



12-3-2021

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EXPLOITATION OF SPACE AND PATENT LAW: HOW THE CURRENT LEGAL SYSTEM INEFFECTIVELY PROTECTS PRIVATE COMPANIES IN THE COMMERCIAL SPACE INDUSTRY

By Liz Malmen*

Abstract

Over fifty years ago man first landed on the moon. Since then, outer space has become increasingly closer with the direction and development of the commercial space industry. What was once an exclusive government function is turning into a private business. It is no longer difficult to imagine the possibility of going to space when companies like SpaceX have launched private crews into orbit. However, encouraging technological advancements to support the commercial space industry requires adequate legal protections of such innovation. This can be challenging when international space law has had little growth since man was first on the moon, and gaps in the law exist that enable exploitation of technology. In order to effectively protect private companies in the commercial space industry there must be a change in the legal system.

This article explores the historical and legal development of international space law and its effect on patent protection as the predominantly governmental activities involving outer space enter the private sector. It will discuss private companies' protection under international treaties and national patent laws. Further, this article will look at the United States' ability to apply its patent laws to infringers extraterritorially or in space and the loophole created in the law. Finally, this article will examine solutions to the jurisdictional gaps that enable exploitation and suggests that the best approach is creating a unified patent law and separate jurisdiction in space.

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INTRODUCTION

Space, the final frontier, is the vast expanse beyond Earth that might seem out of reach for most of the human population, however, research and technological advancements are making this far-off fantasy a possible reality.¹ Commercial activity is leading a new generation of space pioneers, seeking profit as well as scientific value.² Private companies have already developed and launched technology into space.³ In 2012, SpaceX was the first commercial company to dock a privately funded spacecraft carrying cargo to the International Space Station (“ISS”).⁴ Shortly thereafter, SpaceX made further history in the summer of 2020 by being the first private spaceflight company to launch a crewed spaceship into space.⁵ Despite the large amount of private activity in outer space, international space law has barely altered from its original implementation.⁶ Reaching such technological progress as commercial space travel is not possible without progress in the law.⁷ Intellectual property protection, particularly in patent law, will play an important role in encouraging private companies to continue developing technology for, and in, space.⁸ However, the current loophole in the law could bring the whole system crashing down.⁹

This article will explore the system of international space law and its effect on patent protection as the predominantly governmental activities involving outer space enter the private sector. The article begins with looking at the historical overview of the problem, then outlines the laws and treaties involved. Next, it will analyze the ability to extend national patent laws to outer space and the current jurisdictional loophole in the law. The article will end with an overview of proposed solutions to the problem and suggesting the best approach, which is creating a unified patent law and separate jurisdiction in space.

¹ Joshua F. Cheslow, *The Future of the Law: Four Practice Areas on the Horizon*, DRESCHER-CHESLOW (2013), <https://drescher-cheslow.com/resources/publications/four-practice-areas-on-the-horizon/four-practice-areas-on-the-horizon-page-2/> (predicting that space travel will soon be accomplished as a private commercial enterprise).

² *Id.*

³ *Id.*

⁴ Elizabeth Howell, *SpaceX’s Dragon: First Private Spacecraft to Reach the Space Station*, SPACE.COM, Aug. 10, 2020, <https://www.space.com/18852-spacex-dragon.html>.

⁵ *Id.*

⁶ Cheslow, *supra* note 1.

⁷ Cheslow, *supra* note 1 (“As man’s technological prowess increases the ability to travel farther, stay long, and do more in space, so must the legal practice blaze a new path to the stars.”).

⁸ World Intellectual Property Organization [WIPO], *Intellectual Property and Space Activities: Issue Paper Prepared by the International Bureau of WIPO* 21 (Apr. 2004), www.wipo.int/patent-law/en/developments/pdf/ip_space.pdf [hereinafter WIPO Issue Paper].

⁹ See Matthew J. Kleiman, *Patent Rights and Flags of Convenience in Outer Space*, 23 AIR & SPACE L. 4 (2011).

I. HISTORICAL & LEGAL OVERVIEW OF THE PROBLEM

Outer space has been on the cutting edge of human experimentation and innovation since the launch of *Sputnik*.¹⁰ In October 1957, at the threshold of the Cold War with the United States, the Soviet Union shocked the West by launching the first artificial satellite, *Sputnik*.¹¹ By doing so, the U.S.S.R. triggered a “space race” with the United States.¹² *Sputnik* was not about the peaceful uses of outer space, as the beginning of space exploration was exclusively a competition of military and foreign policy between two sovereign superpowers.¹³

The United States responded to *Sputnik* by passing the National Aeronautics and Space Act of 1958 (42 U.S.C. §§ 2451-2477), a federal statutory framework for administering space operations.¹⁴ It also founded the National Aeronautics and Space Administration (“NASA”), a government agency that has been funding and managing outer space-related research and exploration for the United States since 1958.¹⁵ After *Sputnik*, the United States launched its own rocket, *Explorer I*.¹⁶ The launching of artificial satellites into space prompted the United Nations General Assembly to create a permanent Committee on the Peaceful Uses of Outer Space (“COPUOS”) in 1958.¹⁷ Before the enactment of any space treaty, the United States Congress expressed a national policy “that activities in space should be devoted to peaceful purposes for the benefit of all mankind.”¹⁸ Further, Congress encouraged not only the exploration of space but its exploitation, stating, “Congress declares that the general welfare of the United States requires that the Administration seek and encourage, to the maximum extent possible, the fullest commercial use of space.”¹⁹

Around the world, space exploration was originally pursued by the public sector because certain governments saw value in outer space that far exceeded the costs of being first.²⁰ The United States' original policy was that space travel would be conducted almost exclusively in the public sector through NASA.²¹ In 1984, Congress enacted the Commercial Space Launch Act, which finally permitted the

¹⁰ Anthony Farnesi, *The Intellectual Space Race: Applying Terrestrial Patent Laws to Private Outer Space Activity*, 28 S. CAL. INTERDISC. L. J. 713, 716 (2019).

¹¹ Timothy M. Ravich, 2010: *Space Law in the Sunshine State*, 84 FLA. B. J., Sept.-Oct. 2010, at 24, 26.

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.*

¹⁵ Farnesi, *supra* note 10 at 716.

¹⁶ Ravich, *supra* note 11.

