treaty for any harm caused by an object or its parts, including the launch or assistance of an object into orbit around the Moon and other celestial

bodies, according to Article VII (Liability Clause), which states that natural or legal persons located on Earth, in air space, or outer space, including the Moon and other celestial bodies, are subject to liability. The State Party from whence the item was launched is also included in this. Article VIII (Jurisdiction and Control) says that the State Party that has the object's registration has jurisdiction over and control over an object that has been launched into space.

The Rescue Agreement (1968)[2]

This agreement was designed to assist the astronauts if they encountered difficulties, had an accident, or needed to make an emergency landing. As an alternative, you might reach out directly to the launch authority, make a public notice, or notify Secretary-General Ban Ki-Moon of the situation. Because the agreement does not include provisions for the cost of rescuing and returning people and space objects, it is fundamentally flawed. Additionally, the Agreement is quiet on several important topics, like as:

- kind of mishap the spacecraft's crew must have experienced;
- the intensity of their anguish.

The Agreement is silent on several other matters, including expenses, the kind of mishap the spacecraft's crew had to experience, how distressed they were, and the kinds of emergency landings they had to make.[3]

[2] 'Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space' (*Rescue Agreement*) <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introrescueagreement.html> accessed 25 September 2022

[3] *Ibid*

The Liability Convention (1972)[4]

When a Member State launches an object into space, the Liability Convention determines who is accountable for it. "Launching State" was first described in the Rescue Agreement. The Liability Convention's Articles 1(a) and (b) go into greater info on this:

- A state that launches a space object or pays for it to be launched.
- A state from which a space object is launched.

Launching also includes attempts to launch. So, if you look at all three of the above points together, you can safely say that there are three main types of 'Launching States':

- The state that coordinates, aids, or assists the launch;
- The nation that launches; and
- The country whose land was used for the launch.

The OST grants the State of Registry authority and responsibility over its item that has been launched into space, but the launching State is the one that is held liable if something goes wrong, further complicating the issue. An Israeli satellite, for instance, went through the manufacturing and registration processes before its launch by the Indian government. This satellite left behind debris in space, which makes it harder to explore space and needs to be taken care of right away. Now, the Launching State, which is India, has to make sure that this disposal is done properly and by the rules of the OST. If it isn't, India will have to pay compensation to anyone who might be hurt by it, which would be unfair because the object is registered in Israel and it is Israel that has jurisdiction and control over it. In addition, the Convention addresses joint and several liabilities (Articles IV, V, and VI), liability grounds and compensation for losses, exceptions to the rule of total compensation, and the differentiation between the responsibilities of international and intergovernmental organizations.

[4] 'Convention on International Liability for Damage Caused by Space Objects' (*United Nations Office for Outer Space Affairs*) <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introrescueagreement.html> accessed 25 September 2022

The Registration Convention (1975)[5]

For this convention, the OST1967 meeting was the inspiration for its creation. With the help of this Convention, an in-depth explanation of Article VIII of the Convention was supplied. Registering is a substantial contribution to the campaign to preserve space for peaceful pursuits because of how important it is.

- To limit the possibility of weapons of mass devastation being secretly launched into orbit, a well-organized, thorough, and informational register is needed.
- It is impossible to identify a spacecraft that has inflicted harm without an international registry.

The Moon Treaty (1979)[6]

The pact encourages space exploration based on equality and acknowledges the Moon as the Earth's natural satellite. The fundamental aspects are listed in Article 21 of the Agreement as follows:

- A claim of sovereignty over the Moon does not make it subject to national acquisition.
- The "shared inheritance of mankind" concept.

The agreement's goal is to stimulate exploration but on an equal and unrestricted scale. Its primary goals are as follows:

- Development of the moon's natural riches in an organized and secure manner,
- Rational management of those resources,
- Expansion of Resource Utilization Possibilities, and
- Fair distribution of the advantages obtained from these resources across all states.

[5] 'Status of International Agreements Relating to Activities in Outer Space' (*United Nations Office for Outer Space Affairs)* <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/status/index.html> accessed 25 September 2022

[6] Moon Treaty 1979

INTERNATIONAL INTELLECTUAL PROPERTY RIGHTS REGIME (IIPR)

Paris Convention for Protection of Industrial Property (1883)[7]

"The Paris Convention for the Protection of Industrial Property, which is the primary international agreement for the protection of industrial property", makes no mention of inventions that are based on space travel or technologies that are related to space travel. This is because the Paris Convention was established in 1883. National treatment is envisioned in Article 2, whereas shared standards, such as steps to protect intellectual property rights, are outlined in Article 4, which establishes the priority right and shared standards. The patent rules of each country are also discussed in greater detail here. Patents awarded in different countries for the same invention are unrelated to one another. The Patent According to Article 5 of the Patent Act, it is legal to utilise an invention on a ship's hull, machinery, tackle, gear, and other accessories when the vessel enters the territorial waters of a nation that is a member of the Paris Union, provided that the patent holder's rights are not violated. Patented devices and parts cannot be utilised in aircraft or automobiles, even those that are temporarily or unintentionally in the nation because they are covered by intellectual property rights.

