

## AN EXPOSITION OF THE CONCEPT OF INTELLECTUAL PROPERTY PROTECTION IN OUTER SPACE\*

### Abstract

*The relevance and importance of having in place the requisite legal framework for the protection of intellectual property rights for outer space activities cannot be over emphasized. This research examined the interplay between intellectual property and space activities and found that though there is no questioning the fact that intellectual property is essential for exploring space and further contributing to research and development, however, certain conflicts and ambiguities between the two persist. For one, the enforcement of any intellectual property may be in conflict with the principle of free and fair access to knowledge, information and resources derived from space activities and assured by the space treaties and may cause hindrance to the same. Furthermore, the issue of the homogeneity of international law and the territoriality of Intellectual property laws is a challenge. The research adopted descriptive, analytical and comparative methods and relied on data from primary and secondary sources. The primary sources consisted of the United Nations Space Law Treaties, IP Statutes, regional and international legal instruments. The secondary sources include textbooks, journals articles, internet materials, newspapers and magazine. The research delved into the necessity of finding ways around the 'IPR for Space activities' challenge and the need to have in place a legal framework for IPR protection in outer space. This research concludes by recommending amongst others the establishment of a uniform legislative regime governing IP laws in space so that even the developing countries can benefit from their creations rather than being overshadowed by the developed ones. Another approach recommended is the widening of national and international IP laws to cover protection in space.*

**Keywords:** Intellectual Property, Intellectual Property Rights, Outer Space, Space Law Treaties

### 1. Introduction

There has been a lot of discussion recently about intellectual property protection in space and the reason is not far-fetched. There is a rise in private sector-led space flight and space technology development; with this growth in inventiveness comes the need for regulations to protect these individual Intellectual Property (IP) rights. Normally, IP protection in space should not be a problem, but one of the main issues with the protection of creations in space is that the foundation for IP law for Space was laid down during the Cold War era, when Space was a national interest, whereas intellectual property rights aim to protect the interests of private owners, entities, and creators within nations. Furthermore, unlike Intellectual Property Rights (IPR), which are territorial in nature, Space Law is a part of international law and hence uniform for all governments. Incorporating IPR into space thus indicates that the state is willing and capable of providing protection to creations that exist outside of its traditional territorial bounds, in Outer Space. In the event that the creation is economically exploited in Space, the owner of the creation has the right to pursue legal recourse. The private sector's technological and financial contributions are likely to become increasingly crucial in the future growth of space activities. Although there are a variety of public policy measures that could be used to entice the private sector to participate, intellectual property protection will be critical in building effective public-private space business models. Given the rising focus on commercial activities and joint ventures between private and governments, it is critical that legal infrastructure for IP protection be developed quickly before related concerns become a tangle.

### 2. Definition of Terms

#### What are Intellectual Property Rights (IPR)?

Individuals are granted intellectual property rights, as defined by law, for their intellectual creations. Copyright, trademark, design, trade secrets, and patent protection are all examples of these creations. They grant the owner or author, just like any other property right, the legal and economic right to profit from their work. Indeed as explained by Ugbe, IPR are usually granted so that no one can annex the fruits of the labour of owners such as authors, lawyers, actors, playwrights, publishers, artists, musicians, procedures of computer systems, proprietors of trademarks or registered users such as manufactures of goods and products, technicians, technologists, medical scientists, engineers, designers etc.<sup>1</sup>

---

\*By Anne Uruegi AGI, LL.M, Lecturer, Faculty of Law, University of Calabar, Nigeria. Email: anneagi@yahoo.com

<sup>1</sup> R. O. Ugbe, B. F. Anyatang, 'Protection of Intellectual Property Right and Unfair Competition' (Nov 2020) 08-40-57 In book: 'Nigerian Political Economy and the Courtship with Poverty: A Compendium of Readings in honour of Prof. Patrick O. Utomi' (Chapter 22). (2020 Publisher: KAI Consulting Calabar)  
<[https://www.researchgate.net/publication/345508065\\_Protection\\_of\\_Intellectual\\_Property\\_Right\\_and\\_Unfair\\_Competition\\_03-Nov-2020\\_08-40-57](https://www.researchgate.net/publication/345508065_Protection_of_Intellectual_Property_Right_and_Unfair_Competition_03-Nov-2020_08-40-57)> Accessed 22 December, 2021.

### What is Outer Space?

Although there is no universally accepted definition of where the earth ends and outer space begins, the most widely accepted view is that a demarcation line for outer space exists at 100 kilometers above mean sea level. The 'Kármán line,' named for its originator, Hungarian-American physicist Theodore von Kármán, is a globally recognized boundary. This line of demarcation is useful for recognizing that certain legal rights that have traditionally applied on Earth may not apply if economic activity moves into space.<sup>2</sup> Another relevant term is 'Low Earth Orbit,' which refers to an altitude of up to 2,000 kilometers. Most action for outer space, at least for the twenty-first century, will be confined to LEO, the Moon, and Mars. Now, it is common knowledge that intellectual property rules are hampered by jurisdictional restrictions. But what happens when one is in space? Are intellectual property rights vital in space? Is it possible to confine space to jurisdiction and boundaries? Is it necessary to strike a balance between intellectual property rights and space activities? These and other questions are the focus of this study.

### 3. The Rising Interplay between IPR and Outer Space

The demand for intellectual property protection is not new. Certain circumstances, however, are to blame for the current debates about its application to space activities. The increasing importance of intellectual property rights protection in space is due to the globalization of space operations. With the advent of globalization, it is now abundantly obvious that outer space activities have widened from 'government only' exploration to the enthusiastic participation of private entities. Whereas during the space race era, nations competed to outsmart each other in space exploration, and outer space was primarily used for exploration and practical purposes such as satellite communications and weather surveillance,<sup>3</sup> there is now a significant migration to private ventures and commercial activities—along with an increased focus on commercial activities and initiatives such as outer space tourism, mining of outer space objects, the development of orbiting space hotels and even potential human settlements on the Moon and Mars.<sup>4</sup>

