

ISSUE FOCUS

The Aftermath of the US Space Resource Exploration and Utilization Act: What's Left for China?

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The US Space Resource Exploration and Utilization Act 2015 aroused heated discussions. The international community has not yet reached consensus on the application of the concept of “common heritage of mankind” in the Moon Agreement. In accordance with the non-appropriation principle in the Outer Space Treaty, outer space is not subject to national appropriation. However, there is a need to balance the common interests of the international society and the interests of the States and private entities which invest heavily in the space resource exploration. The unilateral approach of the US by adopting a national law is not an ideal way to deal with space resource exploration. As a major space-faring nation, China should take a proactive approach in both national legislation and international cooperation in this field. At the international level, China should consider establishing an appropriate international regime for space resource management.

Keywords

Space Resource, Common Heritage of Mankind, Principle of Non-Appropriation, International Mechanism

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I. Introduction

Great achievements in space exploration and utilization have been made within just 60 years since the successful launch of the first manmade satellite, Sputnik-1, on October 4, 1957.¹ With rapid development of space science and technology, the exploration and utilization of space resources² is no more an illusion. Outer space has rich natural resources, which can bring great economic interests to the mankind.³ The international society was able to reach consensus on a global regime for the orderly development of space activities in the first two decades of space age. However, it proves difficult to come to the common ground regarding the legal nature of and the attribution of the right over space resources once the exploration and utilization of space resources becomes a reality. No rules are currently in place regarding the commercial exploitation of space resources, which is detrimental to the systematic development of space resource exploration and utilization.⁴

Against this background, the US took the initiative to enact the “Space Resource Exploration and Utilization Act” (hereinafter the Act) on November 25, 2015,⁵ serving to clarify the legal regime for commercial aspects of space resources at the domestic level. The Act not only encourages private entities (including the individuals) with the status of the ‘American citizen’ to engage in the exploration and utilization of space resources, but also entitles these private entities with a series of rights, including the ownership over space resources derived from space exploratory activities.

This unilateral action aroused heated discussions in the international community. The International Institute of Space Law (“IISL”) took a quick action by issuing a Position Paper on Space Resource Mining on December 20, 2015. While acknowledging that the Act pays respect to the international legal obligations of the US, the Position Paper leaves it open as to the whether the current legal situation is satisfactory.⁶

¹ K. Tate, *Sputnik: How the World’s 1st Artificial Satellite Worked (Infographic)*, Space.com, Oct. 3, 2012, available at <https://www.space.com/17888-first-satellite-sputnik-1-explained-infographic.html> (last visited on Mar. 8, 2018).

² Unless otherwise stated, the term ‘space resources’ in this paper refers to the natural resources in the outer space including the moon and other celestial bodies.

³ R. Lee, *Creating an International Regime for Property Rights under the Moon Agreement*, 42 PROC. ON L. OUTER SPACE 409-18 (1999).

⁴ L. Tennen, *Towards a New Regime for Exploration of Outer Space Mineral Resources*, 88 NEB. L. REV. 794-831 (2010).

⁵ Summary: H.R.2262 - 114th Congress (2015-2016), available at <https://www.congress.gov/bill/114th-congress/house-bill/2262> (last visited on Mar. 8, 2018).

⁶ IISL, Position Paper on Space Resource Mining, adopted by consensus by the Board of Directors on 20 December

As a consequence of the unilateral approach through the Act, the US fails to pay due regard to the fact that the international community has yet to reach a consensus on the issues of the legal character of and the attribution of the right over space resources. It will have a negative impact on the national economic and security interests of China and other “space-faring nations,” which are also interested in the exploration and utilization of space resource.⁷

Therefore, it is indeed necessary to firstly conduct academic analysis to determine what the legal nature and ownership of space resources should be, and then, on that basis, to make suggestions for China on how to respond to the aforesaid unilateral approach taken by the US and carry out its own exploration and utilization of space resources. China is willing to effectively protect the due interests of China as well as the whole international community derived from the exploration and utilization, under international law.

This paper is composed of five parts including a short Introduction and Conclusion. Part two will provide background information on the US Space Resource Exploration and Utilization Act and its main contents. Part three will discuss relevant legal issues in the above Act, including the nature of space resources and the attrition of relevant rights over space resources. Part four will explore possible legal regime for the regulation of space resource exploration and utilization.

II. Overview of the US Space Resource Exploration and Utilization Act

The US Space Resource Exploration and Utilization Act is actually Title IV of the US Commercial Space Launch Competitiveness Act. It was respectively approved by the US Senate and House of Representatives on November 10 and 16, 2015, and signed by then President Barack Obama on November 25, 2015.⁸ The original headline of Title IV is “Space Resource Exploration and Utilization,” while, according to Section 401 under Title IV of the US Commercial Space Launch Competitiveness Act,⁹ this

2015, available at <http://www.iislweb.org/docs/SpaceResourceMining.pdf> (last visited on Mar. 8, 2018).

⁷ Guoyu Wang & Yangzi Tao, *Analysis and Corresponding Suggestion on the “2015 Space Resource Exploration and Utilization Act” of the United States* [美国《2015外空资源探索与利用法》的分析及应对建议], 12 AEROSPACE CHINA 21-5 (2015), <http://www.cqvip.com/qk/94543a/2015012/667185376.html> (last visited on Mar. 8, 2018).

⁸ H.R.2262 - 114th Congress (2015-16), available at <https://www.congress.gov/bill/114th-congress/house-bill/2262/actions> (last visited on Mar. 8, 2018).