The Berne Convention for Protection of Literary and Artistic Works (1886)[8]

The Berne Union, made up of countries that have signed the Berne Convention, requires that all copyrighted works be treated equally. Literary and creative copyrights will be recognized in the same way as other countries' copyrights. Any work published in the US is subject to US copyright laws. The Berne Convention was signed in 1886. The Berne Convention protects all works against copyright infringement for 50 years after the creator's death. Related parties may, however, be protected more. 7.8 of the Berne Convention specifies the "rule of the shorter term" applies even when the country's copyright legislation is used. Even if the laws allow it, an author's copyright term cannot be longer than their home countries, but not everywhere. Copyrighted works can be used in other broadcasts or publications as long as they don't break

[7] Paris Convention for the Protection of Industrial Property 1883

[8] 'Summary of the Berne Convention for the Protection of Literary and Artistic Works (1886)' (*WIPO*) <https://www.wipo.int/treaties/en/ip/berne/summary_berne.html> accessed 25 September 2022

the law. When consumers talk to each other without permission, ISPs may not seem to be at fault.

Patent Cooperation Treaty (PCT) (1970)[9]

Using the Patent Cooperation Treaty (PCT), an international agreement governing intellectual property rights, you can file a single application for patent protection in many nations at once. The administration of the treaty is handled by WIPO. It has more than 150 signatories. These are the countries that have signed the PCT. Over 150 countries are covered by a PCT patent application, ensuring worldwide protection for your idea. Patents can be granted to major enterprises, research institutions, and universities. They avoid the pitfalls of filing separate applications in each nation of interest.

WIPO Copyright Treaty (1996)[10]

There are several examples of intellectual works that are protected by the WCT, including computer programs and data compilations or other resources (databases). Any public transmission of their works can be authorized, as can the availability of their works for public use at any time and from any location that the general public chooses. Spacecraft communications are also covered in this Article.

WTO/TRIPS[11]

Harmonizing intellectual property laws worldwide is a goal of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS); however, it is more focused on providing basic requirements than integrating laws from different countries". No reason can be expected that the industrialized countries' stance toward intellectual property rights (IPR) will alter, as they are more concerned with maintaining control over their creations. Consequently, "the issue of

[9] 'Summary of the Patent Cooperation Treaty (PCT) (1970)' (*WIPO*) <https://www.wipo.int/treaties/en/registration/pct/summary_pct.html> accessed 25 September 2022
[10] 'Summary of the WIPO Copyright Treaty (WCT) (1996)' (*WIPO*) <https://www.wipo.int/treaties/en/ip/wct/summary_wct.html> accessed 25 September 2022
[11] 'WTO: Intellectual Property (TRIPS) - Gateway' (*WTO*) <https://www.wto.org/english/tratop_e/trips_e/trips_e.htm> accessed 25 September 2022

differing patent laws in the States persists, and this complicates the decision of the relevant law for activities in outer space.

INTELLECTUAL PROPERTY AND SPACE ACTIVITIES

A state's sovereign jurisdiction is required to preserve and enforce intellectual property rights. The location-based nature of IP rights causes us problems when it comes to space activities. It's possible to draw a line in the sand while still preserving your IP. Space exploration can make use of the Moon and other celestial bodies. An object in space can do in space; c) an object in space can do within the confines of a state.