Private commercial ventures/companies have shown a strong interest in, and have invested in the exploration of outer space, as well as actively participated in assisting the government in making greater strides in outer space. Due to the financial and technical resources at their disposal, these companies are collaborating with government agencies on space activities.<sup>5</sup> They have aided space exploration and research by offering services such as fabrication, remote sensing from space, direct broadcasting, supplying materials needed to launch any type of space vehicle,<sup>6</sup> constructing space vehicles, and conducting research and manufacturing in microgravity environments.<sup>7</sup> Jeff Bezos' company, 'Blue Origin', has successfully launched a variety of rockets designed to accommodate space travel and scientific experimentation, Virgin Galactic owned by Richard Branson, continues to test pilot suborbital flights designed for space tourism, and Elon Musk's 'SpaceX', has partnered with NASA to facilitate transport to the International Space Station (ISS) while maintaining a mission to colonize Mars. These private enterprises designed and developed some of these space capsules, which feature unique designs never seen before. SpaceX, for example, has upgraded its 'Dragon Capsule' by adding a touch screen control panel to a crew capsule. This upgrade to the capsule not only gave the Astronauts a more earthlike experience, but it also increased compatibility and long-term viability. This design-based adaptation was recognized as the Space Mission's most groundbreaking experience.<sup>8</sup> As these advancements have become more of a private or commercial affair rather than a state-run activity, questions of Intellectual Property Rights governing these advancements have only recently been raised, owing to the fact that these entities need to recoup their resources and make a profit. Intellectual property rights, such as patents, copyrights, trademarks, and trade secrets, are the outcome of their ingenuity, and these non-governmental organizations are more aware of safeguarding their property/investments in tangible and intangible forms.<sup>9</sup> Indeed, as a result of globalization, a growing number of space activities are

---

<sup>2</sup> The US has traditionally refused to recognize the Kármán line or any other proposed delineations for an 'outer space border.'

<sup>3</sup> C. W. Lackert and J. Goodwill, 'Outer Space: Time to Address the real –world IP Issues', [https://www.americanbar.org/groups/intellectual\\_property\\_law/publications/landslide-extra/outer-space/#:~:text=Although%20some%20existing%20treaties%20recognize,copyrights%2C%20despite%20their%20commercial%20value.](https://www.americanbar.org/groups/intellectual_property_law/publications/landslide-extra/outer-space/#:~:text=Although%20some%20existing%20treaties%20recognize,copyrights%2C%20despite%20their%20commercial%20value.) Accessed 22 December, 2021.

<sup>4</sup> *ibid*

<sup>5</sup> Swayamsiddha Das, 'How does IP Law work in outer space?' <https://blog.ipleaders.in/ip-law-work-outer-space/> Accessed 22 December, 2021.

<sup>6</sup> *ibid*

<sup>7</sup> *ibid*

<sup>8</sup> C. W. Lackert and J. Goodwill, *ibid.*, (n. 4)

<sup>9</sup> J. Sankalp, 'Intellectual Property Protection in Outer Space Activities', [https://www.researchgate.net/publication/315458544\\_Intellectual\\_Property\\_Protection\\_in\\_Outer\\_Space\\_Activities](https://www.researchgate.net/publication/315458544_Intellectual_Property_Protection_in_Outer_Space_Activities) Accessed 14 December, 2021

conducted under international cooperation schemes;<sup>10</sup> as a result, even though national intellectual property laws are well harmonized, different national laws still apply different principles, necessitating the creation of a simple, uniform, and reliable international legal framework for the protection of intellectual property rights in space activities.

Another reason for the growing importance of IP rights in space is that new commercial opportunities are opening up as space technology advances. For example, while space tourism remains a pipe dream for the general public, advancements in space transportation technology have paved the path for it. So far, the key issues when considering intellectual property rights protection for space operations have been patent protection of inventions generated or utilized in space, or copyright protection of databases based on data gathered through space activities. However, if space tourism becomes a reality, trademark and industrial design protection in space may become a significant issue. Currently, the existing space laws are out of sync with these evolving commercial uses of outer space as most of the initial treaties and legislation tied to outer space activities are focused on government activities and national ownership of physical property like satellites and spacecraft. While recent multilateral accords have acknowledged the importance of addressing concerns of private rights, none of the existing agreements have succeeded in filling the vacuum by providing complete ownership and enforcement procedures for private property in space.<sup>11</sup> As a result, the necessity of establishing a legal framework that safeguards intellectual property rights in space activities cannot be overstated. Without such a structure, effective international cooperation among states and other groups involved in space research suffers. IPR protection will encourage creators and investors to participate more actively in space research and exploration for the benefit of the general public.<sup>12</sup>

#### 4. Necessity for a Legal Framework for IPR Protection in Outer Space

While the national laws and international agreements governing intellectual property protection on earth are well-known and unresolved areas are fairly well-defined, in space however, intellectual property protection is subject to greater unknowns.<sup>13</sup> While several existing treaties recognize the use of private physical possessions in space, they do not explicitly regulate intellectual property protection, which is critical if the private sector is to participate commercially in space activities. To protect their intellectual property (IP) creations, investors in outer space commercial activities are forced to rely on a patchwork of treaties, agreements, understandings, declarations, and legislation—all of which are mostly outdated and often do not account for private enterprises or private rights of ownership.<sup>14</sup> The five international accords dealing to outer space are well known to us.<sup>15</sup> The main treaty, ‘The Outer Space Treaty of 1967’ is concerned exclusively with government entities’ actions in space. The Treaty refers to ‘state actors’ in numerous of its Articles, yet there is no mention of private actors. For example, Article I of the Treaty declares that ‘all states are free to use and explore outer space.’ As a result, no single state can claim ownership of outer space.<sup>16</sup> Article II of the Treaty states that ‘outer space should not be subject to any kind of national appropriation through sovereignty’, again alluding to only state nations. In this regard, Outer space, like the high seas and Antarctica, is not subject to national appropriation or any other means, and it is not under any national sovereignty. To track ownership, Article VIII of the Treaty, which deals with the jurisdiction and control over a space object by any personnel thereof, stipulates that such control shall remain in the *state* which registers such space object. When there are two or more launching states, the parties must decide which one shall have jurisdiction and authority over the object. Despite the fact that the innovation is registered and protected under the laws of the country in which it is created, the legislation that governs the activities of such an invention remains a big blank place. Furthermore, despite the fact that Article VI of the Outer Space Treaty of 1967 states that ‘States shall be responsible internationally for national activities in outer space carried out by governmental agencies or non-governmental agencies, and shall authorize the activities of non-governmental agencies,’ there are no provisions for private actors to own space property, nor are there enforcement checks in place when rights to these property are contravened.’ Even more problematic is the fact that no intellectual property rights can be claimed in

---

<sup>10</sup>WIPO, ‘Patent Expert Issues: Inventions in Space’ [https://www.wipo.int/patents/en/topics/outer\\_space.html](https://www.wipo.int/patents/en/topics/outer_space.html) Accessed 14 December, 2021.

<sup>11</sup> C. W. Lackert and J. Goodwill, *ibid*, (n. 4)

<sup>12</sup> *Swayamsiddha Das*, *ibid*, (n. 5).

<sup>13</sup> J. Sankalp, *ibid*, (n. 10).

