
Fundamental Principles of Space Resources Exploitation: A Recent Development of International and Municipal Law

Han Taek Kim*

Space law is normally referred to international space law. As national space activities develop, however, national space laws have been legislated in many countries for the development of space resources. These are used to present conflicting cases between national and international space law (corpus juris spatialis internationalis) on the interpretation of space resource exploitation. This study is devoted to bridging the gap between these two legal systems. In this paper, the author will critically review the fundamental principles of space resource exploitation under international law and suggest a direction for setting up national space laws for future space resources. This paper is composed of seven parts, including a short Introduction and Conclusion. Part two will discuss acts pertaining to asteroid resources. Part three will deal with res extra commercium. Part four will analyze the non-appropriation principle. Part five will look into the common heritage of mankind. Part six will investigate res nullius humanitatus.

Keywords

OST, Moon Agreement, Non-Appropriation, Res Extra Commmercium, CHM, Res Nullius Humanitatus, COPUOS

* Professor of International Law at School of Law, Kangwon National University, Korea; Research Scholar at University of Nebraska-Lincoln College of Law (2015-16). Completion of Univ. Diploma Course in Air & Space Law (UCL), Ph.D. (Korea Univ.). ORCID: <https://orcid.org/0000-0001-7210-2362>. The author may be contacted at: hkim@kangwon.ac.kr / Address: 1, Gangwondachak-gil, Chuncheon-si, Gangwon-do, 24341 Korea. DOI: <http://dx.doi.org/10.14330/jeail.2018.11.1.02>

I. Introduction

After the launch of the first satellite, Sputnik I, in 1957, mankind did not concern itself with space resources for over 30 years. However, since the depletion of future global resources and space-faring activities has become more common, concern over the resources in outer space bodies has grown, especially since 1985, when young engineers at the University of Wisconsin discovered that lunar soil contained significant quantities of a remarkable form of helium.¹

Scientists have found that if Helium-3 is nuclear-fused with heavy hydrogen, it generates tremendous energy through nuclear fusion power generation with only a small amount of energy. Even better, this generation rarely produces radioactive waste because after a short half-life, the radioactivity disappears.² There is little Helium-3 on the Earth, but it is abundant on the moon's surface, where about 100 million tons has been created by solar wind as it flies over. This is enough for mankind to use for a very long time.³ The moon is also the celestial body closest to the earth and could serve as a middle base in outer space. With the lack of gravitational pull caused by the vacuum environment, if a space object is launched here, it would cost much less than on Earth. In this regard, space-faring countries have been interested in constructing a base on the moon and exploiting the Helium-3 there.⁴

Asteroids are another concern for space activity. Asteroids, sometimes called minor planets, are rocky remnants left over from the early formation of the solar system about 4.6 billion years ago. Most of this ancient space rubble can be found orbiting the sun between Mars and Jupiter within the main asteroid belt.⁵ A larger asteroid (*e.g.*, Asteroid 3554 Amun) contains roughly 20 trillion dollars' worth of gold,

¹ See *Mining The Moon*, POPULAR MECHANICS, Dec, 7, 2004, available at <https://www.popularmechanics.com/space/moon-mars/a235/1283056> (last visited on Apr. 23, 2018).

² C. Barnatt, Future Technologies, Helium-3 Power Generation, available at <http://www.explainingthefuture.com/helium3.html> (last visited on Apr. 23, 2018).

³ R. Bilder, *A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options*, 33 FORDHAM INT'L L. J. 250-7 (2009).

⁴ B. Gruner, *A New Hope for International Space Law: Incorporating Nineteenth Century First Possession Principles into the 1967 Space treaty for the Colonization of Outer Space in the Twenty-First Century*, 35 SETON HALL L. REV. 309 (2004).

⁵ Asteroids range in size from Vesta - the largest, at about 329 miles (530 kilometers) in diameter - to bodies that are less than 33 feet (10 meters) across. The total mass of all the asteroids combined is less than that of the Earth's moon. The number of asteroids that exist in the solar system is known to be about 500,000. In the earth orbit, there are over 8,000 asteroids more than 45m diameter. For details, see *Solar System Exploration: Asteroids*, NASA Science, available at <https://solarsystem.nasa.gov/small-bodies/asteroids/in-depth> (last visited on Apr. 23, 2018).

iron, nickel, and platinum.⁶ In addition, since many asteroids contain a considerable amount of carbon, oxygen and water, space enterprises such as Planetary Resources, Deep Space Industries are committed to collecting them.⁷ Asteroids with water can be used for the space bases or facilities to protect astronauts from meteors.⁸ Therefore, countries such as the US, Russia, China, India, and Japan are trying to search for asteroid resources as well as Helium-3.

Along this course, Elon Musk, the CEO of the Tesla Company and founder of SpaceX, has made a long-term plan to send about one million people to space in 100 years, beginning with human immigration to Mars in 2022. He has said: “There are two fundamental paths facing humanity today. One is that we stay on Earth forever and then there will be an inevitable extinction event. The alternative is to become a spacefaring civilization and a multi-planetary species.”⁹ At present, he has developed rocket technology through SpaceX and provides a commercial orbit transportation service to an international space station.¹⁰

Today, each country has adopted national space law¹¹ for the development of space resources. These are some conflicting cases between national and international space law (*corpus juris spatialis internationalis*) on the interpretation of space resource exploitation.¹² This study is devoted to bridging the gap between these two legal systems. In this paper, the author will critically review the fundamental principles of space resource exploitation under international law and suggest a direction for setting up national space laws for future space resources. This essay is composed of eight parts, including a short Introduction and Conclusion. Part two will discuss acts pertaining to asteroid resources. Part three will deal with *res extra commercium*. Part

⁶ B. Leahy, *Book Review: Mining the Sky: Untold Riches from the Asteroids, Comets, and Planets* (by J. Lewis), available at <http://space.nss.org/book-review-mining-the-sky> (last visited on Apr. 23, 2018).