Intellectual property rules and international treaties, for example, may apply to space operations or activities that take place within the borders of a state or nation. At times, the need for international law may be felt more strongly when events take place outside the jurisdiction of one country's borders. If a state has the authority and jurisdiction to enact novel laws, it can do so. States can retain control of their ships and crews even if they are operating outside of their territorial seas under international agreements. The doctrine of quasi-territoriality of vessels takes it that, so far as persons, things, and acts (done) on board a vessel are concerned, the board of the vessel is a jurisdictional locus of its own, and, as such, is within the jurisdiction of the sovereign of the flag.[12]

Since "International law recognizes the exclusive jurisdiction of the state whose flag is flown as regards everything which occurs on board a ship on the high seas.",[13] some have claimed that domestic "IP law might apply to space objects registered in that state by analogy to ships flying that state's flag on the high seas and aircraft registered there."[14] At this juncture attention may

[12] Tony Velocci, 'Space, commercialized' (*Compass Magazine,* 27 January 2021) <https://compassmag.3ds.com/space-commercialized/> accessed 25 September 2022
[13] V Balakista Reddy, 'Commercialisation of Space Activity: Need for a Law' (*Deccan Herald,* 14 April 2015) <https://www.deccanherald.com/content/471680/commercialisation-space-activity-need-law.html> accessed 25 September 2022
[14] *Ibid*

be drawn toward the definition of 'space object', 'launching state', 'state of registry', and Article 8 of the Outer space treaty:

The term "space object" encompasses both spacecraft and launch vehicles, as well as the individual components that make up each. In the context of space exploration, a "launching state" is a country that either launches or contributes financially to the launch of an object in orbit. "State of the registry" is what Article II calls the list of space objects that a launching state keeps.[15]

Article 8 of Outer space treaty, 1967:

That State Party to the Treaty retains sovereignty over the spacecraft and its crew if it is launched from its territory. There is no difference in who owns a component of an object that is in space or has returned to Earth. Space-bound objects, as well as those built or landed on celestial bodies, are subject to this rule. It is required that they be returned to the Treaty State if they are located outside of the Treaty State's borders. Using the concept of quasi-territoriality, the state of registration now has control over its space object and the people working on it.

Launch and registration are two different things. If it is registered in a state, it is subject to that state's laws, no matter where it is located. The space object, on the other hand, is exempt from the laws of the launching state. In particular, Article 8 of the Outer Space Treaty should be taken seriously. An object launched into outer space and any persons on board shall be subject to the control of a State Party to the Treaty," it reads. Can the registration state only regulate and rule the space object once it is in orbit? Spacecraft launched from a treaty member's registry retain jurisdiction and authority. The only thing that can be retained is something that already exists. "A further question which may arise is, does the 'doctrine of temporary presence' as embodied in Article 5ter of Paris Convention for the Protection of Industrial Property, 1883 will be called into the picture as it is usually done in case of sea vessels?"

[15] *Ibid*

Patents: Patented Devices Forming Part of Vessels, Aircraft, or Land Vehicles:

"Article 5 of Paris Convention for the Protection of Industrial Property, 1883 provides":[16] "In any country of the Union the following shall not be considered as infringements of the rights of a patentee":

- "The use on board vessels of other countries of the Union of devices forming the subject of his patent in the body of the vessel, in the machinery, tackle, gear and other accessories, when such vessels temporarily or accidentally enter the waters of the said country, provided that such devices are used there exclusively for the needs of the vessel";
- "The use of devices forming the subject of the patent in the construction or operation of aircraft or land vehicles of other countries of the Union, or of accessories of such aircraft or land vehicles when those aircraft or land vehicles temporarily or accidentally enter the said country".

According to WIPO's reading of article 5ter, the idea of transitory presence does not include space objects; a definitive position has not been adopted. When looking for a way to apply IP laws to activities in space, we keep coming back to the idea that "the registration of all space objects that might have something to do with intellectual property is a requirement for the principle of quasi-territoriality to apply."[17] Article 21 of the International Space Station Intergovernmental Agreement can be used as an example of how IP rights are regulated in space. Due to its simplicity and effectiveness in regulating IP rights in space, it also provides a legal foundation for cooperative space activities.

Article 21(1) of the IGA defines "intellectual property" in the same way as article 2 of the 1967 Convention Establishing the World Intellectual Property Organization, which created the World Intellectual Property Organization. "Article 21(2) of the IGA, which talks about fiction, applies the doctrine of quasi-territoriality to the International Space Station. For IP law to apply, the activity must be seen as having happened on the territory of the Partner State (the IGA party

[16] Paris Convention for the Protection of Industrial Property 1883
[17] *Ibid*

state) of the element's register. Article 21(2) says that any action on a registered element of the European Space Agency can be considered to have happened in any European Partner State."[18]

In other words, a Partner State can't use its laws to stop another Partner State from filing a patent application that protects national security information that is secret or otherwise protected. For example, a Partner State can't delay or turn down a patent application that was filed in another Partner State. This agreement says that it won't get in the way of a Partner State's right to keep a patent application secret or limit how many patents it can file in the future. As part of an international agreement, it won't interfere with the ability of any other Partner State to control the spread.