<sup>14</sup> C. W. Lackert and J. Goodwill, *ibid*, (n. 4)

<sup>15</sup> There are: The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies 1967, (The Outer Space Treaty); The Convention on International Liability for Damage Caused by Space Objects, 1973 (The Liability Convention); The Agreement on the Rescue of Astronauts and Return of Objects Launched into Outer Space 1968 (The Rescue Agreement); The Convention on the Registration of Objects Launched into Outer Space, 1976 (Registration Convention); and The Agreement Governing the Activities of States on the Moon and other Celestial Bodies, 1979 (The Moon Agreement).

<sup>16</sup> It is regarded as ‘Res-Communis’ which means in the public domain or public property

Space as it is historically regarded as a common heritage of all mankind<sup>17</sup> and the provisions of the Outer Space Treaty (OST) mandate the sharing of the benefits derived from Space; this means that individual rights are still a long way off as it is only on an object that is launched into space that a person/nation has exclusive rights over.

As can be seen from the foregoing, the Outer Space Treaty is solely concerned with governments and their actions in space; private actors and their special rights are not considered.<sup>18</sup> This is a tough one for space tech creators as one of the benefits of intellectual property protection is that it provides incentives to the owners/creators for the fruits of their labor; therefore protecting one's innovation is critical to their success.<sup>19</sup> Thus without laws providing for strong intellectual property protection, private actors will have no incentive for investment, leading to low motivation to create and ultimately leading to a dearth of ideas and the required technology for that sector. It is therefore very essential that IP rights in outer space, be identified and protected, so that the private sectors can actively participate in space exploration.

## 5. IP Rights Requiring Protection in Outer Space

### Copyright in Outer Space

The term 'Copyright' as a legal term does not have a precise definition. However, one can safely say that copyright is the exclusive legal right granted to the creator of any work, whether he be an author or artist, to copy, reproduce, sell, make an adaptation or transfer his creative works to another to do same. It is usually for a limited period. Copyright subsists in original literary, dramatic, and artistic works by writers and creators.<sup>20</sup> Copyright protects the original expression of ideas rather than the ideas themselves. As a result, 'originality' is seen as a critical criterion for deciding whether or not a work qualifies for copyright protection. Such originality, however, lies in the expression of thought rather than the originality of the idea.<sup>21</sup> However, copyright exists in the final processed or value-added data generated after the raw spatial data has been disseminated. Indeed the transmission and reception from these satellites can be safeguarded by copyrights. The issue then to consider is 'who is the author of such work'? In most cases, the first owner of the copyright is the author/creator of the work, however in this situation, the first owner is the machine (Earth observation satellites) that collects data without any human intervention in space. As a result, determining who owns such work becomes more challenging. Second, depending on a country's copyright laws, the level of originality required to seek for copyright protection varies. This means that while a specific type of spatial database may be protected by copyright in some countries, similar data may not be protected in others, despite the fact that the images transmitted by these Remote Sensing Satellites are used in weather forecasting, environmental monitoring, terrain mapping, and other applications, and have significant copyright value. Indeed, since the 1960s, preventing illicit interception and use of copyrighted works carried by satellite has been a global problem. Laws governing the same are woefully inadequate.<sup>22</sup> Such copyright issues can also emerge from the direct broadcast satellite technology.<sup>23</sup>

### Trademark in Outer Space

The basic goal of a trademark is to preserve a company's goodwill associated with its products and services. Trademarks must be different and unique in order to serve as a source identifier in the marketplace. Trademarks are symbols, words, or a combination of colors that relate to the reputation and branding of the goods and services in question. While there are no concerns with trademarks in space at the moment, trademarks will not be able to avoid infringement for much longer due to the increase in space travel. Thus the time has come for trademarks for space-related products and services to be carefully secured to avoid misunderstandings, diffusion, and to allow third parties to distinguish their invention from that of others. For instance, companies such as SpaceX and Orbital Sciences Corp. engaged in manufacturing and commercial upstarts would seek to protect their invention and reputation in space. Virgin Galactic is aiming to engage in commercial space trade in outer space, and as a result, anybody wishing to profit from this trade will need to seek trademark protection. There is currently no provision

---

<sup>17</sup> Article I, para 1, OST

<sup>18</sup> Ibid.

<sup>19</sup> A. Singh, (2018) 'India: Intellectual Property Law And The Outer Space: A Promising Future Ahead?' <<https://www.mondaq.com/india/trademark/762020/intellectual-property-law-and-the-outer-space-a-promising-future-ahead>> Accessed 12 December, 2022.

<sup>20</sup> R. O. Ugbe, B. F. Anyatang, *ibid*, (n. 1).

<sup>21</sup> R. O. Ugbe, 'Originality and Fixation as Basis for Copyright in Music' Vol.V, 2002, *University of Maiduguri Law Journal-U.Maid. L.J.*, p. 23-24.

<sup>22</sup> Though Article 22 of the International Telecommunications Convention and Article 17 of the Radio Regulations of the International Telecommunications Union require member states to keep certain telecommunications secret, their relevance to interception of satellite signals is uncertain.

<<http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1005&context=spacelawdocs>> Accessed 12 December, 2022.

<sup>23</sup> It was in furtherance of this deficiency that The Brussels Satellite Convention was formulated

for awarding trademark protection to any inventions sent to space. This is why, despite the fact that the United States enacted the Space Act to deal with IPR rights in space, NASA has built an international trademark portfolio of trademarks that she has registered in the EU as well as seven other countries, including Canada, Germany, Japan, and the United Kingdom, recognizing that the Act is not actionable outside of the United States. These registrations limit the use of NASA's emblem (blue 'meatball'), NASA Logotype ('worm'), and NASA seal on non-NASA-sponsored products, publications, or webpages.<sup>24</sup> NASA is a well-known agency, so it's not strange that private corporations would want to profit from its goodwill. This is where a trademark's importance becomes critical. The trademark will restrict corporations from using the NASA logo without permission on their products.<sup>25</sup>