¹⁷ United Nations Office for Outer Space Affairs, *COPUOS History*, <https://www.unoosa.org/oosa/en/ourwork/copuos/history.html> (last visited Feb. 2, 2021).

¹⁸ 42 U.S.C. § 2451(a) (repealed 2010); 51 U.S.C. § 20102(a).

¹⁹ 42 U.S.C. § 2451(c) (repealed 2010); 51 U.S.C. § 20102(c).

²⁰ Farnesi, *supra* note 10, at 716.

²¹ Timothy A. Brooks, Comment, *Regulating International Trade in Launch Services*, 6 HIGH TECH. L. J. 59, 60 (1991).

private sector to launch spacecrafts into space.²² Then, commercial uses of space slowly began to grow.²³ In 1990, the Launch Services Purchase Act was enacted, which required NASA to “purchase launch services for its primary payloads from commercial providers whenever such services are required in the course of its activities.”²⁴ By 2010, the United States’ space policy had extended the term “commercial” to refer to “space goods, services, or activities provided by private sector enterprises,” thereby making almost every launch since to be contracted to the private sector.²⁵

The commercial launch industry is a rapidly growing technological field valued at over \$100 billion per year.²⁶ All technological companies want to ensure that their future investments are protected.²⁷ Traditionally, inventors use patents as a means of obtaining the exclusive rights granted by a national government to exclude others from making, using, or selling an invention for a limited period of time.²⁸ The holder of a United States patent would enjoy legal protection for his or her invention within the United States, but the inventor would also need to file for a patent in every country in which he or she wishes to receive protection.²⁹ This jurisdictional issue presents many problems for protecting inventions that have wide, international markets, like the space industry.³⁰ However, outer space has no jurisdiction.³¹ “For years, inventors have been filing and obtaining patents for technologies that have either exclusive applicability in outer space or dual-use applicability both on Earth and in outer space.”³² In the beginning of commercial space flight, the technology and cost of entry for joining was a barrier.³³ Therefore, the number of companies in the field was relatively small.³⁴ As the industry grows

²² See Commercial Space Launch Act, 51 U.S.C. § 50901 (1984) (allowed private sector to launch commercial launch vehicles into space).

²³ Brooks, *supra* note 21 at 62.

²⁴ 42 U.S.C. §2465d(a) (repealed 1998).

²⁵ Statement on the New National Space Policy, 2010 DAILY COMP. PRES. DOC. 555 (June 28, 2010).

²⁶ Glennon J. Harrison, *The Commercial Space Industry and Launch* (Apr. 20, 2012), https://digital.library.unt.edu/ark:/67531/metadc812264/m2/1/high_res_d/R42492_2012Apr20.pdf.

²⁷ William C. Pannell, Note, *Pirate Battles in Outer Space: Preventing Patent Infringement on the 8th Sea*, 46 UNIV. MEMPHIS LAW REV. 733, 734-735 (2016).

²⁸ *Id.* at 735.

²⁹ *Id.*

³⁰ *Id.*

³¹ Kleiman, *supra* note 9, at 5

³² Theodore U. Ro, Matthew J. Kleiman & Kurt G. Hammerle, *Patent Infringement in Outer Space in Light of 35 U.S.C. § 105: Following the White Rabbit Down the Rabbit Loophole*, 17 BOS. UNIV. J. SCI. & TECH. LAW 202, 205 (2011).

³³ Pannell, *supra* note 27, at 736.

³⁴ Pannell, *supra* note 27, at 736.

and more companies enter the market, legal issues surrounding patent law will find increasing applicability to commercial space activities.³⁵

The utility of research and development benefits not only to commercialize space, but such discoveries are likely to be useful here on Earth.³⁶ Currently, the United States is reaping the economic benefits of being “home” to the private commercial space industry boom, as it has with the ongoing technology and internet boom of Silicon Valley.³⁷ As this new industry develops, companies are finding creative ways to use outer space activity to increase their profits and productivity on Earth.³⁸ There are multiple United States companies that have launched hundreds of satellites into space.³⁹ Such advancements will continue and being the first to innovate in space is likely to be a lucrative business for private companies and the country where they are based.⁴⁰

II. OVERVIEW OF THE LAWS

Whether the United States patent laws are applicable to an outer space patent dispute requires understanding both patent law and space law.⁴¹ Below is an overview of the most relevant principles to resolving an outer space patent infringement dispute.

A. Patent Law

A patent is a property right granted by a national government to an inventor for a fixed period of time.⁴² In the United States, the term of a patent is 20 years from the date on which an application is filed.⁴³ Rights in a patent authorize the owner to exclude others from making, using, offering for sale, or selling the claimed invention.⁴⁴ In exchange, the inventor must publicly disclose the patented invention.⁴⁵ For a patent to be granted, an invention must be new, useful, nonobvious, and not an invention previously disclosed to the public.⁴⁶ This intellectual property right is limited to the territorial reach of the granting nation.⁴⁷

³⁵ Pannell, *supra* note 27, at 736.

³⁶ See NASA, *NASA Spinoff 2021*, https://spinoff.nasa.gov/sites/default/files/2020-12/NASA_Spinoff-2021.pdf (NASA Spinoff is an annual online and print publication that highlights technologies that benefit life on Earth in the form of commercial products).

³⁷ See Nick Wingfield, *The Silicon Valley of Space Start-Ups?*, N.Y. Times, (July 29, 2016), <https://www.nytimes.com/2016/08/02/science/seattle-space-flight-innovation-center.html> (suggesting that Seattle is on the short list of places to be the Silicon Valley of space start-ups).

³⁸ Farnesi, *supra* note 10, at 718.

³⁹ Farnesi, *supra* note 10, at 718.

⁴⁰ Farnesi, *supra* note 10, at 718-719.

⁴¹ Ro et al., *supra* note 32, at 206.

⁴² Ro et al., *supra* note 32, at 206.

⁴³ 35 U.S.C. § 154(a)(2).

⁴⁴ 35 U.S.C. § 154(a)(1).

⁴⁵ 35 U.S.C. § 112(a).

⁴⁶ Kleiman, *supra* note 9.

⁴⁷ Ro et al., *supra* note 32, at 207.