⁷ G. Reynolds, *Obama and Congress just made property rights in space more secure*, USA TODAY, Nov. 30, 2015, available at <https://www.usatoday.com/story/opinion/2015/11/30/cash-final-frontier-space-mining-asteroids-column/76555366> (last visited on Apr. 21, 2018).

⁸ A. Tingkang, *These Aren't the Asteroids You Are Looking For: Classifying Asteroids in Space as Chattels, Not Land*, 35 SEATTLE U. L. REV. 562 (2012).

⁹ E. Musk, *SpaceX founder Elon Musk plans to get humans to Mars in Six Years*, GUARDIAN, Sept. 28, 2016, available at <https://www.theguardian.com/technology/2016/sep/27/elon-musk-spacex-mars-colony> (last visited on Apr. 23, 2018).

¹⁰ *Id.*

¹¹ Space law is normally referred to as international space law. As national space activities develop, however, it should be divided into ‘national’ and ‘international’ space law. At present, national space laws have been legislated in many countries, such as Russia, France, Britain, Germany, Canada, Sweden, Luxembourg, Australia, South Africa, Brazil, Argentina, Chile, India, China, Korea, and Japan. For details, see N. JASENTULYANA, INTERNATIONAL SPACE LAW AND THE UNITED NATIONS 11 (1999); S. Gorove, *Sources and Principles of Space Law*, in SPACE LAW - DEVELOPMENT AND SCOPE 51-4 (N. Jasantulyana ed., 1992); R. JAKHU (ED.), NATIONAL REGULATION OF OUTER SPACE ACTIVITIES (2010).

¹² F. von der Dunk et al., *Surreal Estate: Addressing the Issue of “Immovable Property Rights on the Moon,”* 20 SPACE POL’Y 151 (2004).

four will analyze the non-appropriation principle. Part five will examine the principle of non-appropriation. Part six will look into the “common heritage of mankind.” Part seven will investigate *res nullius humanitatus*.

II. Acts Pertaining to Asteroid Resources

In 2015, the US enacted the Commercial Space Launch Competitiveness Act (“CSLCA”). CSLCA, nicknamed the ‘Asteroids Act,’ grants qualifications to individuals and enterprises in the US and other countries to use space resources for profit.¹³ It defines asteroid resources as space resources found on the surface or inside of an asteroid.¹⁴ Water or minerals are included in space resources,¹⁵ but only inorganic substance may be utilized.¹⁶ If a microorganism should be found, it cannot be used for profit-making purposes. This Act allows private space exploitation companies to own and sell the resources gathered in outer space, including the moon and asteroids. Section 303 of the CSLCA stipulates: “U.S. citizens involved in the commercial exploration and collection of asteroid resources or space resources subjected to this Act can exercise rights to possess, own, transport, use and sell relevant resources in the range of the U.S. Law.”¹⁷

Chris Lewicki, the President of Planetary Resources, Inc., emphasizes that CSLCA is practical enough to lead to great growth in the space field, likening it to the Homestead Act of 1862,¹⁸ which played a key role in the gold rush and exploitation of forest resources.¹⁹ However, this Act clarifies that the US can claim neither sovereign rights nor ownership over any celestial body in outer space.²⁰

¹³ US Commercial Space Launch Competitiveness Act, Pub. L. No. 114-190, 129 Stat. 704 (2015), available at <https://www.congress.gov/bill/114th-congress/house-bill/2262/text> (last visited on Apr. 21, 2018).

¹⁴ 51 U.S.C.A. § 51301. Definitions.

¹⁵ *Id.* § 51301(2)(B).

¹⁶ *Id.* § 51301(2)(A).

¹⁷ *Id.* § 51303. (Asteroid resource and space resource rights).

¹⁸ See The Homestead Act of 1862, available at <https://www.archives.gov/education/lessons/homestead-act> (last visited on Apr. 21, 2018).

¹⁹ See Planetary Resources Applauds U.S. Congress in Recognizing Asteroid Resource Property Rights, Planetary Resources, Nov. 10, 2015, available at <https://www.planetaryresources.com/2015/11/planetary-resources-applauds-u-s-congress-in-recognizing-asteroid-resource-property-rights> (last visited on Apr. 2018).

²⁰ 51 U.S.C.A. § 403 (Disclaimer of Extraterritorial Sovereignty). It reads: “It is the sense of Congress that by the enactment of this Act, the United States does not thereby assert sovereignty or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body.”

On July 20, 2017, Luxembourg passed a “Law on the Exploration and Use of Space Resources”²¹ modelled after the CSLCA. With this Law, Luxemburg became the first European country to guarantee a private company’s right to collect space resources.²² Article 1 states: “Les ressources de l’espace sont susceptibles d’appropriation (Space resources are capable of being appropriated).” This provision was adopted as an analogy of the rules governing the high seas under the law of the sea since people can explore those resources without appropriating the entire area. Furthermore, it provides the approval and supervision procedures for space exploration duty.²³

III. *Res Extra Commercium*

Regarding the legal status of outer space and celestial bodies in international law, Bin Cheng said that outer space should be understood as *res extra commercium*, just as on the high seas, while celestial bodies should be *res nullius* (or *terra nullius*) and acquired by means of *occupatio* in a legally effective sense, similar to the ‘new world’ discovered by Christopher Columbus, which was settled on a first-come, first-served basis.²⁴

The concept of *res extra commercium* (an object outside commerce) originated from Roman law and means that an object cannot be owned by an individual and may not become the subject of a transaction.²⁵ Under international law, it often refers to a region that exists outside of a national border in which states cannot exercise their sovereignty, but have the freedom of exploration and exploitation.²⁶ Thus, in such a region, no person can own, exclude others or transfer possession of the land.²⁷ This is also expressed as *res communis* or *terra communis*, which indicate a place that is not subordinated or incorporated by a state, exists beyond state territory and may be explored by all states, like the high seas, where the fishing vessels from each country

²¹ Loi du 20 juillet 2017 sur l’exploration et l’utilisation des ressources de l’espace, available at <http://legilux.public.lu/eli/etat/leg/loi/2017/07/20/a674/jo> (last visited on Apr. 21, 2018).