⁹ US Commercial Space Launch Competitiveness Act (Public Law 114-90) ; Title IV (Space Resource Exploration and

Title may be cited directly as the “Space Resource Exploration and Utilization Act of 2015.” The formal text of the Act is adopted as a new chapter (Chapter 513) to amend Subtitle V of Title 51 of the United States Code.¹⁰

A. Main Content

The US Space Resource Exploration and Utilization Act consists of three sections, i.e., Sections 51301 <Definitions>, 51302 <Commercial Exploration and Commercial Recovery>, and 51303 <Asteroid Resource and Space Resource Rights> of the United States Code.¹¹

Despite the limited number of sections, the content of the Act fully reflects its legislative aim “to facilitate a pro-growth environment for development of the commercial space industry by encouraging private entity investments and creating more stable and predictable regulatory conditions, and for other purposes.”¹² Guided by the aforesaid legislative aim, the Act not only defines the legal subject and object for regulation, but also specifies the measures and mechanisms that provide guarantees for the aforesaid subject (private entities with American citizenship)’s exploration and utilization of the object (space resources), and a series of rights enjoyed by the subject over the object.¹³

1. Definitions

Section 51301 defines the terms ‘asteroid resource,’ ‘space resource,’ and “United States citizen.” According to this section, the term ‘asteroid resource’ refers to any space resource found on or within a single asteroid,¹⁴ and the term ‘space resource’ refers to any abiotic resource in situ of outer space, including water and minerals.¹⁵ It can be inferred that, aside from its specific origin, ‘asteroid resource’ should belong to the conceptual category of ‘space resource.’

According to the same section, the term “United States citizen” means the same

Utilization: § 401). This title may be cited as the “Space Resource Exploration and Utilization Act of 2015.”

¹⁰ H.R. 1508 (Report No. 114-153), (June 15, 2015), § 2. In general, Subtitle V of Title 51, U.S.C. is amended by adding at the end the following new chapter: Chapter 513-Space Resource Exploration and Utilization.

¹¹ U.S.C., Title 51 (National and Commercial Space Programs), Subtitle V (Programs Targeting Commercial Opportunities): Chapter 513-Space Resource Exploration and Utilization).

¹² US Commercial Space Launch Competitiveness Act, Preface.

¹³ C. Foster, *Excuse Me, You’re Mining My Asteroid: Space Property Rights and the US Space Resource Exploration and Utilization Act of 2015*, 2 J. L. TECH. & POL’Y 407-30 (2016), available at <http://illinoisjltlp.com/journal/wp-content/uploads/2016/11/Foster.pdf> (last visited on Apr. 17, 2018).

¹⁴ U.S.C., Title 51, Subtitle V, § 51301(1).

¹⁵ *Id.* § 51301 (2).

as the term “citizen of the United States” provided in Section 50902 of the United States Code.¹⁶ Thereby, the term “United States citizen” of the Act shall refer to: (a) any individual with American citizenship; (b) any entity organized or existing under the laws of the US or a state thereof; or (c) any entity organized or existing under the laws of a foreign country if the controlling interest (as defined by the Secretary of Transportation) is held by any individual or entity described in above (a) or (b).¹⁷

Based on the definition of the “United States citizen,” the Act includes not only individuals and entities who are originally the American citizens, but also foreign entities of which each controlling interest is held by the above individuals or entities, as the legal subject it regulates. In this way, the Act obviously aims at attracting such foreign entities to engage in the exploration and utilization of space resources led by the US, so as to expand the international market of the American commercial space industry.

2. Commercial Exploration and Commercial Recovery

Section 51302 specifies the measures and mechanisms that provide guarantees for private entities with American citizenship to engage in the exploration and utilization of space resources. It also makes provisions for the responsibilities that should be taken by the President, federal legislature and government organs therein. According to this section, President, acting through appropriate federal agencies, shall:

- (1) facilitate commercial exploration and commercial recovery of space resources by United States citizens;
- (2) eliminate government barriers to the development of economically feasible, safe, and stable industries for commercial exploration and commercial recovery of space resources in manners consistent with the international obligations of the United States; and
- (3) promote the right of United States citizens to engage in commercial exploration and commercial recovery of space resources free from adverse interference in manners consistent with the international obligations of the United States and subject to authorization and continuing supervision by the Federal Government.¹⁸

Within 180 days after enactment of the Act, President shall submit to Congress a report on commercial exploration and recovery of space resources by the American

¹⁶ *Id.* § 51301 (3).

¹⁷ U.S.C., Title 51, Subtitle V: Chapter 509-Commercial Space Launch Activities, § 50902.

¹⁸ U.S.C., Title 51, Subtitle V, § 51302 (a).

citizens that specifies: “(1) the responsibilities necessary to meet the international obligations of the United States, including authorization and continuing supervision by the Federal Government; and (2) recommendations for the allocation of responsibilities among federal agencies for the aforesaid activities in the outer space.”¹⁹

Following the process, the Act has established the measures and mechanisms to guarantee the exploration and utilization of space resources by private entities in two main aspects. First, on the whole, President, federal legislature and government organs should work together to, in manners consistent with the international obligations taken by the US, place commercial exploration and recovery of space resources by the American citizens under authorization and continuing supervision of the Federal Government. Second, in terms of internal relations, there is a view arguing that, although the Act has already been enacted, private entities still cannot engage in the exploration and utilization practically, until all the involved federal agencies have clarified their respective responsibilities and authorities.²⁰

In other words, the exploration and utilization of space resources by private entities depend on not only space science and technology, but also, to a great extent, the clarification of responsibilities and authorities of all the federal agencies involved in the exploration and utilization, such as the National Aeronautics and Space Administration (“NASA”), the Federal Aviation Administration (“FAA”), and the Commercial Space Office of the Ministry of Transportation. The President’s report to Congress should at least make preliminary planning on responsibilities and authorities of all the involved federal agencies in the exploration and utilization of space resources.

3. Rights over Asteroid Resources and Space Resources

Section 51303 specifies a series of rights, including the right of appropriation for private entities with the American citizenship over space resources. It forms a core part of the Act, but has aroused enormous controversies in the international community.²¹

According to this section, the US citizens engaged in the commercial recovery of

¹⁹ *Id.* § 51302 (b).

²⁰ M. Sundahl, *Regulating Non-Traditional Space Activities in the United States in the Wake of the Commercial Space Launch Competitiveness Act*, 42 AIR & SPACE L. 29-42 (2017).