Therefore, United States patent law is limited to the country's borders, with some extraterritoriality exceptions and international treaty enforcements.⁴⁸

Since patent law is territorial with each nation having its own laws, if an inventor wants to legally protect an invention, he or she must file a patent application in his or her "jurisdiction of interest" (i.e., each nation in which the inventor wishes to legally protect the invention).⁴⁹ An inventor may file an application in multiple countries by filing an international Patent Cooperation Treaty ("PCT") application and will be eligible to subsequently file for patent ownership in each of the participating PCT countries.⁵⁰ Filing a PCT application allows the inventor to temporarily "reserve" his or her international patent rights, but those rights do not become legally enforceable until the inventor files an application in each jurisdiction in which he or she is seeking a patent.⁵¹ Even though efforts have been undertaken by organizations such as the World Intellectual Property Organization ("WIPO") in an attempt to unify international patent laws and streamline the international patent application process, applying for and enforcing patents internationally is a financial and administrative burden.⁵² This is because the procedures for granting patents and the nature of the exclusive rights that are granted can vary widely in each country.⁵³

B. Space Law

In broad terms, "space law" comprises all laws that may govern or apply to outer space and activities in and relating to outer space.⁵⁴ This includes all national laws and international treaties that regulate activities associated with outer space.⁵⁵ The principles surrounding space law were founded during the Cold War.⁵⁶ At that point, the concern focused on regulating the major nations interested in space exploration and not activities of the private sector.⁵⁷ Current space law is contained in five principal agreements⁵⁸:

- The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies ("Outer Space Treaty");⁵⁹

⁴⁸ Ro et al., *supra* note 32, at 207.

⁴⁹ Ro et al., *supra* note 32, at 207.

⁵⁰ Ro et al., *supra* note 32, at 207.

⁵¹ Ro et al., *supra* note 32, at 207.

⁵² Kleiman, *supra* note 9.

⁵³ Kleiman, *supra* note 9.

⁵⁴ FRANCIS LYALL & PAUL B. LARSEN, SPACE LAW: A TREATISE (2nd ed. 2018).

⁵⁵ *Id.*

⁵⁶ Ro et al., *supra* note 32, at 207.

⁵⁷ Ro et al., *supra* note 32, at 207.

⁵⁸ WIPO Issue Paper, *supra* note 8, at 7.

⁵⁹ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

- The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space;⁶⁰
- The Convention on International Liability for Damage Caused by Space Objects;⁶¹
- The Convention on Registration of Objects Launched into Outer Space (“Registration Convention”);⁶² and
- The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies.⁶³

These treaties together provide that space shall be free for all humankind to use in a peaceful manner.⁶⁴ Since the focus behind foundational space law was not on private activity, none of these international space treaties addresses the applicability of national patent laws to activities in outer space.⁶⁵

In the Outer Space Treaty, the instrument that established the international legal framework for outer space activities,⁶⁶ Article VIII provides that a space object's State of registration “shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body.”⁶⁷ This is analogous to the “floating island theory” of jurisdiction in maritime law in which jurisdiction arises out of the nationality of the ship established by the country of registration and the use of that country’s flag.⁶⁸

The Registration Convention implements the Outer Space Treaty's registration requirements.⁶⁹ Article II of the Registration Convention provides that the launching state is responsible for registering a space object.⁷⁰ Article I(a) defines “launching State” as either (i) the State that launches or procures the launching of the space object or (ii) the State from whose territory or facility a space object is launched.⁷¹ Generally, patent laws do not extend to activities in space since they are territorial, but the Outer Space Treaty and the Registration Convention

⁶⁰ Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Apr. 22, 1968, 19 U.S.T. 7570, 672 U.N.T.S. 119.

⁶¹ Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187.

⁶² Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15 [hereinafter Registration Convention].

⁶³ Agreement Governing the Activities of the States on the Moon and other Celestial Bodies, Dec. 18, 1979, 1363 U.N.T.S. 3.

⁶⁴ Lawrence L. Risley, *An Examination of the Need to Amend Space Law to Protect the Private Explorer in Outer Space*, 26 W. ST. U. L. REV. 47, 51 (1999).

⁶⁵ WIPO Issue Paper, *supra* note 8, at 7.

⁶⁶ Ro et al., *supra* note 32, at 208.

⁶⁷ Outer Space Treaty, *supra* note 59, at art. VIII.

⁶⁸ Glenn H. Reynolds, *Legislative Comment: The Patents in Space Act*, 3 HARV. J. L. & TECH. 13, 19 (1990).

⁶⁹ Ro et al., *supra* note 32, at 208.

⁷⁰ Registration Convention, *supra* note 62, at art. II.

⁷¹ Registration Convention, *supra* note 62, at art. II.

together enable launching States to extend their laws, including patent laws, to space objects they register.⁷²

C. Intersection of Patent and Space Law

In 1990, Congress enacted the Patents in Space Act (“Space Act”), which extends the reach of United States patent laws to United States-registered spacecrafts.⁷³ The Space Act states that “[a]ny 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 [United States patent laws],” subject to a few exceptions.⁷⁴ Congress stated its policy in enacting the Space Act was to provide a “clear, indefinite [sic] and understandable set of rules for determining when and how United States patent law applies in outer space.”⁷⁵ The Space Act “establishes a climate of legal certainty for intellectual property rights in space at a time when it is crucial to nurture and facilitate the development of a commercial space industry.”⁷⁶ Based on the legislative history, the Space Act is meant to encourage private investment in space and commercial activities by ensuring United States inventors their investments will be protected.⁷⁷

There are a couple of exceptions listed in the Space Act.⁷⁸ The exceptions state that jurisdiction under section 105 will not extend to space objects that are “specifically identified and otherwise provided for by an international agreement to which the United States is a party” or a “space object or component thereof that is carried on the registry of a foreign state in accordance with the [Registration Convention].”⁷⁹ Even if a space object would normally be under United States jurisdiction, United States patent law will not apply if the object is carried on the registry of a foreign state.⁸⁰

There is only one treaty which the United States is a party to that discusses intellectual property in outer space.⁸¹ In 1998, the major space powers adopted the Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America

⁷² Ro et al., *supra* note 32, at 208.

⁷³ Jocelyn 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. 395, 397-398 (1999).

⁷⁴ 35 U.S.C. § 105(a).

⁷⁵ H.R. Rep. No. 101-960(I) (1990); *see* Shoemaker, *supra* note 73, at 398.

⁷⁶ H.R. Rep. No. 101-1026, at 48 (1991); *see* Shoemaker, *supra* note 73, at 398.

⁷⁷ Shoemaker, *supra* note 73, at 398.

⁷⁸ 35 U.S.C. § 105(a).