Article 21.6 of the IGA says, "The temporary presence of any articles, including parts of a flight element, in transit between any place on Earth and any flight element of the Space Station registered by another partner state or ESA shall not be a basis for any patent infringement proceedings in the first Partner State." Partners in ISSIGA agreed that objects in space should only be there for a certain amount of time. Article 21 of the IGA seems to deal with the new problem of overlapping jurisdiction and different judicial processes that came up when the country joined the EU.

Analyses of Remote Sensing Patents and Database

On-creative databases sometimes referred to as 'sweat of the brow' databases, are databases that are not creative but based on a certain level of effort or investment.[19] "Non-creative databases do not meet the criteria for IP protection because they have not been mandated internationally. Members of WIPO have been debating the possibility of introducing worldwide copyright protection for non-original databases that now do not qualify for copyright protection."[20] In some places, traditional copyright laws protect databases that aren't new, but not in others.

[18] Convention establishing the World Intellectual Property Organization 1967
[19] 'Copyright and Databases' (*ESA*)
<https://www.esa.int/About_Us/Law_at_ESA/Intellectual_Property_Rights/Copyright_and_databases> accessed 25 September 2022
[20] 'Protection of Non-Original Databases' (*IP Copyrights Topics*)
<https://www.wipo.int/copyright/en/activities/databases.html> accessed 25 September 2022

Copyright violations with non-creative datasets are against the law. For example, the European Union's Database Directive 96/9/EC protects databases from copyright violations. Since remote sensing and geospatial technology are used in business, it is against the law to copy or use databases without permission.

First, let's look at how satellite remote sensing works. The first data from remote sensing are made by a computer in sensors on satellites. These data are sent to stations on the ground that can receive them. Raw data from remote sensing is hard for people to understand without processing.[21] The General Assembly's first international accord on remote sensing includes nothing about protecting remote sensing data intellectual property. It depends on how "original data" and "processed data" are defined: "Remote sensor data must be processed before usage. Electromagnetic signals, photographic film, or magnetic tape are used to return data to Earth" In between primary remote sensing data and protected analytical data is processing. Analyzed data is protected by copyright laws because it is derived from original data.[22]

There may be a problem if these definitions are used to protect intellectual property (IP). There can be a wide range of values for primary data, depending on what it is being used for. For example, some activities may require less processing, so the amount of creativity, judgment, skill, labour, and investment needed to qualify such primary data for intellectual property (IP) protection may not be enough. Catherine Doldirina is worried about the IP protection of data from remote sensing.[23]

Remote sensing data protection is complicated by the fact that it is frequently the content, not the expression, which needs to be safeguarded. The concept of copyright, on the other hand, does not lend itself well to such demands. It is suggested that content owners refrain from asserting that their copyright protections apply to it. "Licensing as a whole is a valid option.

[21] 'Principles Relating to Remote Sensing of the Earth from Outer Space:' (*United Nations Digital Library,* 3 December 1986) <https://digitallibrary.un.org/record/126423?ln=en> accessed 25 September 2022
[22] Reddy BV, *Emerging Trends in Air and Space Law: Proceedings of International Conference Held in NALSAR University of Law, Hyderabad, India* (Uppal Pub House 2007)
[23] *Ibid*

Although it lacks some of the negative rights that copyright gives on its owner, this method does at least bind the parties involved to adhere to the agreed-upon rules".

Patents

Novelty, non-obviousness, utility, or functioning may be difficult to prove for "space innovations" covered by alien patents. An invention that only works in microgravity can't always be proven beneficial, innovative, or novel on Earth. If a patent is created in space with the assistance of several nations, the law can likewise be unclear. Setting ground rules before starting a collaborative project is a good idea. The Intergovernmental Agreement for the International Space Station is one illustration of this.

"Since patent protection is location-based and because space belongs to everyone and cannot be controlled by any one government, enforcing intellectual property rights in space operations is difficult. The applicable space item or space vehicle's patent rights must be protected and upheld by the state of registry in line with its domestic intellectual property (IP) protection laws. However, "depending on the regulatory differences among states, companies involved in space activities that may produce patentable inventions may establish contractual arrangements and determine the state where protection is initially sought. This may in turn lead to complications stemming from 'forum shopping' or 'flags of convenience' practices, neither of which is considered an optimal path to follow." "There is still a need to develop a comprehensive international framework for patentable space inventions, even if the International Space Station Intergovernmental Agreement has provided some states with a legal framework for 'space invention' and a platform for cooperative space projects"

CONCLUSION

Many scientists believe intellectual property is crucial to promoting space exploration and wealth. Space operations boost the economy for everyone. Maintain the space program and protect your IP. Satellites collect data and produce patented ideas. The long-term economic success of IP protection. The use of intellectual property as a negotiating tactic has been reduced by many international organisations and high-level treaties like TRIPS. The use of international

space law rules could also help all countries economically and intellectually. The sovereign authority is essential to defend and enforce IP rights in space. It's a kind of territory. Space objects and vehicles link national legislation. ISIA is a great source of knowledge on space operations and IP law. Currently, the space business is unprotected by copyright laws. Copyright regulations may impact old remote sensing data sets. Patentable space technology or inventions that are novel and valuable are patented. Territoriality makes them difficult to apply.