### Patent in Outer Space

Patents are granted to inventions if they are unique and new. Patent law grants exclusive rights to the inventor which excludes others to use, make and sell a patented product for a set length of time. The patent system is indispensable as it encourages research and creativity, and enhances a country's technological and economic development.<sup>26</sup> To obtain patent rights for an innovation/invention, such invention must be innovative, non-obvious (i.e., there must be a significant difference between the invention and the prior one), and the invention should be valuable to mankind. The full technical method for gathering raw data from space using a Remote Sensing Satellite (RSS) has been patented. Every remote sensing satellite employs a technique and technology that is unique and proprietary, and so patentable. When it comes to patent law in space, concerns arise when an invention is used or infringed upon. The main source of concern is the issue of ownership and the fact that, in the event of infringement in an extraterritorial context, who will be held accountable and to what extent? When an object is invented on Earth and used in space, the answer is usually straightforward: the patent system of the country in which the invention was made will be followed, and the patent will only be registered in that country. The space object can then be launched into space, in accordance with many international treaties and other space norms. Virginia Galactica solar panels on the International Space Station (ISS) would serve as an example of an idea created on Earth and utilized in space.<sup>27</sup> Where an object is invented in space and used on Earth, the answer is a little more complicated because it is impossible to know whose jurisdiction will apply to inventions relating to outer space outside of a country's territorial bounds. There is currently no definitive answer, however it is suggested inventors should register their ideas with the patent office of the country whose services they are using, such that in the event of a dispute that country's laws will apply.<sup>28</sup> Even more complicated is the scenario where the object is invented in Space and applied in Space. This can be a very complex issue because it involves technologies that are not only developed in space but also intended to be employed there. Such inventions are more vulnerable to infringement because there is no proper or adequate space control that can assess the act of infringement when an invention is used in space, and even if it is, it will face problems with the application of laws,<sup>29</sup> because IP regulations are only applicable in the territory of the specified State, which, by definition, excludes the extraterritorial areas of outer space.<sup>30</sup> This situation led to the amendment of the patent law in the United States. The legislators made this law also applicable to inventions in outer space when such inventions take place onboard space objects coming under the jurisdiction or control of the United States.<sup>31</sup>

One of the most commonly cited questions in relation to inventions developed and/or used in space is the application of national/regional patent law in space. Before obtaining a patent for their work, any patent applicant must evaluate the following three factors:

1. The jurisdiction(s) in which the technology is used prior to being launched into space; and
2. Inventions made and/or used in outer space.
3. The jurisdiction(s) and associated 'control' point(s) of the technology.

Patents awarded by national governments are fundamentally territorial, making them difficult to grant in a place where there are currently no borders, such as space. While Article VIII of the Outer Space Treaty states that the State (Party to the Treaty) on whose registry an object launched into outer space is carried on retains authority

---

<sup>24</sup> Diganth Raj Sehgal, 'How does IP law work in outer space' (2021) <<https://blog.ipleaders.in/ip-law-work-outer-space/>>

<sup>25</sup> *ibid*

<sup>26</sup> E. E. Udoaka, 'Critical Appraisal of the Problems In Licensing of Patents In Nigeria', [Vol.6] *Indian Journal of Intellectual Property Law (IJIPL)* [53] [2013].

<sup>27</sup> *Swayamsiddha Das*, *ibid*, (n, 5).

<sup>28</sup> *ibid*.

<sup>29</sup> *ibid*.

<sup>30</sup> A.-M. Balsano, 'Intellectual Property Rights and Space Activities', <https://www.esa.int/esapub/bulletin/bullet79/balsano.htm> Accessed 10 December, 2021

<sup>31</sup> This approach inspired the German ratification of the Space Station Agreement.

and control over that object, as well as any personnel on board, while in outer space or on a celestial body,<sup>32</sup> the question arises as to whether the territorial jurisdiction under intellectual property law permits the extension of each national (or regional) law to the objects which the respective country has registered and launched into outer space or to inventions made and used in outer space. In the absence of explicit international rules, under a number of international agreements concluded with respect to international space projects, registered space objects are treated as quasi-territories for the purposes of intellectual property.<sup>33</sup> Thus, while patent protection is subject to the applicable territorial legal framework, according to international space law, the state in which the space object is registered retains jurisdiction and control over that space object.

The technology's control point is also retained by the state that registered the technology. For the purpose of patent protection, the patentee must examine either the first or the second aspect, or a combination of both, depending on the space constrained technology. The exploration and use of outer space for the benefit of mankind, as well as the non-appropriation of outer space by any nation, are fundamental principles under international space law, as stated in Articles I and II of the Treaty on Principles Governing States' Activities in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty). While acknowledging the importance of intellectual property for the exploration of space and the advancement of science and technology, questions have been raised as to whether intellectual property rights protection and enforcement may conflict with the aforementioned fundamental principles in terms of access to knowledge and information derived from space activities, as well as the freedom of exploration and use of outer space.<sup>34</sup> Another issue relates to the interpretation of Article 5ter of the Paris Convention for the Protection of Industrial Property, which provides for certain limitations of the exclusive rights conferred by a patent in the public interest in order to guarantee the freedom of transport (doctrine of temporary presence). The question is then whether the doctrine of temporary presence also applies to space objects, for example, in the case of the transport of patented articles to or from a Space Station through a launching site in a foreign country.<sup>35</sup>

From the foregoing, it is obvious that there are various ambiguities in the patent law relating to space. It is also critical that these inconsistencies be clarified and investors' rights preserved by providing incentives that encourage them to continue working, thereby boosting innovation and exploration. Setting patent law in space will prohibit space enterprises from gaining an unfair advantage due to the jurisdiction in which they are registered. Some businesses are concerned that by publicly disclosing their inventions in order to obtain a patent, their designs would be copied by overseas competitors. As a result, commercial aircraft businesses may choose for trade secret protection rather than patent protection for specific designs.<sup>36</sup>

### **Trade Secrets in Outer Space**

Trade secrets refer to any information owned by an entity that can be used in the management of the entity's company or corporation and is valuable enough to give the entity a real or possible economic advantage over the competition. It is 'a formula, practice, process, design, instrument, pattern, commercial method, or compilation of information which is not generally known or reasonably ascertainable by others, and by which a business can obtain an economic advantage over competitors, who do not know how to use it or customers.'<sup>37</sup> In relation to outer space, Trade secrets can be utilized to safeguard the space related technology of private companies that are self-sufficient and can produce and operate their space-related technologies without the assistance of a third party. In the aerospace business, the use of trade secrets is not uncommon. When one or more space faring parties or launching governments fail to respect a competitor's intellectual property rights, or when the competitor's attempts to effectively prosecute patent infringement charges fail, the exploitation of trade secrets appears to be the sole appropriate weapon against its competitors.<sup>38</sup> This applies to both the test data and scientific data consisting of future scientific discoveries and prototypes. In both cases, whereas, patent registration could protect the IP Rights, in order to obtain a patent, all details must be fully disclosed so as to enable a person skilled in the art to which

---

<sup>32</sup> IFRC, <<https://www.ifrc.org/docs/idrl/I515EN.pdf?>> Accessed 14 December, 2021

<sup>33</sup>Anwasha Singh, 'India: Intellectual Property Law And The Outer Space: A Promising Future Ahead?' (2018) <<https://www.mondaq.com/india/trademark/762020/intellectual-property-law-and-the-outer-space-a-promising-future-ahead>> Accessed 14 December, 2021.