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ Pannell, *supra* note 27, at 747.

Concerning Cooperation on the Civil International Space Station (“ISS Agreement”).⁸² The ISS Agreement states,

“[F]or purposes of intellectual property law, an activity occurring in or on a Space Station flight element shall be deemed to have occurred only in the territory of the [country] of that element's registry, except that for [European Space Agency]-registered elements any European Partner State may deem the activity to have occurred within its territory.”⁸³

Under the ISS Agreement, patent jurisdiction over an activity on the ISS belongs to the country of registration of the space station module wherein that activity occurs.⁸⁴ Therefore, “Japan, Russia, and the United States each ha[ve] exclusive patent jurisdiction over activities conducted in [their] respective space station modules, and any European partner state may claim patent jurisdiction over activities conducted in the space station modules registered to the European Space Agency.”⁸⁵

III. ANALYSIS

A. Extraterritorial Reach of United States Patent Law

As stated above, patents are “inherently territorial and may only be enforced within the jurisdiction of the granting government.”⁸⁶ New technologies that expand into global systems and applications that reach beyond the borders of the United States begs the question of the extraterritorial reach of patent law.⁸⁷

In United States patent law, “courts have focused on defining the act of ‘use or using’ for purposes of extraterritorial reach.”⁸⁸ “One of the leading cases to examine an extension of the extraterritorial reach of U.S. [patent law] ... is *Decca Limited v. United States*.”⁸⁹ In *Decca*, the technology at issue was a worldwide United States Government radio navigation system known as “Omega.”⁹⁰ Omega included components of a system located in foreign countries and called for the placement of receivers in ships and aircrafts in order to pinpoint the location of ships and planes travelling on or over the high seas.⁹¹ In the *per curiam* opinion, *Decca* established that, for “system” or “apparatus” claims to a patent, the

⁸²Agreement Concerning Cooperation on the Civil International Space Station, Jan. 29, 1998, T.I.A.S. No. 12927 [hereinafter ISS Agreement].

⁸³ ISS Agreement, *supra* note 82, at art. 21, ¶ 2.

⁸⁴ Kleiman, *supra* note 9, at 5; See ISS Agreement, *supra* note 82, at art. 21.

⁸⁵ Kleiman, *supra* note 9, at 5; See ISS Agreement, *supra* note 82, at art. 21.

⁸⁶ Kleiman, *supra* note 9, at 1.

⁸⁷ See Ro et al., *supra* note 32, at 209.

⁸⁸ Ro et al., *supra* note 32, at 209.

⁸⁹ *Decca Ltd. v. United States*, 544 F.2d 1070 (Fed. Cir. 1976) (*per curiam*) [hereinafter *Decca*].

⁹⁰ *Id.* at 1074.

⁹¹ *Id.*

determinative factors to consider in deciding whether use of the patented system occurs within the United States are: (1) whether “control of a system” occurs on United States territory, (2) whether the system is “owned” by a United States entity, and (3) whether there is “beneficial use” in the United States.⁹² Under these factors, the court found that the United States Government could be subjected to the court’s jurisdiction for infringement of a United States patent.⁹³

The *Decca* approach was modified in 2005 by the case *NTP, Inc. v. Research in Motion Ltd.*⁹⁴ “The technology at issue [in this case] relat[ed] to systems for integrating existing electronic mail systems . . . with radio frequency . . . wireless communication networks, to enable a mobile user to receive email over a wireless network.”⁹⁵ One of the components of the system was located in Canada, so Research in Motion argued that its allegedly infringing activity did not occur “within the United States” in order to be held liable for patent infringement.⁹⁶ The court considered “whether the using, offering to sell, or selling of a patented invention is an infringement under [patent law] . . . if a component or step of the patented invention is located or performed abroad.”⁹⁷ In its examination, the *NTP* court relied on two of the *Decca* prongs stating, “[t]he use of a claimed system under [patent law] . . . is the place at which the system as a whole is put into service, *i.e.*, **the place where control of the system is exercised and beneficial use of the system obtained.**”⁹⁸ (Emphasis added). Under this modified test, the court found that “use of NTP’s asserted system claims occurred within the United States.”⁹⁹

The court went further to state that “the concept of ‘use’ of a patented method or process is fundamentally different from the use of a patented system or device.”¹⁰⁰ The court reasoned that “a process is nothing more than the sequence of actions of which it is comprised, [so] the use of a process necessarily involves doing or performing each of the steps recited.”¹⁰¹ This is different from “use of a system as a whole, in which the components are used collectively, not individually.”¹⁰² The court held that a process cannot be used “within” the United States under patent law unless each of the steps is performed within the United States.¹⁰³ “Under the *NTP* analysis of extraterritorial reach, . . . [between] system or apparatus claims, as long as the underlying space-based technology concerns a product over which its customer exercises ‘control’ and obtains ‘beneficial use’ of the product in the

⁹² *Id.* at 1083.

⁹³ *See id.*

⁹⁴ *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282 (Fed. Cir. 2005).

⁹⁵ *Id.* at 1287.

⁹⁶ *Id.* at 1311.

⁹⁷ *Id.* at 1315.

⁹⁸ *Id.* at 1317.

⁹⁹ *Id.*

¹⁰⁰ *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1317 (Fed. Cir. 2005).

¹⁰¹ *Id.* at 1318.

¹⁰² *Id.*

¹⁰³ *Id.*

United States, a United States patent infringement claim is feasible, even if necessary components of the product or service are not physically located within United States territory.”¹⁰⁴

However, the enactment of 35 U.S.C. § 105 (Space Act) has put the above extraterritoriality principles of United States patent law as applied to space objects into question.¹⁰⁵ Under either *Decca* or *NTP*, to support a finding of extraterritorial application of United States patent law to an allegedly infringing use of a system or apparatus, “the elements of ‘control’ from and ‘beneficial use’ in the United States must exist.”¹⁰⁶ Like *NTP* removed the United States “ownership” prong from the *Decca* test, 35 U.S.C. § 105 removes the “beneficial use” in the United States prong from the *NTP* test, leaving only the “control” from the United States prong.¹⁰⁷ Under a scenario in which a space object is not registered under the Registration Convention but controlled from the United States, it is still possible that the United States has jurisdiction under 35 U.S.C. § 105, over the space object even without a finding of beneficial use in the United States.¹⁰⁸ If this is taken as true, 35 U.S.C. § 105 effectively modified the state of extraterritorial application of United States patent law for space objects to a single consideration.¹⁰⁹