²² Luxembourg’s new space law guarantees private companies the right to resources harvested in outer space under international law. See Law on the Exploration and Use of Space Resources (Nov. 11, 2016), available at http://www.spaceresources.public.lu/content/dam/spaceresources/press-release/2016/2016_11_11PressReleaseNewSpacelaw.pdf (last visited on Apr. 21, 2018).

²³ *Id.* art. 17.

²⁴ Bin Cheng, *The 1967 Space Treaty*, J. DROIT INT’L 564 (1968).

²⁵ R. SOHM, *THE INSTITUTES: A TEXTBOOK OF THE HISTORY AND SYSTEM OF THE ROMAN PRIVATE LAW* 320-3 (1901).

²⁶ K. BASLAR, *THE CONCEPT OF THE COMMON HERITAGE OF MANKIND IN INTERNATIONAL LAW* 41-2 (1998).

²⁷ P. STEINBERG, *THE SOCIAL CONSTRUCTION OF THE OCEAN* 91 (2001).

catch fish and sell them without occupying the sea.²⁸

In 1952, Oscar Schachter, the Vice Director of UN Bureau of Judicial Affairs, emphasized that outer space and celestial bodies should be considered the common property of all mankind and outside of state control.²⁹ The UN General Assembly finally adopted the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space (hereafter Space Law Declaration)³⁰ on December 13, 1963. In nine principles, it declares that all space exploration should be done with good intentions and equally open to all States in accordance with international law. No nation may claim ownership of outer space or any celestial body. Space activities should be carried out under international law and the nations undergoing these activities must assume responsibility for the governmental or non-governmental agencies involved.³¹ Objects launched into space are subject to their national jurisdiction. Objects, parts, and components discovered outside a national jurisdiction will be returned upon identification.

Since the contents in the Space Law Declaration have been wholly reflected in the following international space treaties and no states object to those principles, each declaration is said to be incorporated into customary international law.

IV. Principle of Non-Appropriation

The UN General Assembly established the Committee on the Peaceful Uses of Outer Space (“COPUOS”)³² as a standing committee on space in 1959. The COPUOS was committed to draft the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (“OST”),³³ which came into effect on October 10, 1967. The Committee made four detailed instruments based on OST as follows:

²⁸ For details on *res communis*, see J. CURRIE, PUBLIC INTERNATIONAL LAW (2008), available at https://www.irwinlaw.com/cold/res_communis (last visited on Apr. 23, 2018).

²⁹ N. Matte, *Limited Aerospace Natural Resources and Their Regulation*, 7 ANNALS OF AIR & SPACE L. 379 (1982).

³⁰ G.A. Res. 1962(XVIII), U.N. Doc. A/RES/18/1962 (Dec. 13, 1963), available at <http://www.un-documents.net/a18r1962.htm> (last visited on Apr. 21, 2018).

³¹ *Id.*

³² The Committee has two subsidiary bodies: the Scientific and Technical Subcommittee, and the Legal Subcommittee, both of which were abolished in 1961. For details, see COPUOS, United Nations Office for Outer Space Affairs, available at <http://www.unoosa.org/oosa/en/ourwork/copuos/index.html> (last visited on Apr. 23, 2018).

³³ G.A. Res. 2222(XXI), U.N. Doc. A/RES/21/2222 (Dec. 19, 1966), available at http://www.unoosa.org/pdf/gares/ARES_21_2222E.pdf (last visited on Apr. 23, 2018).

- Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Rescue Agreement).³⁴
- Convention on International Liability for Damage Caused by Space Object (Liability Convention).³⁵
- Convention on Registration of Objects Launched into Outer Space (Registration Convention).³⁶
- Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement).³⁷

The OST is called the ‘Magna Carta’³⁸ of outer space activities. It specifies the “principle of non-appropriation” in outer space, including the moon and other celestial bodies. Article 2 states: “Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.” This provision converted the legal status of the moon and other celestial bodies from *res nullius* to *res extra commercium*.³⁹ *Res extra commercium* excluded the principle of *terra nullius*, which has dominated European colonial policy since the fifteenth century.⁴⁰ As mentioned above, the legal status of *res extra commercium* is similar to that of the high seas in the international law of the sea, so each state cannot exclusively occupy space, but may freely use the resources there.

He Qizhi mentioned that the principle of non-appropriation and freedom of exploration and scientific survey in outer space developed into a customary law in a relatively short time as an instant international law.⁴¹ In fact, this term originated from Bin Cheng’s argument in his article “United Nations Resolutions on Outer Space: ‘Instant’ International Customary Law?,”⁴² in which relations between *opinio juris* and

³⁴ G.A. Res. 2345(XXII), U.N. Doc. A/RES/2345(XXII) (Dec. 19, 1967), available at http://www.unoosa.org/pdf/gares/ARES_22_2345E.pdf (last visited on Apr. 23, 2018).

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Id.*

³⁸ R. Arziner, *On the Legal Contents and Significance of the Common Heritage of Mankind in Outer Space Law*, THE 28TH COLLOQUIUM OF THE LAW OF OUTER SPACE PROC. 208 (1986).

³⁹ S. Williams, *Celestial Bodies*, 11 MAX PLANCK ENCYCLOPEDIA OF PUBLIC INTERNATIONAL LAW 52 (R. Bernhardt ed., 1989).