<sup>34</sup> *ibid*

<sup>35</sup> *Ibid*.

<sup>36</sup> Elon Musk of SpaceX recently said that his company has virtually no patents for this reason.

<sup>37</sup>T. C. W. Lin, 'Executive Trade Secrets', 87 *Notre Dame Law Review* (2012) <<http://scholarship.law.nd.edu/ndlr/vol87/iss3/1/>> Accessed 14 December, 2021.

<sup>38</sup> K. Muzyka, 'A quick look at trade secrets in outer space', (2015) <https://www.thespacereview.com/article/2758/1>> accessed 24 December, 2022.

the invention pertains to make and use the invention,<sup>39</sup> or in the alternative, the details must be sufficiently described in peer review publications.<sup>40</sup> This worries inventors who are concerned that by publicly disclosing their inventions, their competitors would copy them. This then leads them to seek protection under trade secrets.

Thus far, protection of trade secrets relating to outer space, space vehicles, automated and tele-robotic probes, and private or international space stations remains mainly unregulated. To effectively protect trade secrets from its competitors, a party may be compelled to implement special methods or even unique technologies. In the case of A3R or similar asteroid-survey telescopes or probes, this can be accomplished through proper telemetry solutions, such as laser communication with additional secure signal coding. Any type of purposeful signal interception or attempt to hack the relay server would constitute sufficient basis for filing a lawsuit for infringement or industrial espionage in both the US and EU laws.<sup>41</sup> This, however, is not the only problem with protecting trade secret related to the outer space. There is also the salvage problem. Since there is currently no regulation of space salvage, despite various academic models, such regulations might be taken from both the EU and the US admiralty and maritime law.<sup>42 43</sup> Although EU admiralty law principles primarily require a bilateral salvage agreement known as contract salvage, US admiralty law recognizes the concept of 'pure salvage.'<sup>44</sup> Under pure salvage, the salvor has the right to file a salvage claim with an admiralty court and to receive a salvage reward without the vessel owner's consent. The salvor must, however show that the rescued vessel was in danger of being lost, destroyed, or deteriorated, that the salvor was not obligated to salvage the vessel, and that the salvage operation was wholly or partially successful.<sup>45</sup> The same principles may be applied to survey probes and telescopes. If a crewed or robotic spacecraft captures a telescope that has fallen out of orbit due to a collision with a meteorite, the ship will be able to successfully enforce its right to salvage in an outer space admiralty court and earn a salvage award.<sup>46</sup> However, such salvaging could jeopardize the telescope owner's legal rights, including intellectual property rights stored on disks or incorporated in the telescope's circuits. It's easy to imagine a scenario in which, by the time the salvaged device is returned to its rightful owner, the salvor has gained access to the proprietary data, gaining an unfair competitive advantage in the asteroid mining industry, or even selling the recovered proprietary data to the highest bidder.<sup>47</sup>

Indeed, during the Cold War, such a recovery of confidential material occurred. The US performed a covert salvage operation of a sunken Soviet K-129 submarine, which resulted in the recovery of sensitive information. Under the cover of a deep sea drilling project, the USNS Hughes Glomar Explorer set off on a recovery mission known as Project Azorian. Although the submarine was not fully recovered, the mission did retrieve codebooks and weapons, which were later studied by the CIA.<sup>48</sup> As identical actions can be used to steal trade secrets, the culprit could be charged with industrial espionage. Examining the interiors and mechanisms of spacecraft, satellites, probes, and stations by a 'salvor in possession' does not fall under the legal definition of reverse engineering.<sup>49</sup> In the current legal climate, there are no infallible methods of protecting trade secrets simply because the very process of litigating misappropriation of trade secrets may lead to their partial or full disclosure. Elon Musk, the CEO of SpaceX, admitted as much in an interview for *Wired* magazine, saying: 'We have essentially no patents in SpaceX. Our primary long-term competition is in China—if we published patents, it would be farcical, because the Chinese would just use them as a recipe book'<sup>50</sup> To protect a trade secret, the plaintiff must first show that the information is sufficiently secret, that the plaintiff derives value from the information's secrecy, and that it has taken reasonable means to maintain the information's secrecy. The trade secret owner must then prove that its trade secret was misappropriated by the defendant and used in the defendant's business. The trade secret must be identified precisely during the course of the case. Despite the fact that every

---

<sup>39</sup> U. S. Patent Office, 'The Enablement Requirement': <http://www.uspto.gov/web/offices/pac/mpep/s2164.html>> accessed 24 December, 2022.

<sup>40</sup>D. Fehder, F. Murray, S. Stern; 'Intellectual Property Rights and the Evolution of Scientific Journals as Knowledge Platforms'> [https://funginstitute.berkeley.edu/wp-content/uploads/2013/12/FMS\\_NBER\\_IJIO\\_FINAL\\_11\\_12.pdf](https://funginstitute.berkeley.edu/wp-content/uploads/2013/12/FMS_NBER_IJIO_FINAL_11_12.pdf)> accessed 24 December, 2022.

<sup>41</sup> K. Muzyka , 'ibid, (n. 38)..

<sup>42</sup>N. Jasenrulyana 'Regulation of Space Salvage Operations: Possibilities for the Future' < [https://spacelaw.olemiss.edu/JSL/Back\\_issues/JSL\\_22-1.pdf](https://spacelaw.olemiss.edu/JSL/Back_issues/JSL_22-1.pdf)> accessed 25 December, 2022

<sup>43</sup> W. N. White, Jr. 'Salvage Law for Outer Space' [https://www.academia.edu/6983159/Salvage\\_Law\\_for\\_Outer\\_Space](https://www.academia.edu/6983159/Salvage_Law_for_Outer_Space) accessed 25 December, 2022.

<sup>44</sup> K. S. Brais, Esq. 'Marine salvage at a glance' <https://www.braislaw.com/files/salvage.pdf>> accessed 25 December, 2022.

<sup>45</sup> K. Muzyka , 'ibid, (n. 38).

<sup>46</sup> ibid

<sup>47</sup> ibid

<sup>48</sup> <https://nsarchive.gwu.edu/nukevault/ebb305/doc01.pdf>> accessed 25 December, 2022.

<sup>49</sup> K. Muzyka, 'ibid, (n. 38).