Further, 35 U.S.C. § 105 basically supersedes the above case law because neither *NTP* nor *Decca* expressly examines the element of “jurisdiction” of the United States with respect to space objects.¹¹⁰ In a scenario in which a space object that is not registered under the Registration Convention and not controlled from the United States could still be under United States jurisdiction if the space object is licensed in the United States under its regulatory protocols.¹¹¹ Section 105 supports an analysis that “[United States] patent law would still apply, even if the space object is not controlled from the [United States], has no beneficial use in the [United States], and is not owned by a [United States] entity.”¹¹² Under section 105, if some form of United States jurisdiction exists, the prior extraterritoriality principles of control, beneficial use, and ownership in determining the situs of the infringing act are of no significance to apply United States patent law.¹¹³

Without a further determination from United States courts on the matter, it would appear that private companies’ only recourse for extraterritoriality reach of United States patent law to space activities is 35 U.S.C. § 105.¹¹⁴ This could bring

¹⁰⁴ Ro et al., *supra* note 32, at 211.

¹⁰⁵ Ro et al., *supra* note 32, at 211.

¹⁰⁶ Ro et al., *supra* note 32, at 211; *Decca*, *supra* note 89; *NTP*, *supra* note 94.

¹⁰⁷ Ro et al., *supra* note 32, at 213.

¹⁰⁸ Ro et al., *supra* note 32, at 213.

¹⁰⁹ Ro et al., *supra* note 32, at 214.

¹¹⁰ Ro et al., *supra* note 32, at 214.

¹¹¹ Ro et al., *supra* note 32, at 214.

¹¹² 35 U.S.C. § 105(a).

¹¹³ Ro et al., *supra* note 32, at 23 n.59.

¹¹⁴ Ro et al., *supra* note 32, at 214.

dangers for the private sector's ability to protect their investments because of the loophole the exceptions create under section 105.¹¹⁵

B. Problems Created by the Jurisdictional Loophole

Having the outer space patent system based on the application of national patent laws to registered space objects will limit the ability to protect space technologies.¹¹⁶ Under the current law, a company must file patents in every country in which it wants to protect its inventions.¹¹⁷ Generally, the company would file patents only in countries where there is a significant market for the patented technology.¹¹⁸ This requires the company to

[A]pply for patent protection in every country where a competing space object might be registered, a potentially very expensive and time-consuming process.¹¹⁹ If a company is unable to obtain patent protection in every such country or if a country becomes a potential country of registration after the invention has already been disclosed to the public . . . , competitors may be able to circumvent the company's patents by using flag of convenience.¹²⁰

i. Article VIII of the Outer Space Treaty

As stated above, Article VIII of the Outer Space Treaty is similar to maritime law in which a ship operates under the law of the country it is registered and whose "flag" it uses.¹²¹ The Outer Space Treaty creates a flag of convenience problem for the private sector.¹²² "The term "flag of convenience" refers to the practice of registering a ship in a country different from that of the ship's owners for the purpose of reducing operating costs and avoiding burdensome regulations."¹²³ Similarly, a United States company could own an infringing space object but register it under the law of a country in which the object would not be infringing in order to avoid liability.¹²⁴

¹¹⁵ Ro et al., *supra* note 32, at 217.

¹¹⁶ Kleiman, *supra* note 9, at 5.

¹¹⁷ Kleiman, *supra* note 9, at 4.

¹¹⁸ Kleiman, *supra* note 9, at 5.

¹¹⁹ Kleiman, *supra* note 9, at 5.

¹²⁰ Kleiman, *supra* note 9, at 5.

¹²¹ Convention on the High Seas, Apr. 29, 1959, 450 U.N.T.S. 11, art. 6 ("Ships shall sail under the flag of one State only and, save in exceptional cases expressly provided for in international treaties or in these articles, shall be subject to its exclusive jurisdiction on the high seas"); *See* Outer Space Treaty, *supra* note 48, at art. VIII (space object's country of registration "shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body").

¹²² Kleiman, *supra* note 9, at 5.

¹²³ Kleiman, *supra* note 9, at 5.

¹²⁴ Kleiman, *supra* note 9, at 5.

The flag of convenience problem is even more unique for outer space patent problems.¹²⁵ Under maritime law, a ship transporting cargo from one country to another is under the jurisdiction of the registered country.¹²⁶ Once the cargo reaches the port of the destination country, that cargo becomes subject to the laws of the destination country.¹²⁷ So, a United States company can rely on United States patent law to prevent infringing products from being imported into the United States from a ship registered in a different country.¹²⁸ However, space is not considered its own jurisdiction so it does not have a “destination country” with its own patent laws.¹²⁹ Patent owners have to rely on the laws of the country where the spacecraft is registered to prevent a competitor from using an infringing space object.¹³⁰ If the patent owners did not file the patent or enforcement is difficult in a particular country, they would be virtually powerless to protect its invention.¹³¹

ii. Exceptions to the Space Act

Outside of the Outer Space Treaty, the exceptions to 35 U.S.C. § 105 (Space Act) create their own flag of convenience loophole in United States patent law.¹³² This loophole permits not just foreign entities, but also private United States companies to avoid patent infringement liability in the United States, for outer space activities under circumstances where they might otherwise be liable under current United States extraterritorial principles.¹³³

One of the exceptions to 35 U.S.C. § 105 is a “space object or component thereof that is carried on the registry of a foreign state in accordance with the [Registration Convention],” (“registration exception”).¹³⁴ The Registration Convention defines the “State of Registry” as the “launching State on whose registry a space object is carried in.”¹³⁵ Based on the definition of “launching State”, there are four possible ways in which a country can become the “launching State” for a space object: (1) the State launches a space object, (2) the State procures the launching of a space object, (3) the State has a space object launched from its territory, or (4) the State has a space object launched from its facility.¹³⁶

Interpreting the definitions under the Registration Convention, a United States court would not have jurisdiction according to the registration exception over an infringing space object owned and controlled by a United States company if the

¹²⁵ Kleiman, *supra* note 9, at 5.

¹²⁶ Convention on the High Seas, *supra* note 120.

¹²⁷ Kleiman, *supra* note 9, at 5.

¹²⁸ Kleiman, *supra* note 9, at 5.

¹²⁹ Kleiman, *supra* note 9, at 5.