²¹ A. Linter, *Extraterrestrial Extraction: The International Implications of the Space Resource Exploration and Utilization Act of 2015*, 40 FLETCHER F. WORLD AFF. 139-58 (2016), available at https://static1.squarespace.com/static/579fc2ad725e253a86230610/t/57ec6ac65016e1636a21e331/1475111622859/FletcherForum_Sum16_40-2_139-157_LINTNER.pdf (last visited on Apr. 27, 2018).

asteroid resources or space resources under the Act shall be entitled to appropriate, own, transport, use, and sell the asteroid resources or space resources obtained in accordance with applicable laws, including the international obligations taken by the US.²²

Besides, according to Section 403 of the US Commercial Space Launch Competitiveness Act, through the enactment of the Act, the US does not thereby, as a State, assert sovereignty, sovereign or exclusive rights, jurisdiction over, or the right of appropriation over, any celestial body.²³

Therefore, it should be noted that, while granting private entities the right of appropriation over space resources, the Act only deprives the US, as a State, of the right to claim sovereignty or other relevant rights over any celestial body. It could only claim the right of appropriation over natural resources in any celestial body.²⁴

B. Legislative Aims

The Outer Space Treaty in 1967²⁵ makes express provisions that no State may claim sovereignty over or appropriate outer space (including the moon and other celestial bodies). Article II of the Outer Space Treaty provides: “The 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.”

The Moon Agreement in 1979²⁶ moves one step further by providing that no individual or entity, including any country, may claim sovereignty over the moon and its natural resources. Article 11.2 of the Moon Agreement provides: “The moon is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.” Article 11.3 provides: “Neither the surface or subsurface of the moon, nor any part thereof or natural resources therein, shall become property of any country, international intergovernmental or non-governmental organization, national organization or non-governmental entity or of any natural person.”

²² U.S.C., Title 51, Subtitle V, § 51303.

²³ US Commercial Space Launch Competitiveness Act, Title IV, § 403.

²⁴ *Supra* note 13, at 420.

²⁵ 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, U.N. Doc. A/RES/222(XXI), Annex; 610 U.N.T.S. 205; T.I.A.S. 6347; 18 U.S.T. 2410; U.K.T.S. 1968 No. 10; Cmnd. 3198; A.T.S. 1967 No. 24; 6 I.L.M. 386 (1967).

²⁶ Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 5 December 1979, U.N. Doc. A/RES/34/68; 1363 U.N.T.S. 3; A.T.S. 1986 No. 14; 18 I.L.M. 1434 (1979).

While so far, the US has only ratified the Outer Space Treaty,²⁷ but not the Moon Agreement.²⁸ Therefore, on the one hand, according to the basic international law principle of “*pacta sunt servanda*,” the US must abide by the provision of not claiming sovereignty over or appropriating outer space in the Outer Space Treaty. On the other hand, however, according to the principle of “*pacta tertiis nec nocent nec prosunt*” (a treaty binds the parties and only the parties),” the provision of not claiming sovereignty over or appropriating space resources in the Moon Agreement shall not be binding on the US.

Meanwhile, based on the literal meaning of the above provision in the Outer Space Treaty, only a State cannot be the subject of appropriation. Here, as the object of non-appropriation is limited to outer space, space resources are excluded from the object for non-appropriation.²⁹ Therefore, both the provision of granting private entities the right of appropriation over space resources in the Act, and the right of appropriation over space resources enjoyed by private entities itself, do not conflict with the international legal obligations undertaken by the US.³⁰

Consequently, the Act neither expressly forbids private entities to sell or otherwise transfer the right of appropriation over space resources to the US Government, nor definitely deprives the US Government of the right of appropriation over space resources.³¹ As mentioned above, although not being directly granted by the Act, in practice, the US can still take the right of appropriation over space resources from private entities by way of purchase or any other means.

On the legislation level, the Act took the full account of the international legal obligations undertaken by the US. On the practice level, however, the Act offers the possibility for the US to take the right of appropriation over space resources from private entities. In this regard, the Act is supposed to provide an indirect and implied domestic legal basis for the US to take the right of appropriation over space resources. It can be inferred that, to a great extent, the real purposes of the Act-to encourage private entities to engage in the exploration and utilization of space resources and to grant private entities a series of rights, including the right of appropriation, over

²⁷ Status of international agreements relating to activities in outer space as at 1 January 2017, United Nations Office for Outer Space Activities, available at http://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105_C2_2017_CRP07E.pdf (last visited on Mar. 8, 2018).

²⁸ *Id.*

²⁹ N. Cooper, *Circumventing Non-Appropriation: Law and Development of United States Space Commerce*, 36 HASTINGS CONST. L.Q. 457-82 (2008-2009).

³⁰ *Supra* note 21, at 141.

³¹ M. Koerth-Baker, *Who Makes the Rules for Outer Space?*, PBS.org, Nov. 30, 2015, available at <http://www.pbs.org/wgbh/nova/next/space/space-law> (last visited on Mar. 8, 2018).

space resources - are to meet the US' own demand on the right of appropriation over space resources.³²

Truly, the Act itself does not conflict with the international legal obligations of the US.³³ The unilateral approach of the US through the Act, however, is to directly grant private entities the right of appropriation over space resources, and indirectly and impliedly create possibilities for the US to enjoy the right of appropriation over space resources. It will doom to have negative impact on the existing space legal regime, which remains to be valid for the exploration and utilization of space resources.³⁴ Furthermore, because the international community has not yet reached a consensus on the disputes regarding the legal nature and ownership of space resources,³⁵ such a unilateral approach of the US will possibly lead to a 'competition' of exploring and utilizing space resources among space-faring nations, and consequently make the above disputes even more serious.

III. Understanding Legal Issues of the US Space Resource Exploration and Utilization Act

Soon after its enactment, the Act quickly attracted common concerns of the international community. On one hand, the Act has made the international community recognize the importance of establishing an international mechanism for the exploration and utilization of space resources. On the other hand, its legality issue has also led to widespread controversies in the international community.