⁴⁰ H. Keefe, *Making the Final Frontier Feasible: A Critical Look at the Current Body of Outer Space Law*, 7 SANTA CLARA COMPUTER & HIGH TECH. L. J. 358 (1995).

⁴¹ He Qizhi, *The Outer Space Treaty in Perspective*, 25 J. SPACE L. 97 (1997), available at <http://heinonline.org/HOL/LandingPage?handle=hein.journals/jrsl25&div=13&id=&page=> (last visited on Apr. 21, 2018).

⁴² Bin Cheng, *United Nations Resolutions on Outer Space: ‘Instant’ International Customary Law ?*, 23 INDIAN J. INT’L L. 23 (1965).

practice in formation of customary law were explained. In this case, the importance of state practice and the time factor would be denied in the formation of international customary law.⁴³

The non-appropriation principle was influenced by the Antarctic Treaty of 1959.⁴⁴ However, it is not found in aviation law.⁴⁵ As far as the non-appropriation principle of outer space and celestial bodies are concerned, it may be international customary law that binds all states even developing into *jus cogens*.⁴⁶ In other words, the non-appropriation principle has been admitted as general international law through its 50-year's implementation.⁴⁷

Non-appropriation means that exclusive domination is prohibited by any public or private entity.⁴⁸ If any state, individual or private enterprise is granted a right or a possessory right for the use, benefit and disposal of outer space and celestial bodies, it violates international law under the principle of “*nemo plus juris transfere potest quam ipse habet*” (one cannot transfer more rights than he has).⁴⁹ In this regard, though some domestic courts would deliver a judgement that states may appropriate outer space and celestial bodies, such appropriation cannot be allowed under international law.⁵⁰

Since Article 2 of OST only prohibits state appropriation, individual or private enterprise appropriation should be allowed.⁵¹ In this context, states as well as individuals and private enterprises would naturally become the subjects of non-appropriation because the legislators of this provision would be unable to find individuals or private enterprises as the main agents of space activities.⁵²

⁴³ P. MALANCZUK, *AKEHURST'S MODERN INTRODUCTION TO INTERNATIONAL LAW* 46 (7th ed. 1997).

⁴⁴ Antarctic Treaty art. IV (2). It provides: “No acts or activities taking place while the present treaty is in force shall constitute a basis for asserting, supporting or denying a claim to territorial sovereignty in Antarctica or create any rights of sovereignty in Antarctica. No new claim, or enlargement of an existing claim, to territorial sovereignty in Antarctica shall be asserted while the present treaty is in force.” For details, see *The Antarctic Treaty*, available at https://www.ats.aq/index_e.htm (last visited on Apr. 21, 2018).

⁴⁵ P. HAANAPPEL, *THE LAW AND POLICY OF AIR SPACE AND OUTER SPACE - A COMPARATIVE APPROACH* 11-2 (2003).

⁴⁶ R. Jakhu, *Legal Issues Relating to the Global Public Interest in Outer Space*, 32 *J. SPACE L.* 44-8 (2006).

⁴⁷ L. Tennen, *Enterprise Rights and the Legal regime for Exploitation of Outer Space Resources*, 47 *U. PAC. L. REV.* 284 (2015).

⁴⁸ Jakhu, *supra* note 46. See also C. Christol, *Article 2 of the 1967 Principles Treaty Revisited*, 9 *ANNALS OF AIR & SPACE L.* 263 (1984); Han Taek Kim, *Fifty Years of Outer Space Treaty: Its Retrospect and Prospect*, 50 *KANGWON L. REV.* 559-83 (2017).

⁴⁹ Z. Paliouras, *The Non-Appropriation Principle: The Grundnorm of International Space Law*, 27 *LEIDEN J. INT'L L.* 50 (2014).

⁵⁰ See *Sullivan v. Sao Paulo*, 36 F.Supp.503 (E.D.N.Y.), aff'd 122 F.2d 355 (2d Cir. 1941), recited from S. Gorove, *Interpreting Article II of the Outer Space Treaty*, 37 *FORDHAM L. REV.* 352 (1969).

⁵¹ S. Gorove, *Interpreting Article II of the Outer Space Treaty*, in *THE 11th ON THE LAW OF OUTER SPACE PROC.* 40 (1968).

⁵² F. TRONCHETTI, *THE EXPLOITATION OF NATURAL RESOURCES OF THE MOON AND OTHER CELESTIAL BODIES-A PROPOSAL FOR A LEGAL REGIME* 29-30 (2009).

Ricky J. Lee contends that although Article 2 of OST remains silent on “exclusive property rights,” sovereign right should not be exercised in outer space.⁵³ At COPUOS’ Scientific and Technical Subcommittee session in February 2015, representatives of Brazil and Russia maintained that CSLCA should be inconsistent with the principle of non-appropriation referred to in Article 2 of OST. Since the US is a party to OST, this is a violation of international law.⁵⁴

Article 6 of OST states: “States Parties shall bear international responsibility for national space activities whether carried out by governmental or non-governmental entities [...] The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty...” For the specific application of this international liability principle under OST, the “Convention on International Liability for Damage Caused by Space Object” of 1972 should be invoked.

V. Principle of Appropriation

Gorove mentioned that the meaning of appropriation used in Article 2 of the OST should be distinguished from casual or temporary usage because it exclusively means to acquire property for an eternal purpose. Any individual may receive the state’s consent to establish a settlement on part of a celestial body and commercially use it.⁵⁵ This activity corresponds to national appropriation. However, if the state does not exercise an exclusive sovereign power in the same region, this case should be understood differently.⁵⁶ Gorove opined that as Article 2 of OST only prohibits national appropriation, individual appropriation should be allowed. This argument is based on Article 17 of the Universal Declaration of Human Rights, which states that “Everyone has the right to own property alone as well as in association with others” and “No one shall be arbitrarily deprived of his property.” He further contended that the phrase, “province of all mankind” specified in Article 1 of the OST should not

⁵³ R. Lee, *Article II of the Outer Space Treaty: Prohibition of State Sovereignty, Private Property Rights, or Both?*, 11 *AUSTL. J. INT’L L.* 137 (2004).