Since spaceships exhibit or use quasi-territoriality, their marks may be protected by the trademark registration regime. The US IP laws are now considered quite consistent. National governments apply global concepts to suit their purposes. Governments may accept or agree on international standards for a space legal system. A space-related IP framework must take into account the concerns of governments, poor countries, technological advancements, exploration, and private sector use of space. "Weakening secrecy regulations governing cooperative space activities, and requirements for preserving noncreative databases and/or primary data sets generated by remote sensing activity may arise".

The protection of intellectual property rights in space is the subject of Chapter 3. The 20th century saw major changes in both intellectual property law and space law. "Even if space law began to emerge considerably earlier than intellectual property law, both fields grew a lot in the second half of the twentieth century. Technology improvements in space have led to the building of space stations and plan to build similar stations on the Moon and other celestial bodies".[24]

IPR PROTECTION IN OUTER SPACE ACTIVITIES

International law includes a section on space law. "Outer space" currently refers to a location that is 100 kilometers distant. This place makes me feel like I'm in another world. But no one agrees on where air ends and space begins. Spaceships usually stay within 100 kilometers of Earth, but planes usually avoid this area. Most space projects were paid for by the government

[24] 'NASA Is Recruiting to Send Humans to Mars as Soon as 2037' (*WION*, 6 August 2021) <https://www.wionews.com/science/nasa-is-recruiting-to-send-humans-to-mars-as-soon-as-2037-403689> accessed 25 September 2022

or the public sector until recently. Space exploration by corporations is now a common thing. Before, only the government could do this. Both government and non-government organisations are in charge of a nation's space activities, whether they are carried out by the former or the latter. This is stated in Article VI of the Outer Space Treaty. Non-government space activities need permission from the state. Microgravity research and microgravity remote sensing are two examples of this. Can the private sector do business in space in a safe way? Businesses need to make money to stay in business. For new technologies to be developed and sold, creative intellectual property protections are needed. A patent is an example of intellectual property. Both national and international laws protect the rights to intellectual property. Not as many people know about IP protection in space as they do about the problems it faces. It can take a long time for new rules to catch up with new technology. International space law is written down in the UN space accords. Even though these treaties usually cover what the government does in space, they do not cover intellectual property. As more and more non-governmental organizations (NGOs) work in space, the picture will become clearer.

OUTER SPACE: WHO OWNS IT? [25]

International law and the UN charter say that national ownership doesn't matter when it comes to exploring and using space and celestial bodies. On December 20, 1961, the UN passed resolution 1721, which says that national ownership doesn't matter. Article II of the Outer Space Treaty says that a government that claims sovereignty over outer space, which includes the Moon and other celestial bodies, cannot take it "by use, occupation, or any other means." In other words, there is no such thing as nationalism in space. The name for it is "*Res Communista*." It is in the public domain, which means that anyone can use it. No one owns or controls space, so anyone can do whatever they want with it. But this doesn't mean that states couldn't have some control over how space is explored and used. "Article VIII of the 1967 Outer Space Treaty says

[25] 'International Space Law' (*Space Foundation,* 10 February 2021) <https://www.spacefoundation.org/space_brief/international-space-law/#:~:text=The%20Outer%20Space%20Treaty,-%E2%80%9CTreaty%20on%20Principles&text=There%20is%20no%20claim%20for,be%20used%20for%20peaceful%20purposes> accessed 25 September 2022

that a space object or its people should stay under the control of the country that registered the object".