During the 55th session of the Legal Subcommittee of the UN Committee on the Peaceful Uses of Outer Space ("UNCOPUOS") from 4 to 15 of April 2016, delegations from several countries had an intense debate on the legality issue of the Act and finally formed three main different opinions: (1) affirming the legality; (2) denying the legality; and (3) putting the legality issue aside. In this session, they also claimed for straightly establishing an international mechanism for the exploration and utilization

³² *Supra* note 7, at 24-5.

³³ M. Smith, *International Institute of Space Law OK with US Asteroid Mining Law*, Spacepolicyonline.com, Dec. 24, 2015, available at <https://spacepolicyonline.com/news/international-institute-of-space-law-ok-with-u-s-asteroid-mining-law> (last visited on Mar. 8, 2018).

³⁴ F. Tronchetti, *The Space Resource Exploration and Utilization Act: A Move Forward or a Step Back?*, 34 SPACE POL'Y 6-10 (2015).

³⁵ *Supra* note 31.

of space resources.³⁶

Countries would have different opinions on the legality issue of the Act because their understandings on the legal nature and ownership of space resources are totally different.³⁷ Therefore, the legality issue of the Act would substantially be that of the legal nature and ownership of space resources. It has already bothered the international community for a long time, and now is rising to a climax.³⁸

A. Legal Nature of Space Resources

Basically, the question of space resources ownership may arise because there is no specified legal nature of space resources. Actually, international space law does not often refer to the legal nature of space resources.³⁹ The Moon Agreement initially deals with ‘space resources’ in Article 11.1 which has abstractly defined ‘space resources’ (the moon and its natural resources) as “the common heritage of mankind. Since only 18 countries around the world have ratified the Moon Agreement so far,⁴⁰ the actual binding forces of the Moon Agreement are very limited. Consequently, the legal nature of space resources is further evolved into two questions, i.e., (1) “what is the common heritage of mankind?”; and (2) “whether space resources are the common heritage of mankind or not?”⁴¹

Generally, the concept of “common heritage of mankind” can be traced back to the ‘*res communis*’ system in the Roman (property) law. The ‘*res communis*’ system means if public property is owned by all the Roman citizens, the ownership shall not be exclusively enjoyed by anyone.⁴² Under public international law, the concept of “common heritage of mankind” and its relevant legal regime are firstly established

³⁶ Report of the Legal Subcommittee on its fifty-fifth session, held in Vienna from 4 to 15 April 2016, U.N. Doc. A/AC.105/1113, ¶¶ 74-83, available at http://www.unoosa.org/oosa/ooasdoc/data/documents/2016/aac.105/aac.1051113_0.html (last visited on Mar. 8, 2018).

³⁷ E. Paxson, *Sharing the Benefits of Outer Space Exploration: Space Law and Economic Development*, 14 MICH. J. INT’L L. 487-517 (1992-93).

³⁸ *Supra* note 31.

³⁹ Yun Zhao, *Commentary on Selected Critical Issues in Outer Space Law* [外层空间法中的热点问题评议], 23:1 J. BEIJING U. AERONAUTICS & ASTRONAUTICS [Social Science Edition] 42-8 (2010).

⁴⁰ As of January 19, 2018, only 18 countries ratified the Moon Agreement. See Status of international agreements relating to activities in outer space as at 1 January 2018, United Nations Office for Outer Space Activities, available at http://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105_C2_2018_CRP03E.pdf (last visited on Mar. 8, 2018).

⁴¹ Guoyu Wang, *Analysis on the Legislation of US Planetary Mining* [拉开外空采矿竞赛的序幕—美国行星采矿立法的法律政策分析], 5 SPACE INT’L 12-21 (2016).

⁴² L. Brilmayer & N. Klein, *Land and Sea: Two Sovereignty Regimes in Search of a Common Denominator*, 33 N.Y.U. J. INT’L L. & POL. 703-68 (2000-01).

in the law of the sea.⁴³ Resolution 2749 of the UN General Assembly declared that the seabed and ocean floor, and the subsoil thereof, beyond the limits of national jurisdiction (hereinafter the Area), and the resources of ‘the Area,’ are “the common heritage of mankind.”⁴⁴ Then, Article 136 of the United Nations Convention on the Law of Sea (“UNCLOS”) in 1982 formally affirmed: “The Area and its resources are the common heritage of mankind.”

According to Articles 137, 140 and 141 of the UNCLOS,⁴⁵ meanwhile, the concept of “common heritage of mankind” and its relevant legal regime shall include the following five elements: (1) no sovereignty by any country; (2) exploration and utilization by all mankind; (3) the benefit and interest for all mankind; (4) exclusively for peaceful purposes; and (5) preservation for future generations.⁴⁶

Then, whether the concept of “common heritage of mankind” and its relevant legal regime under the international law of the sea are also applicable under space law? Are space resources re “the common heritage of mankind”?

Someone argued that the principle of “the common heritage of mankind” has already constituted part of customary international law.⁴⁷ In this regard, it should be applicable under both the international law of the sea and space law through different application processes.⁴⁸ On the contrary, other scholars held that the theory of “the common heritage of mankind” is still far away from constituting a rule of customary international law.⁴⁹ Furthermore, it is a legal regime restricted to be applicable only under the international law of the sea, but not space law.⁵⁰

Between the two entirely distinct views, the latter may be preferred. First, the legal regime of “the common heritage of mankind” is not yet a rule of customary

⁴³ N. Matte, *The Common Heritage of Mankind and Outer Space: Toward a New International Order for Survival*, 12 ANNALS AIR & SPACE L. 313-36 (1987).

⁴⁴ U.N. Doc. A/RES/2749 (XXV) (Dec. 17, 1970), available at [www.un.org/zh/documents/view_doc.asp?symbol=A/RES/2749\(XXV\)](http://www.un.org/zh/documents/view_doc.asp?symbol=A/RES/2749(XXV)) (last visited on Mar. 8, 2018).

⁴⁵ UNCLOS arts. 137 (Legal status of the Area and its resources), 140 (Benefit of mankind), & 141 (Use of the Area exclusively for peaceful purposes).