⁵⁴ M. Sundahl, *Don’t muddy the message to space mining companies*, *SPACE NEWS*, June 9, 2016, available at <http://spacenews.com/op-ed-dont-muddy-the-message-to-space-mining-companies> (last visited on Apr. 21, 2018).

⁵⁵ Gorove, *supra* note 50, at 352.

⁵⁶ *Id.*

mean that humans collectively possess outer space and other celestial bodies.⁵⁷ Thus, individuals/private enterprises and international organizations can legitimately appropriate any part of outer space.⁵⁸ Regarding private enterprises' commercial utilization of space resources, John Sprankling supports the concept of usufruct, which is the right to use without appropriating outer space, including the moon and other celestial bodies.⁵⁹ He maintains that the legal maxim, *expressio unius est exclusio alterius* (when one or more things of a class are expressly mentioned, others of the same class are excluded), should be applied to the OST in legal interpretation. In other words, prohibiting the state appropriation of outer space and other celestial bodies is not prohibiting the appropriation of individual or private entities.⁶⁰

An American named Dennis Hope sent a letter to the UN General Assembly and the Soviet Union in 1980 to address his ownership of outer space and the celestial bodies and his plans to divide and sell them. He contended that as Article 2 of OST did not mention individuals' appropriation and only specified national appropriation, similar to the Homestead Act of 1862 at the time of reclamation of the West, everyone can own the parts of outer space and celestial bodies that they want.⁶¹ Although there was no answer from the UN and the Soviet Government, he has been selling parts of the moon at USD 24 per acre (4000m²) and issues certificates of transfer corresponding to a land registration map indicating the land location to the buyers. In 1996, he established a company called the 'Lunar Embassy'⁶² and is running even today. Frans von der Dunk regarded "Dennis Hope's ownership" as "either a hollow claim or a fraud."⁶³

In *Nemitz v. United States*, the US District Court for the District of Nevada held that the OST implies a non-appropriation principle.⁶⁴ The Plaintiff, Gregory Nemitz,

⁵⁷ A. Murnane, *The Prospector's Guide to the Galaxy*, 37 *FORDHAM INT'L L. J.* 262-3 (2013).

⁵⁸ Gorove, *supra* note 51.

⁵⁹ J. SPRANKLING, *THE INTERNATIONAL LAW OF PROPERTY* 181-3 & 189 (2014).

⁶⁰ A. Wasser & D. Jobes, *Space Settlement, Property Rights, and International Law: Could a Lunar Settlement Claim the Lunar Real Estate It Needs to Survive*, 73 *J. AIR L. & COM.* 47 (2008).

⁶¹ R. Britt, *Could lunar real estate spark a future war?*, NBC NEWS.com, available at http://www.nbcnews.com/id/4137710/ns/technology_and_science-space/t/could-lunar-real-estate-spark-future-war/#.WsgXhE0h11M (last visited on Apr. 23, 2018).

⁶² See The Lunar Embassy, available at <https://www.moonestates.com/about-us/the-lunar-embassy> (last visited on Apr. 23, 2018).

⁶³ M. Kelley, *The Man Who 'Owns' The Moon Has Made Serious Bank*, BUS. INSIDER, Mar. 26, 2013, available at <https://www.businessinsider.in/The-Man-Who-Owns-The-Moon-Has-Made-Serious-Bank/articleshow/21226166.cms> (last visited on Apr. 21, 2018).

⁶⁴ No. CV-N030599, 2004 WL 3167042, at *1 (D.Nev. Apr. 26, 2004). For details, see A. Mann, *Space Claims: The Weirdest Legal Claims in Outer Space*, WIRED, Jan. 12, 2006, available at <https://www.wired.com/2012/06/space-cases> (last visited on Apr. 21, 2018).

who owned “Orbital Exploitation,” registered an asteroid called ‘Eros 433’ at the Archimedes Institute through a website on March 3, 2000.⁶⁵ When the NASA tried to explore the same asteroid, Nemitz requested a fee of USD 20. It was, however, refused by the NASA. The Agency stated that an individual’s claim of ownership of this asteroid was not legitimate.⁶⁶ He then filed a lawsuit to the federal court on this matter. In this case, the court decided that no phrase in the OST allowed ownership of the asteroid for either the Archimedes Institute or Nemitz.⁶⁷ Nonetheless, it should be noted that this judgment does not exclude the commercial use of outer space, which the US has continuously insisted upon after the Commercial Space Launch Act of 1984.⁶⁸ This judgment was based on the premise that Nemitz registered the asteroid through a website and could not actually access and own it.⁶⁹

Recently, an American lawyer, Andrew Tinkang, contended that since a celestial body is not defined, it could indicate a large object, like a planet, rather than a small object, like a wandering asteroid. He contended that this is more like creating ‘chattel’ than realty. In his opinion, the OST has allowed the use of outer space resources without prohibiting private ownership of them.⁷⁰ Furthermore, the co-founder of Space X, Naveen Jain, said:

The idea of exploiting the moon’s resources for private gain should not be a concern.” He points out that the United States has “already brought back moon rocks to our country without any other country fighting wars over it.” He further gave the opinion that “the moon will be treated no differently than the international waters in our oceans [...] [because no] one really owns the water but any company or country can mine the resources [...] from the international water as long as they follow certain safety/moral guidelines.”⁷¹

⁶⁵ L. David, *Who Owns the Asteroids? Space Mining Project Raises Legal Questions*, SPACE.com, available at <https://www.space.com/16515-space-mining-asteroid-legal-issues.html> (last visited on Apr. 23, 2018).