INTERNATIONAL REGIME OF SPACE LAW

There was a lot of space law to sort out for a while. Owning space was a big deal for a lot of people. On the list of concerns were questions about who had control over space objects, who was responsible for damage, and whether or not governments had to pay for them. People talked a lot about space exploration, and they argued about whether or not it should be governed by the same rules as water and air. The United Nations set up COPUOS to look into these issues and questions (CO-PUOS). Celestial bodies and outer space are governed by international law and the United Nations Charter. As long as they adhere to international law, all nations are allowed to explore and utilise space, as stated by Resolution 1721 on December 20, 1961. The International Law of Outer Space has altered over time as a result of several accords and treaties related to space law. "Between 1967 and 1979, the Outer Space Treaty, the Rescue Agreement, the Registration Convention, and the Liability Convention were all signed. The Outer Space Treaty is the most important thing ever made. The Space Treaty has a set of rules for civil aviation, similar to the Chicago Convention of 1944. First of all, the 1967 Outer Space Treaty set the stage for future changes in laws about space. It sets the rules for how space can be explored and used. Here are the rules you need to follow":[26]

Right to Use in Outer Space but Not to Appropriate It

The Outer Space Treaty of 1967 deals with the right to use under Articles 1 and 2. Article 2 says that Outer Space can't be taken over by a country by claiming sovereignty, using it, occupying it, or any other way, as Article 1 says. Space is open for usage and exploration by all countries. As a result, space is not under government authority.

[26] '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 25 September 2022

International Law Application: According to Article 3 of the Outer Space Treaty, all parties operating in space must abide by international law, including the UN Charter.

Injunction on Mankind to Utilise Outer Space for Peaceful Ends: "Under Article 4 of the United Nations Charter, state parties are required to use outer space only for peaceful purposes".

Involvement of the Government in Private Activities: When it comes to government and non-government space activity, Article 6 mandates that the state is responsible for approving and keeping an eye on these endeavours.

Damage Liability: These treaties and conventions hold states accountable for any harm they cause third parties. "Any harm to the Earth's surface or an aircraft in flight is entirely the fault of the launching state. A launching state is liable for any harm caused to other spacecraft". The term "defect" is not defined in the Outer Space Treaty. A fault is a culpa. However, it's unclear how much carelessness or guilt is necessary. The state from which the space object is launched, or whose resources are used to launch it, is known as the "launching state."

Registration of Space Object: This obligation is stated in Article 8 of the 1975 Registration Convention. States are required by both of these standards to have jurisdiction over and control over registered space objects. In addition to these five significant accords, the UN General Assembly has also adopted five space-related resolutions. Those are:[27]

- Laws that control governmental activity in space exploration and utilization were established in 1963,
- 1982 guidelines for direct satellite transmission (DBS),
- Remote sensing principles from 1986,
- Guidelines for the use of nuclear energy in outer space were adopted in 1992

[27] 'Status of International Agreements relating to Activities in Outer Space' (*United Nations Office for Outer Space Affairs*) <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/status/index.html> accessed 25 September 2022

- Third-world countries profit from the 1996 statement on international cooperation in outer space.

Industrial property includes business-useable inventions, whereas "literary and artistic property" includes cultural works of art. SUI GENERIS systems are required as technology advances. A patent is a sort of industrial property. Copyright is a sort of literary property. Sui Generis methods also protect "Plant Breeder's Rights and Integrated Circuit Layout Design Protections." Globally, organizations and treaties defend intellectual property. The World Intellectual Property Organization (WIPO) is the most vital (WIPO). An international agency based in Geneva has been handling most international intellectual property treaties since 1967.[28]

IMPORTANCE OF IPR IN SPACE REGIME

The protection of intellectual property in space has just lately been a prominent emphasis. Private and commercial interests are gradually replacing state-owned ones in space exploration and development. "Remote sensing from space, broadcasting directly from space, and research and production in microgravity are some of the possibilities". As a result, businesses and government agencies are becoming increasingly commercial. They are also growing more aware of their assets. Without funds or expertise, governments and private firms are collaborating on space initiatives. More government and private space agencies are licensing each other. Private investment in R&D must be justified in the long run. Thus, maintaining intellectual property rights in space operations facilitates private sector participation.

As space operations become more global, protecting intellectual property rights becomes even more critical. The International Space Station (ISS) is a new space trend (ISS). As a result, a reliable international legal system is essential. National intellectual property laws are efficiently coordinated, but ideas vary. A space intellectual property system must be implemented as soon as possible.

[28] 'Resolution Adopted By The General Assembly' (*Status of International Agreements relating to Activities in Outer Space*) <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/liability-convention.html> accessed 25 September 2022

The third benefit is the new business opportunities. Space tourism is now conceivable, against popular belief. Patents and trademarks must be protected if space tourism is commercialized so having a legal framework to protect IPRs during space activities is critical. States and other groups involved in space exploration need to work together. Protecting intellectual property rights will increase interest in space exploration.