⁴⁶ C. Joyner, *Legal Implications of the Concept of the Common Heritage of Mankind*, 35 INT'L & COMP. L. Q. 190-9 (1986). See also M. White, *The Common Heritage of Mankind: An Assessment*, 14 CASE W. RES. J. INT'L L. 509-42 (1982).

⁴⁷ L. Goldie, *A Note on Some Diverse Meanings of “the Common Heritage of Mankind,”* 10 SYRACUSE J. INT'L L. & COM. 72 (1983).

⁴⁸ Tieya Wang, *The Concept of the Common Heritage of Mankind*, in SELECTED WORKS OF TIEYA WANG [王铁崖文选] 69 (Zhenglai Deng ed., 2003).

⁴⁹ Bin Cheng, *United Nations Resolutions on Outer Space: “Instant International Customary Law”?*, 5 INDIAN J. INT'L L. 23 (1965).

⁵⁰ Qiang Li, *The Legal Status of “the Common Heritage of Mankind” in the Moon Agreement* [论《月球协定》中“人类共同继承财产”概念的法律地位], 6 LANZHOU ACADEMIC J. 135-7 (2009).

international law. Resolution 2749 was passed at the General Assembly, with 118 affirmative votes, 0 negative vote, and 14 abstention votes.⁵¹ Nevertheless, it has not satisfied the two elements for constituting the rule of customary international law – accumulation of State practices and *opinio juris*.⁵²

On one hand, the General Assembly resolution does not have the full legal binding force but some recommendatory nature. The General Assembly is not the international law-making body, either.⁵³ Although the vote for Resolution 2749 can show the countries' acceptance of the entirely new concept of "the common heritage of mankind," no evidence whatsoever can prove that the concept of "the common heritage of mankind" has already been accepted by most of the countries around the world as a notion of law *psychologically*.⁵⁴

On the other hand, meanwhile, someone viewed that the international community has never formed consistent and repeated practices for implementing the legal regime of "the common heritage of mankind."⁵⁵ So, the existing practices of the international community can hardly prove the common state practice regarding the legal regime of "the common heritage of mankind," which is necessary for constituting customary international law.⁵⁶

Second, although the Moon Agreement defines the legal nature of space resources as "the common heritage of mankind," it has not been widely accepted by the international community yet.⁵⁷ The Moon Agreement has been ratified by only 18 countries. It shows that most countries around the world are against or at least in doubt about the application of the legal regime of "the common heritage of mankind" under space law.

Furthermore, the legal regime of "the common heritage of mankind" has been differently applied between the countries with developed space science and technology (or space-faring nations), and those with less developed space science and technology.⁵⁸ Space-faring nations aim at recovering the costs invested in the

⁵¹ Voting Summary, United Nations Bibliographic Information System, available at <http://unbisnet.un.org:8080/ipac/20/ipac.jsp?profile=voting&index=.VM&term=ares2749> (last visited on Mar. 8, 2018).

⁵² For the opposite opinion, see *supra* note 48.

⁵³ H. Thirlway, *The Sources of International Law*, in INTERNATIONAL LAW 113 (M. Evans ed., 2014).

⁵⁴ R. Jennings, *The United States Draft Treaty on the International Seabed Area: Basic Principles*, 20 INT'L & COMP. L.Q. 433-52 (1971). [Emphasis added]

⁵⁵ Letter dated April 23, 1979 from the Group of Legal Experts on the Question of Unilateral Legislation to the Chairman of the Group of 77, Geneva, 8th Sess., Mar. 19 to Apr. 27, 1979, at 6, *recited from* Goldie, *supra* note 47.

⁵⁶ SHOUPIING LI & YUN ZHAO (EDS.), INTRODUCTION OF THE LAW OF OUTER SPACE [外层空间法专论] 95 (2009).

⁵⁷ S. Rosenfeld, *The Moon Treaty: The United States Should Not Become a Party*, 74 AM. SOC'Y INT'L L. PROC. 162-6 (1980).

⁵⁸ K. Zullo, *The Need to Clarify the Status of Property Rights in International Law*, 90 GEO. L. J. 2413-44 (July 2002).

exploration and utilization of space resources. They are seeking reasonable profits from such activities. In the other side, however, non-space-faring nations try to find a chance to correct the past inequalities and to redistribute the interests derived from the exploration and utilization.⁵⁹

Therefore, without a consensus on the application under space law, it is impossible to determine the legal nature of space resources as “the common heritage of mankind.”⁶⁰

B. Attribution of the Right over Space Resources

Since the legal regime of “the common heritage of mankind” has not been clarified under space law, they need to rely on other legal sources to determine the ownership of space resources. Such legal sources include the existing applicable space legal regime and the corresponding practice of the international community.

Considering that the provision of granting private entities the right of appropriation over space resources in the Act has led to enormous controversies in the international community, the authors would argue that rights over space resources can be further divided into the right of appropriation, the right to use, and the right to profits. Accordingly, the attribution of these different rights should be determined separately.⁶¹

1. Attribution of the Right of Appropriation

The principle of “non-appropriation” laid down at Article II of the Outer Space Treaty is a fundamental principle of space law.⁶² This was firstly introduced by the General Assembly Resolution 1721,⁶³ which affirmed it as one of nine guiding principles for the exploration and use of outer space in Resolution 1962 (Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space).⁶⁴ The non-appropriation principle has been finally established as a basic

⁵⁹ F. TRONCHETTI, THE EXPLORATION OF NATURAL RESOURCES OF THE MOON AND OTHER CELESTIAL BODIES, A PROPOSAL FOR LEGAL REGIME 130 (2009). See also M. Finch, *Limited Space: Allocating the Geostationary Orbit*, 7 NW. J. INT'L L. & BUS. 788-802 (1985-86).

⁶⁰ D. Barritt, *A “Reasonable Approach” to Resource Development in Outer Space*, 12 LOY. L.A. INT'L & COMP. L. J. 615-42 (1989-90).