<sup>50</sup> Anderson C., *Wired Magazine* (2012). <<https://www.wired.com/2012/10/ff-elon-musk-qa/>> accessed 24 December, 2022.

vessel and craft in space is viewed as an extension of the state of registry's territory,<sup>51</sup> and thus every form of intellectual property appears to be protected by those states' laws, these rules do not guarantee protection against theft or IP piracy. As instances from maritime salvage illustrate, an entity that salvages a whole spacecraft or a part of one will keep it in its control, until he is properly awarded by its owner, after filing a salvage claim. Thus, nothing prevents a third party with the necessary knowledge and equipment from 'hunting' for wrecks and abandoned ships.<sup>52</sup> However, this could indeed be a solution to the problem of IP theft during salvage operations. In order to make a salvage claim, the salvor must be in physical possession and control over the wreck. The salvor in possession, however, must also show that it is not only in physical possession of the salvaging object, but also is carrying out ongoing operations in order to fully recover such wreck.<sup>53</sup>

While the international community works on a solution to secure the protection of intellectual property rights in space, space enterprises' legal departments can ensure that their intellectual property rights and trade secrets are sufficiently protected using technology that is constantly improving. As a countermeasure, the owner of a spacecraft, probe, or other critical space equipment may nominate a specific party to salvage its wreck or derelict through a pre-salvage contract and insurance. The owner will ensure that the pre-contracted emergency salvor has the title of 'salvor in possession' by permanently installing an emergency beacon of the designated emergency salvage company on its spacecraft prior to its launch. This will prevent unauthorized salvors from attempting to salvage or intercept them. In case of an emergency, the beacon sends properly coded signals to the salvage company's HQ, which automatically files a salvage claim with the appropriate outer space admiralty court. A secrecy and non-disclosure clause should, of course, be included in the contract with the designed emergency salvor.<sup>54</sup> Companies must impose confidentiality constraints on potential customers while exhibiting their products, or they risk waiving their trade secret rights unwittingly. In *Gal-Or v. United States*,<sup>55</sup> the United States Court of Federal Claims dismissed an Israeli scientist's theft claim because he failed to insist on non-disclosure agreements from his clients each time he showed them his ideas.<sup>56</sup> As a result, corporations must remember to defend their trade secrets at all costs before they go 'boldly go where no man has gone before.' Commercial space enterprises should rely on numerous traditional tactics to secure their trade secrets in a field where success is dependent on R&D prowess. To ensure that employees do not leak proprietary information, companies should use confidentiality, non-disclosure, and non-complete agreements; they must restrict physical and electronic access to trade secrets to only those personnel who require access.<sup>57</sup> They are advised to develop stronger encryption and security solutions. Recognizing the importance of cyber-security, the Department of Defense established final guidelines in 2013 requiring government contractors and subcontractors to maintain adequate security to secure 'unclassified controlled technical information with military or space use.'<sup>58</sup> Companies should also protect their trade secrets with zeal, enforcing these agreements whenever there is a violation.

### **Industrial Design in Outer Space**

The relevance of industrial design in outer space is significant, as it is responsible for the entire aesthetic aspect of the creation. The law of aerodynamics, which depicts the interplay of patents and industrial designs, determines the aesthetics of space inventions. Aside from that, the design of a certain invention would enhance the entire quality and experience of the product. SpaceX, for example, has improved its 'Dragon Capsule' by incorporating a touch screen control panel inside a crew capsule. In an interview with BBC News, SpaceX engineer John Federspiel noted that the corporation intended Crew Dragon to 'feel like a 21st Century spaceship.' He explained as follows:

Probably one of the biggest features of Dragon are the touch screens on the inside. We designed them not just to be very functional, but with a user experience in mind.'The three large touch screen displays that allow the commander and pilot to monitor and control the spacecraft are a

---

<sup>51</sup> Article II and III, 1976 Convention on the Registration of Objects Launched into Outer Space. (Resolution adopted by the General Assembly: 3235 (XXIX).

<sup>52</sup> K. Muzyka, 'ibid, (n. 38).

<sup>53</sup> *RMS Titanic, Inc. v. Wrecked & Abandoned Vessel* 286 F.3d 194

<sup>54</sup> K. Muzyka, 'ibid, (n. 38).

<sup>55</sup> No. 15-5079 (Fed. Cir. 2015) <https://law.justia.com/cases/federal/appellate-courts/cafc/15-5079/15-5079-2015-11-04.html> accessed 24 December, 2022

<sup>56</sup> R. Shwarts and M. Disotell, 'The New Space Race: Protecting Trade Secrets on the Final Frontier' (2015) <<https://blogs.orricks.com/trade-secrets-watch/2015/06/05/the-new-space-race-protecting-trade-secrets-on-the-final-frontier/>> accessed 24 December, 2022.

<sup>57</sup> *ibid*

<sup>58</sup> 78 Fed. Reg. at 69,280; 48 C.F.R. § 204.7302(a);

[https://www.regulations.gov/#!documentDetail;D=DARS\\_FRDOC\\_0001-0658](https://www.regulations.gov/#!documentDetail;D=DARS_FRDOC_0001-0658) accessed 24 December, 2022; See also Geoffrey Moss, 'Cybersecurity Update: New Rules Require Defense Contractors to Protect Technical Information.' (Nov. 25, 2013) <https://blogs.orricks.com/trade-secrets-watch/2013/11/25/cybersecurity-update-new-rules-require-defense-contractors-to-protect-technical-information/> accessed 24 December, 2021.



world away from the analogue buttons and dials in the cockpits of previous vehicles such as the space shuttle.<sup>59</sup>

This improvement to the capsule not only provided a more earthlike experience for the Astronauts, but it also improved compatibility and sustainability. This design modification was regarded as the most breakthrough experience of the Space Mission, and as such it should be protected. All IP rights should be protected, and the rights of the original/novel creator should be upheld, as it is the designer of the space product who uses his or her intellects to foresee things beyond the horizon, combining his or her scientific knowledge to improve the overall look, appeal, and experience of the product.

## 6. Countries with IPR Law Compatible with Space Law

The United States of America is the only country that has enacted explicit provisions for the applicability of domestic IPR law to Space activities with its enactment of the US Patents in Space Act of 1990. With this Act, provided in 35 U.S.C. § 105, the United States became the only country to generally apply its patent law to its objects in outer space. Section 105 provides reads as follows:

(a) 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 the purposes of this title, except with respect to 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 with respect to any space object or component thereof that is carried on the registry of a foreign state in accordance with the Convention on Registration of Objects Launched into Outer Space. '(b) 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 in accordance with the Convention on Registration of Objects Launched into Outer Space, shall be considered to be made, used or sold within the United States for the purposes of this title if specifically so agreed in an international agreement between the United States and the state of registry.<sup>60</sup>