NATIONAL/REGIONAL IP LAWS IN OUTER SPACE

Most laws about intellectual property only apply to the country that made them. Because of this, the country's rules about IP are followed. In addition to the WIPO treaties, national and regional IP laws have also been brought into line. But intellectual property laws vary a lot from country to country and region to region, so different amounts of protection are given.

International space law, on the other hand, says that no government has the right to claim control over space (Article II of the Outer Space Treaty). The Outer Space Treaty says that launched objects are not in space. Article VIII of the Outer Space Treaty says that a government that registers a spacecraft keeps control over the ship and the people on it. The Registration Convention also says how to find the person who registered an interstellar object. Before a "launching State" can send a spacecraft into space, its land or building must be properly registered. A "launching State" is a country that is in charge of a satellite launch or pays for it. The thing has to be registered in one of the countries. This can't be changed by jurisdiction and control agreements with other countries. So, any crew members are still subject to the rules of the place they are in. In other words, the nationality of the crew determines who is in charge of the spaceship.[29]

People worry about whether intellectual property laws can protect things that are registered in a country and then sent into space. What laws should be followed if the job is done outside of the country where it was first done? Who makes sure that international space law is followed? In the second case, each country's own rules about intellectual property apply. The first one has

[29] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (n26)

no rules. No matter where the idea comes from, intellectual property rules might need to be changed.

"So far, only the United States has passed legislation explicitly tying inventions, authority, and geographic territory together. Section 105 of 35 U.S.C[30]. (Inventions in outer space) reads as follows":

- "Any invention made, used, or sold in outer space on a space object or component thereof under the jurisdiction or control of the United States shall be considered to be made, used, or sold within the United States for this title, except concerning any space object or component thereof that is specifically identified and otherwise provided for by an international agreement to which the United States is a party, or concerning any space object or component thereof that is carried on the registry of a foreign state by the Convention on Registration of Objects Launched into Outer Space."
- "Any invention made, used or sold in outer space on a space object or component thereof that is carried out on the registry of a foreign state by the Convention on Registration of Objects Launched into Outer Space, shall be considered to be made, used or sold within the United States for this title if specifically so agreed in an international agreement between the United States and the state of registry."

If there isn't an international agreement, something that is registered in the US almost only affects the US. Germany is not like other countries because it has clear laws. The 1988 Intergovernmental Agreement says that German IP law applies to ESA-registered objects. "Some people say that intellectual property laws at the national level might not apply to space objects that are registered in that state. Even though it's not clear if the national patent law covers things in space, some people think it does. In addition, the European Commission's proposal for a Council Regulation on the Community Patent emphasizes that it can be used for inventions

[30] '35 U.S. Code § 105 - Inventions in Outer Space' (*Legal Information Institute*) <https://www.law.cornell.edu/uscode/text/35/105> accessed 25 September 2022

made in space by one or more member states that follow international law. This should make things clear about Europe".

Concerning trademarks and industrial designs, there is uncertainty. "Because the status of a work is based on the origin of the creator, copyright protection is indifferent to the location of a spaceship. Article 3(1)(a) and (b) of the Berne Convention applies to authors who are nationals or residents of a Berne Union member state. Article 3(1)(b) of the Berne Convention provides that only unprotected authors are affected by the location of an initial publication". Since the vast majority of publications require several copies, this is improbable. Even if a database is created in space, its protection under the Berne Convention may be limited.

COHERENCE BETWEEN IP AND SPACE LEGISLATION

It is controlled by national or territorial legislation. These laws are brought into compliance with one another thanks to international accords like WIPO, WTO/TRIPS, and others. These regulations could harm space activities globally as a result. They shouldn't be utilised there because it is neither someone's property nor under their authority. A standard and harmonised approach for safeguarding intellectual property in space is required for the benefit of emerging nations. This involves applying Earth-based national laws in space, possessing rights and privileges that may be used for cooperative endeavours, resolving disputes, and upholding international responsibilities. IP rules are being introduced into space through national, regional, and international efforts. Only the US has enacted new patent laws to expand its jurisdiction. Only the US Space Bill and the NASA Act now address how domestic intellectual property law relates to space-related activities. With the US Space Bill, US patent law can be used in space. Under the NASA Act, a "space object" is a "vehicle."