⁶¹ E. Husby, *Sovereignty and Property Rights in Outer Space*, 3 J. INT'L L. & PRAC. 359-72 (1994).

⁶² D. Goldman, *Settlement and Sovereignty in Outer Space*, 22 U. W. ONTARIO L. REV. 155-70 (1984).

⁶³ U.N. Doc. A/RES/1721 (XVI) (Dec. 20, 1961), available at [http://www.un.org/zh/documents/view_doc.asp?symbol=A/RES/1721\(XVI\)](http://www.un.org/zh/documents/view_doc.asp?symbol=A/RES/1721(XVI)) (last visited on Mar. 8, 2018).

⁶⁴ U.N. Doc. A/RES/1962 (XVIII) (Dec. 13 1963), available at [http://www.un.org/zh/documents/view_doc.asp?symbol=A/RES/1962\(XVIII\)](http://www.un.org/zh/documents/view_doc.asp?symbol=A/RES/1962(XVIII)) (last visited on Mar. 8, 2018).

principle of space law in the Outer Space Treaty. According to this principle, no country may appropriate outer space by claim of sovereignty, by means of use or occupation, or by any other means.⁶⁵

However, the literal meaning of Article II of the Outer Space Treaty implies that only a State is forbidden to be the subject of the principle of ‘non-appropriation’ to appropriate outer space and the object of the principle is limited to outer space. In this connection, private entities can appropriate the outer space and States or private entities can appropriate space resources.⁶⁶ Regarding Article II, Gorove argued: “An individual acting on his own behalf or on behalf of another individual or private association or an international organization could lawfully appropriate any part of outer space.”⁶⁷

Actually, according to the existing space legal regime and the corresponding practice of the international community, neither States nor private entities may take the right of appropriation over space resources. The following are the details in this regard.

Firstly, Article VI of the Outer Space Treaty provides that States shall bear international responsibility for their activities in outer space, no matter such activities are carried out by governmental agencies or non-governmental entities. Article VI assures that such activities are carried out in conformity with the provisions set forth in the Outer Space Treaty. Meanwhile, activities of non-governmental entities in outer space shall be subject to authorization and continuing supervision by their States.

Since States themselves are forbidden to appropriate outer space under the principle of ‘non-appropriation,’ it is inappropriate (or even illegal at the international level) for States to authorize their non-governmental entities for the appropriation.⁶⁸ If a State authorizes any non-governmental entity to appropriate outer space, it will thus constitute a violation of the principle of ‘non-appropriation.’⁶⁹

Pop viewed that a private entity can appropriate outer space when the State is allowed to appropriate outer space.⁷⁰ While national appropriation of outer space is forbidden, there is no need for Article II of the Outer Space Treaty to make express

⁶⁵ *Supra* note 62, at 158.

⁶⁶ M. Listner, *The Ownership and Exploitation of Outer Space: A Look at Foundational Law and Future Legal Challenges to Current Claims*, 1 REGENT J. INT’L L. 75-94 (2003).

⁶⁷ S. Gorove, *Interpreting Article II of the Outer Space Treaty*, 37 FORDHAM L. REV. 349-54 (1968-69).

⁶⁸ *Supra* note 13, at 423.

⁶⁹ Yan Ling, *The Right of Ownership over the Moon and Other Celestial Bodies*, in NEW THEORY ON THE OUTER SPACE LAW [国际空间法问题新论] 59 (Yan Ling ed., 2008).

⁷⁰ V. Pop, *Appropriation in Outer Space: The Relationship between Land Ownership and Sovereignty on the Celestial Bodies*, 16 SPACE POL’Y 275-82 (2000).

provisions for forbidding private entities to appropriate outer space, because the prohibition of national appropriation has fully implied that of private appropriation.⁷¹

Secondly, Article II of the Outer Space Treaty does not expressly forbid States or private entities to appropriate space resources. In order to strike the balance between the due interests of States and private entities derived from the exploration and utilization of space resources, and the common interests of the whole international community, space resources can be distinguished by ‘immovable property’⁷² and ‘movable property.’⁷³

Space resources classified as ‘immovable property’ may never be appropriated by States or private entities, whereas space resources classified as ‘moveable property’ may be possible for appropriation, depending on specific circumstances.⁷⁴

Undeniably, such a view is neutral since it takes both interests of the two opposite sides into account. However, according to the declarations made by delegations of several States during the negotiation of the Outer Space Treaty,⁷⁵ both “the acquisition of sovereignty” and “the creation of private property rights” are forbidden by the existing provision of Article II.⁷⁶ So, both States and private entities shall be forbidden to appropriate space resources. Furthermore, even if the appropriation of space resources is affirmed in practice for private entities, the negative results will be serious.⁷⁷

States with necessary space science and technology will conduct the exploration and utilization of space resources to appropriate the resources as much as possible.⁷⁸ Also, if all the resources are appropriated by only a tiny part of States around the world, it will consequently cause great damage to the common interests of the whole international community. Furthermore, while exploring and utilizing space resources, there will be serious controversies on the attribution of the right of appropriation among the States.⁷⁹ Since there are no clear rules for the attribution, the

⁷¹ P. Sterns & L. Tennen, *Preliminary Jurisprudential Observation Concerning Property Rights on the Moon and Other Celestial Bodies in the Commercial Space Age*, 39 PROC. ON L. OUTER SPACE 50 (1996).

⁷² Black’s Law Dictionary 765 (B. Garner ed., 2014).

⁷³ *Supra* note 72, at 1040.

⁷⁴ ZHENJUN ZHANG, RESEARCH ON THE INTERNATIONAL LEGAL REGIME GOVERNING THE EXPLORATION OF THE LUNAR RESOURCES [月球资源开发国际法律制度研究] 81-2 (2012).

⁷⁵ See, e.g., UNCOPUOS Legal Subcommittee, Fifth Session, “Provisional Summary Record of the Seventieth Meeting,” U.N. Doc. A/AC.105/C.2/SR.70, at 14 (Aug. 9, 1966).