This law also applies to inventions in outer space which occur onboard space objects under the jurisdiction or control of the United States.<sup>61</sup> As a result, unless otherwise agreed by an international agreement, the patent law of the United States of America provides quasi-territorial effect on a space object carried on the registry of the United States of America. The basic result is that the US Space legislation extends patent law to outer space, whereas the NASA Act deems a space item to be nothing more than a 'vehicle.'<sup>62</sup> The Act's broadening of jurisdiction is not without caveats. The statute contains three exceptions that prevent acts on US space objects from being classified as infringing.<sup>63</sup> The first two exclusions are pertinent to our discussion. Extraterrestrial patent jurisdiction does not apply where, first, the spacecraft or component in question is the subject of a separate international agreement to which the United States is a party; and second, the spacecraft is registered with a foreign country for purposes of the Registration Convention, regardless of whether it is subject to U.S. jurisdiction.<sup>64</sup> The first exception promotes a cooperative space environment by preventing patent jurisdiction from being extended where a sui generis agreement covers the spacecraft in issue. The necessity of fostering such an environment, at least at the international level, is dictated by order; if multiple countries adopted doctrines of extraterritoriality, the aggregate effect would be problematic.<sup>65</sup> The exceptions in 105(a) restrict U.S. patent law from being applied to cases of infringement on spacecraft or extraterrestrial modules that are registered under the laws of another country.<sup>66</sup> There is no specific statutory provision of this kind in other countries, except that German intellectual property law applies to ESA-registered items due to the ratification of the 1988 Intergovernmental Agreement.

---

<sup>59</sup> P. Rincon., 'What is the SpaceX Crew Dragon?' (14 November 2020) <https://www.bbc.com/news/science-environment-52840482> accessed 24 December, 2021.

<sup>60</sup> Patents in Space Act of 1990, 35 U.S.C. §. 105 (2012)

<sup>61</sup> The same approach inspired the German ratification of the Space Station IGA.

<sup>62</sup> <<http://docs.manupatra.in/newslines/articles/Upload/DFC0906E-2C8A-45EF-8553-8604077E1D49.pdf>> accessed 2nd January, 2022.

<sup>63</sup> U. R. Theodore, et al., 'Patent Infringement in Outer Space in Light of 35 U.S.C. § 105: Following the White Rabbit Down the Rabbit Loophole', 17 B.U. J. SCI. & TECH. L. 212 (2011).

<sup>64</sup> 35 U.S.C. § 105.

<sup>65</sup> See J. H. Shoemaker, 'The Patents in Space Act: Jedi Mind Trick or Real Protection for American Inventors on the International Space Station'? 6 J. INTELL. PROP. L. 405S (1999).

<sup>66</sup> Ibid at 218-219.

Some contend that the applicability of national intellectual property law to space objects registered by that State is dubious in the absence of an express legal provision.<sup>67</sup> Others believe that, because of the broad concept of territoriality, by which national patent law may be applicable to ships flying that State's flag on the high seas and aircraft registered in that State, national patent law may be applicable to space objects registered in that State by analogy, even if the national patent law does not expressly provide for such applicability to space objects.<sup>68</sup> It should be noted that, in order to clear up this ambiguity in Europe, the European Commission's Proposal for a Council Regulation on the Community Patent (document COM (2000) 412) states that the Regulation should apply to inventions made in outer space that are under the jurisdiction and control of one or more member States in accordance with international law.

### **7. Blending Intellectual Property Rights and Space Law**

Space operations have experienced a massive paradigm shift as a result of technological advancements. As the number of space missions grow, the implementation of IP rights and preservation of the rights of creator/companies is becoming increasingly important. What is the best way to accomplish this? There are a few options:

#### **Amendment of the International Space Treaties**

The first international space agreements were negotiated through the United Nations (UN) during the Cold War with the current consensus that space activities should benefit all humankind. These accords often reject claims to outer space regions or private property ownership, declaring, for example, that space is 'for the benefit and in the interest of all governments,' and that outer space is 'the province of all people.' While these UN agreements do not address today's private commercial firms, they are generally recognized and provide a useful platform for addressing new legal challenges. One solution to the IPR protection for space activity problem could be to amend existing UN agreements to recognize the increased role of private actors in outer space and to institute methods for resolving disputes over intangible property (such as IP) to supplement existing understandings about ownership of physical property and damages assessment. The 2019 Guidelines for the Long-Term Sustainability of Outer Space Operations, adopted by the UN Committee on the Peaceful Uses of Outer Space, are the most recent international response to commercial outer space activities for the United Nations. The recommendations acknowledge that an international agreement is needed to control and regulate non-state party activity in space, but the terminology still emphasizes collaboration and respect rather than the definition of private rights and obligations. The NASA 'Artemis Accords,' signed on October 13, 2020, a set of general principles on lunar exploration that was carried out by multiple governments, with the notable exception of the Russian Federation, reflected these guidelines, as well as the 1967 Outer Space Treaty's fundamental goals previously mentioned. These principles recognize the role of non-state actors in modern space activities; however private parties are often exempt from governmental duties to exchange scientific data.<sup>69</sup>

#### **Option 2: 'Launch' WIPO into Space**

A second particularly attractive option could be to develop agreements through the World Intellectual Property Organization (WIPO).<sup>70</sup> WIPO could begin by educating the public on the need for obtaining governmental support through a series of programs on the subject. WIPO's excellent 2004 study on IP in space should be updated to include the state of play in space in 2021, which has changed considerably in nearly twenty years. Moreover, the study should include specific suggestions on how to implement a plan of action.<sup>71</sup> One possible action item would be to use the present WIPO Madrid Protocol, which has 107 members and currently covers 123 nations, to expand trademark registration protection into space. A new protocol might be added to the treaty, which would need to modify Article 14 of the protocol's accession process to allow these territories to be deemed 'countries' for the purposes of joining the registration system. The protocol might subsequently be expanded to include protection for LEO, the Moon, and Mars, with each member having the option to accept or reject it. The 1883 Paris Convention may also need to be updated to reflect the expansion. Another way to broaden the protocol is for Earth members to declare that their protection extends to other worlds<sup>72</sup>(e.g., Nigeria declaring that its Madrid Protocol rights extend to an orbiting Nigerian hotel). The United States adopted this notion for patents in 35 U.S.C.

---

<sup>67</sup>Krishanu, 'IPR protection in outer space activities' <http://www.legalservicesindia.com/article/790/IPR-protection-in-outer-space-activities.html> accessed 2nd January, 2022.

<sup>68</sup> *ibid*

<sup>69</sup>American Bar Association (ABA), 'Intellectual Property Law', [https://www.americanbar.org/groups/intellectual\\_property\\_law/publications/landslide-extra/outer-space/#:~:text=Although%20some%20existing%20treaties%20recognize,copyrights%2C%20despite%20their%20commercial%20value.](https://www.americanbar.org/groups/intellectual_property_law/publications/landslide-extra/outer-space/#:~:text=Although%20some%20existing%20treaties%20recognize,copyrights%2C%20despite%20their%20commercial%20value.)