¹³⁰ Kleiman, *supra* note 9, at 5..

¹³¹ Kleiman, *supra* note 9, at 5.

¹³² Ro et al., *supra* note 32, at 221.

¹³³ Ro et al., *supra* note 32, at 221.

¹³⁴ 35 U.S.C. § 105(a).

¹³⁵ Registration Convention, *supra* note 62, at art. I.

¹³⁶ Ro et al., *supra* note 32, at 215; Registration Convention, *supra* note 62, at art. I.

company launches the space object from another country's territory or facility.¹³⁷ This is where the problem of 35 U.S.C. § 105 controlling the extraterritorial reach of United States patent law to space objects arises.¹³⁸ If both *Decca* and *NTP* were applicable, a court could have jurisdiction in the above scenario, depending on the amount of control exercised by the United States company over the space object and the beneficial use to the United States.¹³⁹ Since the language of 35 U.S.C. § 105 does not consider the amount of control or beneficial use in determining the applicability of United States patent law, the registration exception will always remove a space object registered in another country, regardless of who controls and benefits, from the jurisdiction of United States patent law.¹⁴⁰ Therefore, Congress created its own flags of convenience problem for United States space companies when enacting 35 U.S.C. § 105.¹⁴¹

While this does not seem like much of a problem now,¹⁴² the growth of the commercial space industry is upon us.¹⁴³ With technological advances, space companies can establish themselves in almost any country they wish.¹⁴⁴ Additionally, advances in launch technology may lead companies to launch a spacecraft from almost any country.¹⁴⁵ When that time comes, the flag of convenience problem in space law could render the patent system ineffective at protecting inventions designed for use in outer space.¹⁴⁶

iii. Public Policy

As a matter of public policy, an effective patent system plays a critical role in nurturing new industries by rewarding innovation and promoting public disclosure of new inventions.¹⁴⁷ By contrast, an ineffective outer space patent system will harm the research and development of space.¹⁴⁸ First, without meaningful patent protection in outer space, this reduces companies' incentives to innovate and develop new space technologies.¹⁴⁹ Second, certain companies will obtain a competitive advantage if they are able to ignore liability for infringement of patents.¹⁵⁰ This could cause all space companies to register their space objects under flags of convenience, which would result in exacerbating patent protection,

¹³⁷ Ro et al., *supra* note 32, at 218.

¹³⁸ Ro et al., *supra* note 32, at 218.

¹³⁹ Ro et al., *supra* note 32, at 219.

¹⁴⁰ Ro et al., *supra* note 32, at 220.

¹⁴¹ Ro et al., *supra* note 32, at 217.

¹⁴² Kleiman, *supra* note 9, at 5 (stating that commercial space operations are too high profile and the barriers to entry too great for flags of convenience to be an immediate problem).

¹⁴³ Ro et al., *supra* note 32, at 205.

¹⁴⁴ Kleiman, *supra* note 9, at 5.

¹⁴⁵ Kleiman, *supra* note 9, at 5.

¹⁴⁶ Kleiman, *supra* note 9, at 5.

¹⁴⁷ Kleiman, *supra* note 9, at 4.

¹⁴⁸ Kleiman, *supra* note 9, at 6.

¹⁴⁹ Ro et al., *supra* note 32, at 221.

¹⁵⁰ Kleiman, *supra* note 9, at 6.

deteriorating safety of individuals, and environmental damage, all problems traditionally associated with flags of convenience.¹⁵¹

C. Proposed Solutions

Commentators have suggested multiple solutions to the current gaps in international space law surrounding the protection of private companies.

i. *Encourage Free Enterprise in Space*

One proposed solution is that the legitimate body governing activities in outer space should change space law to encourage free enterprise in space by allowing explorers and developers of space to realize the financial rewards from what they discover.¹⁵² The idea involves changing the “fundamental proposition that the only way to explore space is by keeping all of space open to everyone, allowing no one to own any of it.”¹⁵³ Article II of the Outer Space Treaty provides for the “non-appropriation of space,” stating outer space is “not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”¹⁵⁴ This solution calls for permitting the appropriation of space, opposite of the Outer Space Treaty, and creating space as a free enterprise zone, allowing those who claim property to own and develop it.¹⁵⁵ Mr. Jim Benson, Chairman of the Space Development Corporation, has said:

“Space is a place and not a government program. A precedent to help establish property rights in space is needed. . . . I believe no entity currently has standing in space, and the only widely ratified space treaty, the Outer Space Treaty, has no mention of property rights.”¹⁵⁶

This solution would not close the jurisdictional loophole because it suggests that national territorial laws from each country would still apply to the areas of space appropriated by individuals from each nation.¹⁵⁷ However, it is suggested that the commercial space industry would continue to develop technologies because companies would be able to gain financial rewards from the vast resources in space, which they are currently unable to do under the Outer Space Treaty.¹⁵⁸

¹⁵¹ Kleiman, *supra* note 9, at 6.

¹⁵² Risley, *supra* note 64, at 48.

¹⁵³ Risley, *supra* note 64, at 48.

¹⁵⁴ WIPO Issue Paper, *supra* note 8, at 7.

¹⁵⁵ Risley, *supra* note 64, at 68.

¹⁵⁶ Risley, *supra* note 64, at 68-69.

¹⁵⁷ Risley, *supra* note 64, at 61.

¹⁵⁸ Risley, *supra* note 64, at 67.

ii. Universal Patent Law and a Corresponding Space Patent Jurisdiction

Another solution proposed by WIPO is the formation of a uniform patent law and a corresponding space patent jurisdiction.¹⁵⁹ This solution would establish space as its own territory with a separate jurisdiction to create and enforce patents.¹⁶⁰ Further, inventors would file one patent application that would be universally enforceable and protectable throughout space.¹⁶¹

WIPO's proposition does not identify a governing body who would administer the uniform patent law.¹⁶² Nevertheless, the proposed solution would provide greater protections and legal certainty, an essential factor for the space industry, to private companies by creating uniform rules.¹⁶³ Also, this solution would close the loophole that allows companies to infringe patents simply by registering their space objects in different countries.¹⁶⁴ Further, a uniform patent system simplifies the patenting process by requiring inventors to file only one patent application, instead of a separate application for each country in which they want to enforce their rights.¹⁶⁵ However, the most significant obstacle to the creation of a single space patent jurisdiction is the traditional reluctance of countries to part with their sovereignty in order to give power to an international governing organization.¹⁶⁶

iii. COPUOS Administering Space Patent System under the TRIPS Agreement

Another proposed solution is creating a new subcommittee of the United Nations COPUOS.¹⁶⁷ This subcommittee would have the authority to either grant or deny patent applications for inventions for outer space activities.¹⁶⁸ Outer space has been COPUOS's focus for many years.¹⁶⁹ Since its creation, COPUOS has been responsible for:

“. . . serving as a focal point for international cooperation in the peaceful exploration and use of outer space, maintaining close contacts with governmental and non-governmental organizations concerned with outer space activities, providing for exchange of

¹⁵⁹ WIPO Issue Paper, *supra* note 8, at 22.