⁶⁶ W. White, *Homesteading the High Frontier: How should space property rights be handled?*, 17 AD ASTRA (The magazine of the National Space Society) 32 (Fall 2005), available at <http://space.nss.org/ad-astra-volume-17-number-3-fall-2005> (last visited on Apr. 23, 2018). See also *Nemitz v. United States*, 2004 WL 3167042 at *2.

⁶⁷ 2004 WL 3167042 (D. Nev. 2004) and 2005 WL 319010(9th Cir. 2005). See B. Gilson, *Defending Your Client’s Property Rights in Space: A Practical Guide for the Lunar Litigator*, 80 FORDHAM L. REV. 1391 (2011); B. Brittingham, *Does the World Really Need New Space Law?*, 12 OR. REV. INT’L L. 44 (2010).

⁶⁸ Public Law 98-575-OCT. 30, 1984, 98th US Congress.

⁶⁹ *Id.* at 1399.

⁷⁰ Tinkang, *supra* note 8, at 563.

⁷¹ W. Henningan, *MoonEx Aims to Scour Moon for Rare Minerals*, L.A. TIMES, Apr. 8, 2011, available at <http://articles.latimes.com/2011/apr/08/business/lafi-moon-venture-20110408> (last visited on Apr. 21, 2018). See also V. Blanchette-Seguin, *Reaching for the Moon: Mining in Outer Space*, 49 N.Y.U. J. INT’L L. & POL. 966-7 (2017).

However, there is a difference between the Apollo space project conducted for scientific purposes, and the commercial projects permitted by CSLCA.⁷²

Are property rights without sovereignty possible in outer space? It is worth noting the case of dominion over the Swan Islands in the Caribbean Sea in the early twenty-first century. The Swan Islands, vested to Honduras in 1971, had become *res nullius*. A legal interpretation was asked of the US Attorney General in regard to a commercial company's management of these Islands according to the Guanno Islands Act of 1856,⁷³ granting American citizens an authority to go to deserted islands and collect guano to be used for fertilizer.⁷⁴

The US Attorney General decided that the commercial company should not own these islands if the US government did not claim sovereignty over them.⁷⁵ Accordingly, if individuals or private enterprises belong to a state that is not asserting sovereignty over outer space and the celestial bodies, they cannot claim ownership of those entities.

VI. Common Heritage of Mankind

When the soil collected from the moon was first brought to the earth in 1969, the question arose on the future use of space natural resources. On July 3, 1970, an Argentine representative proposed that the regulation of state activity regarding the use of the moon and other celestial bodies be conducted by the COPUOUS,⁷⁶ which led to the adoption of the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (hereafter Moon Agreement) on December 18, 1979.⁷⁷ Article 11 of the Moon Agreement clarified that the moon and other celestial bodies, except for the Earth in the Solar System and its natural resources, are the "Common Heritage of Mankind ("CHM")." It is significant that the concept of CHM, which has

⁷² N. Harn, *Commercial Mining of Celestial Bodies: A Legal Roadmap*, 27 GEO. INT'L ENVTL L. REV. 638 (2015).

⁷³ 11 Stat. 119, enacted on Aug. 18, 1856; codified at 48 U.S.C. ch. 8, §§ 1411-1419, available at <https://www.law.cornell.edu/uscode/text/48/chapter-8> (last visited on Apr. 23, 2018).

⁷⁴ K. Jacobson, *From Interstate to Interstellar Commerce Incorporating the Private Sector into International Aerospace Law*, 87 TEMPLE L. REV. 161 (2014).

⁷⁵ J. Davis, *Sovereignty over Swan Islands*, 31 U.S. Op. Att's Gen. 216, 220 (1918). See also S. Roth, *Developing a Law of Asteroids: Constants, Variables, and Alternatives*, 54 COLUM. J. TRANSNAT'L L. 851 (2016).

⁷⁶ Committee on the Peaceful Uses of Outer Space, Legal Sub-committee, Ninth Session, U.N. Doc. A/AC 105/C. 2/L. 71 & Com.1 (1970).

⁷⁷ Bin Cheng, *The Legal Regime of Airspace and Outer Space; The Boundary Problem, Functionalism versus Spatialism: the Major Premises*, 5 ANNALS OF AIR & SPACE L. 81 (1980).

been referred to in the law of the sea, was introduced in international law. However, the question may arise whether this is limited to the celestial bodies in the Solar System or includes the celestial bodies in the entire Milky Way Galaxy. In this regard, Sweden asserted that this should be limited to the celestial bodies in the Solar System, considering our current scientific level.⁷⁸

Article 11(1) of the Moon Agreement sets forth that the moon and its natural resources are CHM. Article 11(2), like Article 2 of the OST, repeatedly sets forth the non-appropriation principle, which claims that the moon cannot be the subject of state appropriation. Article 11(3) states:

Neither the surface nor the subsurface of the moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental organization, national organization or non-governmental entity or of any natural person. The placement of personnel, space vehicles, equipment, facilities, stations and installations on or below the surface of the moon, including structures connected with its surface or subsurface, shall not create a right of ownership over the surface or the subsurface of the moon or any areas thereof. The foregoing provisions are without prejudice to the international regime referred to in paragraph 5 of this article.

Article 11(4) provides that the parties have the right to explore and use the moon equally under international law and the Moon Agreement. The provisions in the Moon Agreement are without prejudice and a type of international regime, as referred to in Article 11(5). In relation to the international regime, Article 11(7) lays down its purpose, as follows:

- (a) The orderly and safe development of the natural resources of the moon;
- (b) The rational management of those resources;
- (c) The expansion of opportunities in the use of those resources; and
- (d) The equitable sharing by all States Parties in the benefits derived from those resources, whereby the interests and needs of the developing countries, as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the moon, shall be given special consideration.