⁷⁶ F. Tronchetti, *The Non-Appropriation Principle under Attack: Using Article II of the Outer Space Treaty in Its Defense*, 50 IISL PROC. 258 (2007).

⁷⁷ *Supra* note 34.

⁷⁸ *Supra* note 60, at 616.

⁷⁹ *Id.*

relevant disputes could not be well settled down or even cause conflict among the States involved in larger scale.⁸⁰ Even worse, those disputes could trigger any military confrontation in outer space, thereby causing damage to the international rule of law, and the peace and security of outer space.

2. Attribution of the Right to Use and the Right to Profits

Olinga argued that the legal regime prohibiting the appropriation of space resources deprives private entities of the guarantee for payback of costs invested in the exploration and utilization of space resources, and makes them lose the driving force of further conducting the exploration and utilization.⁸¹ As a consequence, whole activities of exploring and utilizing space resources could get into the trouble of slow development or even stagnation. Therefore, it is strongly argued that private entities should be granted the right of appropriation over space resources, so that they may engage in the exploration and utilization of space resources more positively, under the attraction of expected profits to be derived from the exploration and utilization.⁸²

It is necessary to attract private entities to engage in the exploration and utilization of space resources, so as to conform to the current trend of the booming development of the commercial space industry; maximize the economic value of space resources; and stimulate the development of space science and technology in return.⁸³ The negative results from the appropriation of space resources will be far beyond the benefits to be brought thereby. That is, the international rule of law, the peace, and security of outer space should take the priority to the interests from the exploration and utilization of space resources.

Therefore, despite the necessity of attracting private entities to engage in the exploration and utilization, private entities still should not be granted the right of appropriation over space resources. Instead, as an alternative way, when determining the attribution of the right to use and profits over space resources, more emphasis should be placed on the interests of private entities practically engaged in the exploration and utilization of space resources, while conforming to “the common

⁸⁰ A. Bueckling, *The Strategy of Semantics and the “Mankind Provisions” of the Space Treaty*, 7 J. SPACE L. 15-22 (1979).

⁸¹ L. Olinga, *New Space Mining Law to Spark Interplanetary Gold Rush*, PHYSORG, Dec. 8, 2015, available at <https://phys.org/news/2015-12-space-law-interplanetary-gold.html> (last visited on Mar. 8, 2018).

⁸² Hailong Jia, *The Defects and Possible Improvements of the Legal Regime Governing Outer Space Mining* [外层空间自然资源开发制度的缺陷和展望], 23:6 J. BEIJING U. AERONAUTICS & ASTRONAUTICS (Social Science Edition) 30-3 (2010).

⁸³ T. Masson-Zwaan & Bob Richards, *International Perspectives on Space Resource Rights*, SPACENEWS, Dec. 8, 2015, available at <http://spacenews.com/op-ed-international-perspectives-on-space-resource-rights> (last visited on Mar. 8, 2018).

interests of all mankind” as a whole.⁸⁴

The right to use means the right of using space resources for both scientific and commercial purposes. The most distinguishing feature of this right is that space resources should be used in a non-exclusive way, which differentiates the right from the “appropriation by means of use.”⁸⁵ The latter may be interpreted as the establishment of exclusive rights (especially the right of appropriation) over space resources.⁸⁶ The right to profits means the right of obtaining interests (mainly economic interests) from the exploration and utilization of space resources. Economic interests can be obtained from either direct sale of space resources or sale of related products processed from space resources.⁸⁷

The right to use and profits over space resources enjoyed by private entities may be affirmed by the existing space legal regime. Article VI of the Outer Space Treaty provides that non-governmental entities can carry out activities in outer space under the authorization and continuing supervision by relevant States. As such, private entities, as non-governmental entities, surely can engage in the exploration and utilization of space resources.⁸⁸ When relevant entities conduct such space activities, the right to use and profits will be naturally involved. Furthermore, although the Outer Space Treaty does not explicitly grant private entities the right to carry out space activities, it still recognizes the important role played by private entities in exploring and utilizing outer space.⁸⁹ Unless appropriating space resources, private entities should be allowed to obtain economic interests to a certain extent from the exploration and utilization.⁹⁰

When it comes to the appropriate share of private entities in the right to use and profits over space resources, we need to make reference to Article I of the Outer Space Treaty (the exploration and use of outer space shall be carried out for the benefits and in the interests of all mankind). However, Article 11.7(d) of the Moon Agreement provides that the interests of contributing States to the exploration and utilization of

⁸⁴ *Supra* note 61, at 371-2.

⁸⁵ R. Jakhu, *Principle of Non-Appropriation of Outer Space and the Geostationary Satellite Orbit*, 26 *PROC. ON L. OUTER SPACE* 21-6 (1983).

⁸⁶ M. Dausés, *The Relative Autonomy of Space Law*, 18 *PROC. ON L. OUTER SPACE* 75-84 (1975).

⁸⁷ L. Tennen, *Outer Space: A Preserve for All Humankind*, 2 *HOUS. J. INT'L L.* 145-58 (1979-80).

⁸⁸ I. Diederiks-Vershoor & W. Gormley, *The Future Legal Status of Nongovernmental Entities in Outer Space: Private Individuals and Companies as Subjects and Beneficiaries and International Space Law*, 5 *J. SPACE L.* 125-56 (1977).

⁸⁹ S. Gorove, *The Concept of Common Heritage of Mankind*, in *STUDIES IN SPACE: ITS CHALLENGES AND PROSPECTS* 49-51 (S. Gorove ed., 1977).

⁹⁰ *Supra* note 87, at 149.

space resources shall be given special consideration.⁹¹

Consequently, in order to attract and encourage private entities to engage in the exploration and utilization of space resources through economic interests, a reasonable portion should be reimbursed for their investment.⁹² Furthermore, as a matter of equity, special consideration should be also given to private entities for their actual investment.⁹³

In conclusion, private entities should not be granted the right of appropriation over space resources under any circumstance, but the right to use and profits. Such profits should be set at an appropriate level for private entities to obtain the due interests from the exploration and utilization of space resources.⁹⁴

IV. The Ways Forward for China

Although private entities' right of appropriation over space resources is not expressly forbidden by the existing space legal regime, according to the principles of 'non-appropriation,' "due interests of private entities," and "common interests of the international community," it is legally and practically unreasonable, unfeasible and even unnecessary to grant private entities the right of appropriation over space resources.