¹⁶⁰ WIPO Issue Paper, *supra* note 8, at 22.

¹⁶¹ WIPO Issue Paper, *supra* note 8, at 22; Kleiman, *supra* note 9, at 4.

¹⁶² WIPO Issue Paper, *supra* note 8, at 4.

¹⁶³ WIPO Issue Paper, *supra* note 8, at 4.

¹⁶⁴ Kleiman, *supra* note 9, at 4.

¹⁶⁵ WIPO Issue Paper, *supra* note 8, at 4.

¹⁶⁶ Kleiman, *supra* note 9, at 4.

¹⁶⁷ Juan Felipe Jiménez, *Patents in Outer Space: An Approach to the Legal Framework of Future Inventions*, 98 J. PAT. & TRADEMARK OFF. SOC'Y 447, 450 (2016).

¹⁶⁸ *Id.*

¹⁶⁹ *Id.* at 464.

information relating to outer space activities and assisting in the study of measures for the promotion of international cooperation in those activities.”¹⁷⁰

This proposition states that COPUOS has acquired invaluable experience over the years, which makes it the best choice for administering an international patent system.¹⁷¹ “As the leading entity in outer space affairs, this qualifies them as the most outstanding organization in this context, which is the main reason why it should bear the responsibility to address these matters.”¹⁷²

This proposition further states that the Agreement on Trade-Related Aspects of Intellectual Property Rights (“TRIPS Agreement”) is the most suitable source of substantive law to be applied in the outer space activities context.¹⁷³ However, the TRIPS Agreement does not specifically address the question of outer space.¹⁷⁴ It is a minimum standards agreement, which allows members to provide more extensive protection of intellectual property as they want.¹⁷⁵ However, the commentator argues two reasons why the TRIPS Agreement is the best applicable law in outer space patent infringement cases.¹⁷⁶ First, the TRIPS Agreement is recognized by the majority of countries.¹⁷⁷ So, almost all of the countries which would be governed by the proposal already have approved the provisions in the TRIPS Agreement.¹⁷⁸ “As a result, the substantive legal provisions of the space patent regime are already adopted by many countries.”¹⁷⁹ Second, the TRIPS Agreement incorporates the substantive provisions of the Paris Convention.¹⁸⁰ Therefore, choosing the TRIPS Agreement as the standard legal framework for space patent protection is beneficial because it further assures a strong degree of protection for inventors.¹⁸¹ However, just like WIPO’s proposition, implementing this solution may be challenged by countries’ reluctance to cede power to an international governing organization.¹⁸²

¹⁷⁰ *COPUOS History*, *supra* note 17.

¹⁷¹ Jiménez, *supra* note 167, at 464.

¹⁷² Jiménez, *supra* note 167, at 464.

¹⁷³ Jiménez, *supra* note 167, at 464.; *see generally* Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, 33 I.L.M. 81, 1869 U.N.T.S. 299.

¹⁷⁴ WIPO Issue Paper, *supra* note 8, at 6.

¹⁷⁵ World Trade Organization, *Overview: the TRIPS Agreement*, https://www.wto.org/english/tratop_e/trips_e/intel2_e.htm (last visited Oct. 31, 2021).

¹⁷⁶ Jiménez, *supra* note 167, at 464.

¹⁷⁷ Jiménez, *supra* note 167, at 464.

¹⁷⁸ Jiménez, *supra* note 167, at 464-65.

¹⁷⁹ Jiménez, *supra* note 167, at 465.

¹⁸⁰ Jiménez, *supra* note 167, at 465.

¹⁸¹ Jiménez, *supra* note 167, at 465.

¹⁸² Jiménez, *supra* note 167, at 465.

iv. Patent System Modeled on European Patent Convention and Providing Tax Incentives to Join

Another proposed solution provides an intermediate measure for patent holders in lieu of a single uniform patent jurisdiction.¹⁸³ The proposition is creating a system modeled on the European Patent Convention (“EPC”) that provides a single patent prosecution process for all of its member states throughout Europe.¹⁸⁴ This system would standardize patent laws among spacefaring countries and reduce the financial cost and burdens of applying for patents in as many potential launching States as necessary for protection.¹⁸⁵ Additionally, members could use reciprocity and agree to recognize and enforce space patents filed in other member states.¹⁸⁶

Further, the solution proposes providing tax incentives and government contracting preferences to companies that register their space objects in member states.¹⁸⁷ The idea is to deter private companies from filing for registration in flags of convenience states.¹⁸⁸ However, it is unlikely that the amount of money a government could provide in tax incentives would be able to match or exceed the costs of developing space technology.¹⁸⁹ If a company’s research and development costs, including licensing patented technology, account for forty percent of its expenses, then the United States would need to give tax incentives that would, at a minimum, match that amount to deter the company from utilizing the registration exception in 35 U.S.C. § 105.¹⁹⁰

v. Treaty between Largest Spacefaring Countries Banning any Benefits Derived from Violating Technology of Patents in any Member Nation

Another proposed solution is to form a treaty among the largest space-related countries which would ban any benefits derived from the use of technology that violates the patents of any of the member countries.¹⁹¹ The idea is having this ban in the most technologically advanced countries would take away the large majority of consumers of the violating technology.¹⁹² This idea is different than other proposed solutions because it involves targeting the companies’ potential customers, not creating laws or treaties that target the infringing companies themselves.¹⁹³ The purpose of most private companies is generating income, so limiting violating companies’ number of consumers would make appropriating

¹⁸³ Kleiman, *supra* note 9, at 4.

¹⁸⁴ Kleiman, *supra* note 9, at 4.

¹⁸⁵ Kleiman, *supra* note 9, at 4.

¹⁸⁶ Kleiman, *supra* note 9, at 4.