Likewise, Article 11(5) provides that an international regime should be established when such exploitation is about to become feasible. In order to facilitate the

⁷⁸ U.N. Doc. A/AC.105/196 (Apr. 11, 1977), available at http://www.unoosa.org/pdf/reports/ac105/AC105_196E.pdf (last visited on Apr. 23, 2018).

establishment of this international regime, the parties should inform the UN Secretary-General of the public and international scientific community of all natural resources discovered on the moon as comprehensively as possible.⁷⁹

The legal characteristics of CHM are similar to *res communis* or *res extra commercium*, which indicate that no one can exercise ownership. Bin Cheng pointed out that although *res extra commercium* and CHM have the same characteristics, they cannot be territorially appropriated by any state and differ in that the former is essentially a negative concept, whereas the latter is a positive one.⁸⁰ Namely, in *res extra commercium*, as long as one state respects the exclusive quasi-territorial jurisdiction of other states over their own vessel, aircraft, and spacecraft, general international law in times of peace allows such a state to use the same area or even to abuse it, such as by blocking off an extensive region for weapons testing and military drills and even using this area as the dumping ground for its domestic industrial wastes. In CHM, however, the management, exploitation and distribution of natural resources in CHM will be decided not by a state, but the international community as a whole.⁸¹

As mentioned above, an international regime should be established when the exploitation of the natural resources of the moon is becoming feasible. Does this mean the exploitation of the natural resources is prohibited prior to the establishment of an international regime? When compared to the declaration of the exploration and exploitation of sea-bed resources in the UN General Assembly Resolution 2574, is the Moon Agreement a moratorium on the exploitation of the natural resources on the moon until the international regime is adopted?

Examining the legislation process, the Moon Agreement reveals that a moratorium on the natural resources of the moon and other celestial bodies is not implemented before the establishment of an international regime.⁸² The L-5 Society, a US space exploitation group, stated that the Moon Agreement is a treaty preventing private enterprises' exploitation, demanding that developed countries make sacrifices and giving the third world control over it.⁸³ However, the US has indicated that the Moon Agreement "places no moratorium upon the exploitation of natural resources

⁷⁹ Moon Agreement art. 11(6).

⁸⁰ Bin Cheng, *The Extra-terrestrial Application of International Law*, 18 CURRENT LEGAL PROBS. 135 (1965).

⁸¹ Cheng, *supra* note 77, at 337.

⁸² Williams, *supra* note 39, at 53. See also E. Galloway, *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, 5 ANNALS OF AIR & SPACE L. 500 (1980).

⁸³ T. Gangale, *Common Heritage in Magnificent Desolation*, 46th AIAA Aerospace Sciences Meeting and Exhibit, Jan. 7-10, 2008, Reno, Nevada, at 1, available at <https://pdfs.semanticscholar.org/6b1c/49510a9ba12f2d98dd2ddbfa3dc58ab694f0.pdf> (last visited on Apr. 29, 2018). See also JASENTULIYANA, *supra* note 11, at 231.

on the celestial bodies, pending the establishment of an international regime.”⁸⁴ The US representative of COPUOS, Neil Horsenball, responded that the Moon Agreement should not prohibit exploitation before the establishment of an international regime, but disallow it when natural resources exploitation becomes substantial.⁸⁵ Considering that the Soviet representative did not have any objection to this, there might be acquiescence in international law.⁸⁶ However, this does not mean that there are no restrictions or limitations on natural resource exploitation, but they are just waiting for the establishment of an international regime in the future.⁸⁷

As referred to in Article 11(7)(d) of the Moon Agreement, the equal distribution of benefits derived from the natural resources of the moon and other celestial bodies does not mean equal distribution of raw products, but that of the profits derived from the moon. ‘Equal’ in this regard does not mean that every state holds the same stake.⁸⁸ The profits of the states would correspond to direct and indirect participation in the moon exploitation with the consideration for developing countries.⁸⁹

States are afraid that the Moon Agreement is hindering the commercial development of outer space.⁹⁰ In 2008, Australia, Belgium, Chile, Mexico, the Netherlands, Pakistan and the Philippines jointly declared that if moon exploitation conforms to the CHM principle, exploitation by a public or a private organization is not excluded, nor is commercialization prohibited.⁹¹ Up until March 2018, only 18 countries had ratified the Moon Agreement,⁹² while France, Guatemala, India, Romania are only signatory countries. The US, Russia, China, Japan and Korea have not yet joined. Considering the 107 parties to the OST, the *corpus juris spatialis internationalis* and *res extra commercium* concept of the OST is more generally recognized than the CHM of the Moon Agreement.⁹³

⁸⁴ U.N. Doc. A/AC.105/PV.203, at 23-5 (1979). For details, see TRONCHETTI, *supra* note 52, at 230.

⁸⁵ JASENTULIYANA, *supra* note 11, at 231.

⁸⁶ C. Christol, *The Moon Treaty Enter into Force*, 79 AM. J. INT’L L. 166 (1985).

⁸⁷ K. Walsh, *Controversial Issues under Article XI of the Moon Treaty*, 6 ANNALS OF AIR & SPACE L. 494 (1981).

⁸⁸ T. Nelson, *The Moon Agreement and Private Enterprise: Lessons from Investment Law*, 17 ILSA J. INT’L L. 401 (2011).

⁸⁹ Galloway, *supra* note 82.

⁹⁰ H. Hertzfeld & F. von der Dunk, *Bringing Space Law into the Commercial World: Property Rights without Sovereignty*, 6 CHI. J. INT’L L. 85 (2005).

⁹¹ Blanchette-Seguin, *supra* note 71, at 963.

⁹² Armenia, Australia, Austria, Belgium, Chile, Kazakhstan, Kuwait, Lebanon, Mexico, Morocco, The Netherlands, Pakistan, Peru, The Philippines, Saudi Arabia, Turkey, Uruguay, and Venezuela.