INDIAN SPACE REGULATIONS

Many countries, including India, have failed to pass legislation governing space exploration. Solving this complex legal issue could be as simple as passing comprehensive domestic space legislation along the lines of what other developed and developing countries have already done. Indian signatures can be found on all of the major international space treaties. "Indian themes

have been included in five sets of legal principles accepted by the United Nations General Assembly. Global cooperation and concord are hoped to be fostered by this, together with the enforcement of international law. In addition, domestic legislation must be used to meet the numerous criteria of these standards. The list I of the seventh schedule of the Indian Constitution gives the Union complete control over all space activities". As a result, legislation addressing several aspects of India's space policy must first be approved by the Indian Parliament before any further action can be done. "As a result of recent events in India and across the world, as well as private sector involvement and the commercialization of space operations, as well as national and international agreements with a range of organizations and governments, strong space laws are now required by law".[31]

To make it simpler for departments throughout the nation to collaborate and to standardise the current institutional framework, India needs to examine and formalise its institutional structure. India needs limits on space flying for two key reasons. Clarifying the fundamental legal rules and principles that govern both the public law and the private law aspects of space activities is vitally necessary. Public laws in the space sector govern a variety of topics, including the resolution of disputes, the control of space industries and activities, and the jurisdiction of courts over space activities and installations. Some examples of private property laws are contract and indemnity laws. Internal lawyer India is currently commercializing its space operations, generating a vast and increasing market for its space products Clarification may be required about the connection between Antrix and industry, the participation of private entities in space activities in India and elsewhere, the exchange of information, and the marketing of products. India must promptly put its space laws into effect because significant advancements are taking place not just within the country but also beyond. As a result, India urgently needs a National Space Law. Many legal and business issues must be resolved before India's space legislation may be implemented. To reduce regulatory risks, communication satellite authorizations, licenses and approvals must be properly governed.

[31] Prof. (Dr.) Ranbir Singh et al., '*Current Developments in Air and Space Laws*' (first published 2012, Delhi University Press)

"Better utilization of existing infrastructure and resources can be achieved by a well-defined space law:

- Aiming to promote the orderly and organized evolution of the space industry by giving acknowledgement to ongoing space activities;
- giving a chance to domestic and foreign space operators;
- Instigating the creation of indigenous technology that is on par with global best practices;
- Enforcement and prevention of misuse of space operations; and
- Providing mechanisms for enforcement and prevention ensuring that those who break the law of space are held accountable."

The Commercial Space Act of 1998, the Land Remote Sensing Policy Act of 1992, "and the Inventions in Outer Space Act, among other pieces of legislation, should be examined critically and objectively by India to craft its own set of rules in the area of space. "As part of India's domestic space law, the following clauses should be included":

- Control all aeronautical and space activities save those linked to the development of weapons systems, military operations, or the defence of India.
- Commercial usage of space should be encouraged,
- The development of vehicles capable of transporting biological organisms and equipment into space should be encouraged,
- Establishing licensing standards for space entrepreneurs involved in diverse commercial activities and applications is a necessary fourth step.
- Ensure the protection of intellectual property rights and environmental protection;
- To cultivate space professionals, it is necessary to promote and manage autonomous educational institutions of international standards;
- Include insurance and indemnification clauses, as well as liability provisions;
- International cooperation in public safety and the space industry is made possible;
- Allow for cooperation with the military's defence systems."

There must be a national space agency, as well as rules safeguarding intellectual property in space and restrictions on spacecraft and astronauts' usage of them under the proposed legislation. Because our nation's space policy needs to be comprehensive and harmonious, this draft should be a confluence of various regulations.[32] Chapter 4 talks about the intersections between various national space laws and policies. With the whole world now becoming a global family, international boundaries have blurred to somewhat the extent that there is a significant hike in joint ventures. This brings in the need to study as well as compare space laws of various countries and come to a point of consensus. IPR is the main area of study of this dissertation paper and thus the whole comparison is made with the IP laws as a centre of study with Space Laws.

CONCLUSION

The "shared Heritage of Mankind," space, offers tremendous opportunities for several joint programs combining national governments and business organisations and links them for creative uses for the benefit of all humanity. In the space regime, intellectual property rights necessitate a few special considerations. To resolve the conflicts between Intellectual Property Laws and the Space Law regime, the international community involved in IPR and Space Law may develop a unified framework under the supervision of UN Bodies like UN COPUOS and WIPO. Such a harmonised system of IPR control for outer space should comply with the fundamental principles of international space law and other international agreements. It is also highly suggested that the harmonised system take into account the demands of developing countries and promote the moral and ethical use of space for the benefit of all humankind

[32] Shashi Sharma, 'Space Program and Business in India - Legal Perspectives' (*Bepress Legal Repository*, 8 January 2007) <https://law.bepress.com/expresso/eps/1923/> accessed 25 September 2022