<sup>70</sup> *ibid*

<sup>71</sup> *ibid*

<sup>72</sup> *ibid*

105, an Act that essentially extends U.S. jurisdiction to outer space, as described above. Revision of the WIPO Patent Cooperation Treaty of 1970 could be a patent parallel road.

### **Option 3: Systematize Space Enforcement**

How will new rights be enforced if they are created? While creating a functional court system for space will be a big undertaking, there are some practical alternatives that may be implemented in the short term. A choice-of-law and jurisdiction clause, mediation, and/or arbitration can be incorporated in contracts for Earth territories promptly and without cost or negotiation. Existing or new agreements could also include specific space areas. An agreement that might include both the US and LEO's territory is an example. Despite the fact that several arbitration forums have been established, they have received little support. The International Court of Aviation and Space Arbitration in Paris, France, is one such venue. Despite its early formation in 1993, there is little direction on how this forum would handle individual issues. Decisions are not made public, and there is no counseling on the merits or cons of using it for specific types of disputes. The bilateral Space Activities Act (SAA) between Australia and the Russian Federation is another example. The SAA focuses on commercial operations and includes mutual understandings on the acquisition and retention of intellectual property rights associated to space activities. While the SAA mandates that issues be resolved through diplomatic channels first, it also governs the formation of an arbitral tribunal to resolve any disputes that may arise. Of course, the SAA only binds the Australian and Russian governments, and other bilateral or multilateral agreements involving other countries may not represent the same ideas, understandings, or goals, leading to a proliferation of opposing national approaches and duties.<sup>73</sup> It is crucial to remember that future bodies may not require physical presence while evaluating new space enforcement methods. The Uniform Domain-Name Dispute-Resolution Policy (UDRP) for domain names, which is handled by the WIPO Arbitration and Mediation Center and others, is one effective example. Surprisingly, the Uniform Domain Name Dispute Resolution Policy (UDRP) is governed by a virtual online tribunal that has no specific country jurisdiction (aside from cyberspace) but is empowered to decide the fate of disputed domain names.<sup>74</sup>

### **Option 4: Extend National Laws to Space**

As previously stated, space law is international, as IP law is territorial, resulting in a conflict as a solution, States could amend their IP rights in space legislation and come up with a far more structured approach. Currently, the United States is the only country that specifically states that domestic IP law applies to space activities as well. With the Commercial Space Launch Act of 1984 (51 U.S.C. 50901 et seq.) and the Patents in Space Act of 1990 (35 U.S.C. 105), the United States led the world in the late twentieth century. The former statute, encouraged commercial use of space and the latter statute extended US national patent protection to govern ownership of outer space inventions 'made, used, or sold' in outer space on a 'space object or component thereof' under the jurisdiction or control of the US. Furthermore, the NASA Act is not deluded by the notion of inter-terrestrial sovereignty, and has already accepted the concept of a space object being merely a 'vehicle' to make overriding laws more adaptable. Even the European Space Agency has addressed the issue by enacting regulations governing intellectual property rights, contracts, and other matters that incorporate ideas developed under the auspices of international accords.<sup>75</sup> This extension of national jurisdiction may be a sign of developments to come because Australia and other countries have already recognized a need to reward private innovation in their national legislation updates.

## **8. Conclusion**

It could take years for us to even realize the potential of space; a frontier capable of delivering resources that are currently unpriced. Though national laws govern intellectual property, and international organizations such as the World Intellectual Property Organization (WIPO) and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) have achieved some degree of harmonization of IP laws, such convergence is insufficient to extend intellectual property protection to space-related activities and inventions. International legislation governing intellectual property rights in space has yet to be established. As a result, increased global collaboration is required to ensure equal access to resources for all, taking into account the needs of emerging as well as least-developed countries. Only through the technical and financial cooperation of the private sector and government entities can proper and adequate methods for exploring space be devised.

Enterprises have the incentive to innovate and create better technologies because they have exclusive rights to their inventions to the exclusion of others. To harness the actual potential of these inventions and objects, a uniform legislative regime to harmonize the interplay of outer space inventions and IP must be realized through

---

<sup>73</sup> *ibid*

<sup>74</sup> *ibid*

<sup>75</sup> Kashishipr, 'Aligning Outer Space and IPRs – A Pressing Priority', (2020) <https://www.kashishipr.com/blog/aligning-outer-space-and-iprs-a-pressing-priority/> Accessed 15<sup>th</sup> January, 2022.

the medium of sui generis treaties or existing treaties governing IPRs such as TRIPS. Intellectual property rights are the only way to grant such an exclusive right. Furthermore, there is a wide range of new IP rights dimensions that can be opened in outer space, such as the application of territory-based national laws in outer space for the enforcement of rights, entitlement, and ownership in joint activities, compliance with international obligations, and so on. A more practical approach might be to broaden the provisions of international treaties such as the TRIPS Agreement to encompass not only territorial use but also extra-territorial enjoyment of rights without regard to the place of invention. Furthermore, the term ‘vessels’ or ‘aircraft’ in Article 5ter of the Paris Convention for the Protection of Industrial Property can be broadly interpreted to include extraterritorial boats such as spaceships, rockets, and so on, as well as domestic vessels.<sup>76</sup> Finally, in addition to all the other recommendations above, a standard enforcement mechanism, such as International Arbitration, should be established to hear and decide disputes arising out of IPR in outer space, in addition to the uniform legal framework outlined above.

As more space exploits take place, it is clear that the importance of establishing a legal regime that effectively protects intellectual property in space cannot be overstated. As a result, the time has come to have a serious discussion about how to design and implement an outer space IP infrastructure. This is critical because a lack of legal certainty will hinder space research and international cooperation, whereas a legal infrastructure will protect both consumers and owners by preserving the principle of harnessing and protecting space for posterity. All nations, organizations, and corporations stand to benefit from well-balanced, well-organized mechanisms for protecting and enforcing intellectual property in outer space. Limited exclusive rights provided by intellectual property protection would provide right holders with a competitive advantage, either through licensing or by prohibiting competitors from exploiting a specific technology. Intellectual property rights created in the company may improve the company's overall image. For example, the acquisition of patents may be viewed as proof of the company's technical competence. The ability to license intellectual property also allows companies to negotiate a cross-license with other parties, which is especially useful when a specific space technology is a consolidation of various high-techs. Given the large investments required for space operations, a legal framework that ensures a fair and competitive environment is required to attract private sector participation. Space should be a safe haven for investment, not a hindrance to humanity's exhilarating journey beyond its home planet into the stars. Thus, IPR laws must be brought in line with Space Laws for the benefit of space exploration as a whole.

---

<sup>76</sup> *ibid*