⁹³ Han Taek Kim, *Thirty Years of the Moon Agreement: Its Retrospect and Prospect*, 55 KOREAN J. INT’L L. 79-99 (2010).

VII. *Res Nullius Humanitatus*

An American lawyer, Brandon Gruner, has suggested a plan to grant a license to declare *res nullius humanitatus* to the country who first arrives at the celestial body to solve the problems that the *res extra commercium* of the OST or the CHN of the Moon Agreement have in the course of exploring and utilizing space's resources.⁹⁴ He asserted that any country that arrives at a new planet, the moon or asteroid could own it according to *res nullius humanitatus* and enjoy the profit generated by the first occupants.⁹⁵ It means that settlers there have rights as universal humans, not as the people of one country on the globe, since they do not have the same benefits generated by space exploration utilization as the people of a single country. However, *res nullius humanitatus* grants the right to equal compensation received from space activity to all humans. According to him, all mankind can assert a right to the outer space in a situation like the Manifest Destiny of the nineteenth century in the US⁹⁶ when going to outer space.⁹⁷ The theory of *res nullius humanitatus* addresses that space should be the province of mankind, as mentioned in the OST, and all countries should be guaranteed the access to outer space.⁹⁸ According to *res nullius humanitatus*, if the outer space is exploited for human settlement, they will pursue other concerns and preferred matters that are different from those of Earth culture. If the moon and Mars present better conditions and compensation than the Earth, regardless of risk and adversity, humans on the globe would immigrate there, leaving their home countries.⁹⁹ Gruner asserts that the concept of *res nullius humanitatus* is similar to that of *res communis* (or *res extra commercium*). However, it is more freewheeling than CHM and is the only method for solving the problem of dominion in outer space and the celestial bodies that mankind has faced for the past half a century.¹⁰⁰ From the author's perspective, *res nullius* uses *occupatio* on a "first come, first served" principle from a nationalist point of view, while *res nullius humanitatus* perceives a new human

⁹⁴ Gruner, *supra* note 4, at 354-5 (n. 4).

⁹⁵ *Id.* at 354.

⁹⁶ According to the nineteenth century's American expansionist theory, the US rationalized expansionism and territorial looting by asserting that it had been commanded by God to rule and develop politically, socially, and economically across North America across the West and into the Pacific. See J. Heidler & D. Heidler, *Manifest Destiny*, ENCYCLOPEDIA BRITANNICA, available at <https://www.britannica.com/event/Manifest-Destiny> (last visited on Apr. 21, 2018).

⁹⁷ Gruner, *supra* note 4, at 354.

⁹⁸ *Id.*

⁹⁹ *Id.*

¹⁰⁰ *Id.* at 354-5. See also B. Landry, *A Tragedy of Anticommons: The Economic Inefficiencies of Space Law*, 38 BROOK. J. INT'L L. 561-2 (2013).

society which would be formed and settled in outer space. Thus, the concept of nations existing on the Earth will have no significant in the new space era.

VIII. Conclusion

In the past, Bin Cheng said that outer space was *res extra commercium*, while the moon and the other celestial bodies were *res nullius*. The non-appropriation principle was introduced to *corpus juris spatialis internationalis*. According to Article 2 of the OST, however, the moon and other celestial bodies neither have different legal statuses as *res extra commercium*, nor be appropriated by an individual country. As such, the resources there are freely available, as those on the high seas. Whether or not the non-appropriation principle is binding for the non-parties of the OST, many scholars see this principle as an international customary law, developing into *jus cogens*.

Article 11(2) of the Moon Agreement reconfirms the non-appropriation principle of Article 2 of the OST, but it has much less effect than the OST because the Moon Agreement binds only the parties involved and applies only to the moon and celestial bodies other than the Earth, while the OST has no such substantive enactment. Therefore, the OST's application scope extends to the solar system and all celestial bodies.

As referred to in the CSLCA or Luxembourg's Law of Space Resources, if a provision allows individuals and enterprises run by other countries to commercially explore and utilize the space resources, the question may arise whether this violates the non-appropriation principle of outer space and the celestial bodies under Article 2 of the OST and Article 11 of the Moon Agreement. In the case of the CSLCA, the law explicitly specifies that sovereignty, possessory rights, and judiciary rights to a specific celestial body cannot be claimed, let alone ownership.¹⁰¹

This author believes that the status of outer space and the celestial bodies is *res extra commercium*. As long as any countries or private enterprises or individuals respect the non-appropriation principle of outer space and the celestial bodies, they should be able to use and benefit from it.

Individuals or private enterprises intending to perform space exploitation must receive approval from the nation and may not appropriate outer space or the celestial bodies. In the course of this space activity, each party will be liable. Articles 6 and 7

¹⁰¹ 51 U.S.C.A. § 403.

of the OST and the Liability Convention of 1972 deal with matters concerning those problems.

Another question is the difference between *res extra commercium* on the high seas and *res extra commercium* in outer space and the celestial bodies. Collecting resources on the high seas and exploiting space resources should be interpreted differently. On the high seas, resources can be collected without any obstacles like fishing, whereas, in the deep sea-bed area, the CHM under the UNLOS should be operated by an international regime. The nature or form of the resources found on the high seas are thus different from that of space resources, which are fixed on the moon and the celestial bodies.

Thus, if individuals or private enterprises collect these resources from outer space and the celestial bodies, they must secure a certain section and continue collecting or mining works for resources. When there is a problem, how will other countries see those of adhering to the non-appropriation principle and securing a certain section for collection? If an American enterprise receives approval from the government, secures the best location and collects resources, can other enterprise access this area? How large of a parcel may be allotted on the moon? How long should collection be measured? Under the current international space law, these questions must be answered according to the principle of "first come, first served." As a consequence, the international community should settle any foreseeable disputes during the space activity in a timely fashion to solve plausible space legal questions.