¹⁸⁷ Kleiman, *supra* note 9, at 4.

¹⁸⁸ Kleiman, *supra* note 9, at 4.

¹⁸⁹ Pannell, *supra* note 27, at 756.

¹⁹⁰ Pannell, *supra* note 27, at 756.

¹⁹¹ Pannell, *supra* note 27, at 758.

¹⁹² Pannell, *supra* note 27, at 758.

¹⁹³ Pannell, *supra* note 27, at 758.

patented technology unprofitable.¹⁹⁴ However, such a ban would not deter private companies that do not rely on or derive their benefits from a pool of terrestrial consumers in these large countries.¹⁹⁵

vi. *Best Solution: Appointing a Single Governing Body to Administer a Unified Patent Law and Creating a Separate Jurisdiction in Space*

While multiple solutions have been proposed to a flags of convenience problem of patent law in outer space, the best solution is a combination of WIPO's proposition and the creation of a subcommittee of COPUOS.¹⁹⁶ In order to provide the most protection and legal certainty to private companies, creation of a uniform international space patent law system is necessary to avoid a flags of convenience problem.¹⁹⁷ Additionally, private companies would benefit by reducing the financial costs and burdens associated with filing a patent in multiple jurisdictions.¹⁹⁸ Companies could then invest their cost-savings into further research and development of space technologies.

Unlike the proposed solution above, the TRIPS Agreement should not be the single source of substantive law to be applied.¹⁹⁹ Instead, the TRIPS Agreement should be the starting point for the universal patent system to be built upon. There are two reasons for this. First, the TRIPS Agreement is only a minimum standards agreement.²⁰⁰ Meaning members can provide more extensive protection.²⁰¹ For the majority of countries to agree to a single international law, the universal system would need to include some of the national laws among these countries beyond the minimum standard set in the TRIPS Agreement.²⁰² Second, as stated above, the TRIPS Agreement does not specifically address the question of outer space.²⁰³ Therefore, the TRIPS Agreement alone would not be suitable for addressing complex disputes among space patent infringement.

Additionally, as WIPO has proposed, space and its accessories should be declared as a single territory.²⁰⁴ By creating this separate jurisdiction in space,

¹⁹⁴ Pannell, *supra* note 27, at 758.

¹⁹⁵ Pannell, *supra* note 27, at 759 (“Companies in these [space] industries instead rely on customers coming to them and would not be affected by such a ban”).

¹⁹⁶ See Marie Weisfeiler, *Patent Law in Space*, B.C. INTELL. PROP. & TECH. F. 1, 7 (2019) (proposing a similar solution combining the WIPO and COPOUS solutions).

¹⁹⁷ See WIPO Issue Paper, *supra* note 8, at 22.

¹⁹⁸ Kleiman, *supra* note 9, at 6.

¹⁹⁹ See Jiménez, *supra* note 167.

²⁰⁰ *Overview: the TRIPS Agreement*, *supra* note 175.

²⁰¹ *Overview: the TRIPS Agreement*, *supra* note 175.

²⁰² What that combination among the national laws would be is beyond the scope of this Comment.

²⁰³ WIPO Issue Paper, *supra* note 8, at 6.

²⁰⁴ WIPO Issue Paper, *supra* note 8, at 22.

companies would not be able to circumvent patent liability.²⁰⁵ This is because the territory of space would be subject to the laws of the universal patent system, regardless from where a space object is launched.²⁰⁶

Based on the above solution, the governing body for this universal space patent system should be a newly created subcommittee of COPUOS.²⁰⁷ COPUOS has extensive experience in research and development of outer space matters and therefore would be the most suitable for executing a universal space patent system.²⁰⁸ Further, the main focus of COPUOS's two subcommittees, the Scientific and Technical Subcommittee and the Legal Subcommittee, is on the complex issues which have arisen alongside the development of space technology.²⁰⁹ As COPUOS is a committee of the United Nations that regularly works with other international organizations, WIPO as a United Nations agency, could assist the new subcommittee in creating and executing the universal patent system.²¹⁰ Additionally, members of the new subcommittee should include agents of WIPO.

Overall, the best solution to overcome a flag of convenience problem in space patent law is to create a universal space patent system, built upon the TRIPS Agreement, that is governed by a new subcommittee of COPUOS with assistance from WIPO.

CONCLUSION

It is argued that “[t]he current legal regime restrains the commercialization and development of outer space and subsequently, its infinite economic and humanitarian rewards. Although a viable and lucrative space industry exists, only a minute fraction of the industry's potential is reached as a result of uncertainty created by space law.”²¹¹ In order to further commercialize the space technology industry, financial rewards and investment protection are an essential element to encourage exploration and development.²¹² However, the current loophole in space law, even in United States patent law, threatens to limit the patent system's ability to incentivize costly research and development of space technologies.²¹³ There are multiple solutions proposed to solve the current gaps in the law. However, the best approach is a combination of different proposed solutions. Creating a universal patent system that is governed by a United Nations body would provide the greatest protection and certainty private companies are looking for to continue investing in space technologies. “A simple and reliable international legal framework would

²⁰⁵ Kleiman, *supra* note 9, at 6.

²⁰⁶ Kleiman, *supra* note 9, at 6.

²⁰⁷ Jiménez, *supra* note 167.

²⁰⁸ Jiménez, *supra* note 167.

²⁰⁹ *COPUOS History*, *supra* note 17.

²¹⁰ Jiménez, *supra* note 167, at 466.

²¹¹ Ty S. Twibell, Comment, *Space Law: Legal Restraints on Commercialization and Development of Outer Space*, 65 UMKC L. REV. 589, 610 (1997).

²¹² Risley, *supra* note 64, at 51.

²¹³ Kleiman, *supra* note 9.

facilitate maximizing the collective utilization of public and private resources in the area of space technology for the benefit of all nations.”²¹⁴

This is especially true for the United States, since it is currently “home” to the private commercial space industry boom and reaping the economic benefits associated with that title.²¹⁵ It is within the United States and all large spacefaring countries' best interest to come together and implement a solution to the loophole in the law. Otherwise, while the commercial space industry continues to grow, these large countries will begin to see a reduction in financial benefits as private companies move to “convenient” states and exploit the gaping hole in the space patent system.

²¹⁴ WIPO Issue Paper, *supra* note 8, at 23.

²¹⁵ Wingfield, *supra* note 37.