The Act does not directly violate the international legal obligations on the legislation level. However, granting private entities the right of appropriation over space resources has already make a negative impact on the existing space legal regime. Its provision might even cause damage to the international rule of law, peace, and security of outer space.⁹⁵

China is a "responsible major country" of space activities.⁹⁶ It should thus take corresponding positions in response to the adoption of the Act. With rapid development

⁹¹ M. White, *The Common Heritage of Mankind: An Assessment*, 14 CASE W. RES. J. INT'L L. 509-42 (1982).

⁹² P. Sterns & L. Tennen, *International Recognition of the Art of Living in Space: The Emergence of Settlement Competence*, 22 PROC. ON L. OUTER SPACE 221-32 (1979).

⁹³ S. Rosenfeld, *Solar Energy and the Common Heritage of Mankind*, 21 PROC. ON L. OUTER SPACE 58-66 (1978).

⁹⁴ *Supra* note 87, at 157.

⁹⁵ E. Swartrauber, *Congress Should Fix Space Property Rights Bill*, TECHFREEDOM, May 19, 2015, available at <http://techfreedom.org/congress-should-fix-space-property-rights-bill> (last visited on Mar. 8, 2018).

⁹⁶ Yansong Xu, *China's Space Activities: Present and Future*, in CELEBRATING THE SPACE AGE: 50 YEARS OF SPACE TECHNOLOGY, 40 YEARS OF THE OUTER SPACE TREATY CONFERENCE REPORT 57 (UNIDIR ed., Apr. 2-3, 2007), available at <http://unidir.org/files/publications/pdfs/celebrating-the-space-age-50-years-of-space-technology-40-years-of-the-outer-space-treaty-conference-report-2-3-april-2007-331.pdf> (last visited on Apr. 19, 2018).

of space science and technology, China will be ready to engage in the exploration and utilization of space resources in the near future.⁹⁷ Space resources have high value but limited quantity. As space science and technology for exploring and utilizing those space resources may be used for both civilian and military purposes, it is necessary for China to firmly refute the legality of granting private entities the right of appropriation over space resources for global common interest. In addition, China should not follow the unilateral approach of appropriating space resources. Instead, it should actively promote the improvement of the existing space legal regime, taking the leading role in establishing an international mechanism governing the exploration and utilization of space resources. In this process, China should take full account of due interests of the whole international community in the exploration and utilization of space resources, as well as maintain the international rule of law for the peace and security of outer space.⁹⁸

On the domestic level, meanwhile, China is in the process of drafting its national space law which will provide legal basis for the space industry.⁹⁹ This law is expected to clarify the legal status of space resources, the attribution of the right of appropriation, the right to use and profits over space resources, and the rules for the exploration and utilization of space resources by both governmental and private entities.

On the international law level, China should play a more active role in the international space law-making process regarding space commercialization and privatization.¹⁰⁰ In this course, China is willing to establish a global governance mechanism for space exploration and utilization. This part will focus on an international mechanism for the space mining activities.

A. Guiding Principles for an International Regime

1. Basic Principle of Non-appropriation

Space resources should not be appropriated definitely and absolutely. Article 6.2 of the Moon Agreement provides that samples of space resources may be collected and removed by States, which will remain at the disposal of these States and may be

⁹⁷ *Id.* at 60-1.

⁹⁸ The Information Office of the State Council, White Paper on China's Space Activities in 2016, (Dec. 27, 2016), available at http://english.gov.cn/archive/white_paper/2016/12/28/content_281475527159496.htm (last visited on Mar. 8, 2018).

⁹⁹ *Id.* National space law is in the drafting process, with the provisional title, "Astronautical Law of the People's Republic of China [中华人民共和国航天法]" The time schedule for the adoption is not confirmed yet.

¹⁰⁰ *Id.*

used for scientific purposes. As a result, the Moon Agreement has shown its attitude towards the attribution of the right of appropriation over space resources used for scientific purposes. Therefore, States which collected space resources and removed them from outer space shall enjoy the right of appropriation.¹⁰¹

However, Article 6.2 of the Moon Agreement only grants States the right to use and the right of disposal over samples of space resources used for scientific purposes.¹⁰² Both rights enjoyed by States are non-exclusive, since Article 6.2 further requires that States should make a portion of samples available to other interested States for scientific investigation.

In practice, space resources samples are ‘appropriated’ by an individual State. However, the quantity of samples is so tiny that such a circumstance may not even be regarded as appropriating the corresponding space resources.¹⁰³ The practice of individual States for appropriating space resources samples is thus far from constituting a rule of customary international law on the right of appropriation over space resources for scientific purposes.¹⁰⁴ Even if being used for scientific purposes, space resources may not be appropriated yet.

Also, space resources may not be appropriated in situ of outer space, while those which have already been collected and removed should be excluded from the applicable scope of the ‘non-appropriation’ principle.¹⁰⁵

The commercial value of space resources can only be realized after being collected and removed from outer space for scientific or commercial use.¹⁰⁶ With the development of space science and technology, more space resources will be gradually collected and removed. States and private entities will naturally compete for the ownership of those space resources.

Consequently, if collected and removed space resources are excluded from the scope of non-appropriation, it will lead to the ‘competition’ of collecting, removing, and even appropriating space resources. Such a competition will inevitably lead to a negative impact on the international order of exploration and utilization of space resources. Even worse, the ‘non-appropriation’ principle would lose its practical meaning in the end, because, in the future, all the space resources will doom to

¹⁰¹ *Supra* note 74, at 83.

¹⁰² *Supra* note 87, at 156.

¹⁰³ *Supra* note 4, at 812.

¹⁰⁴ *Id.*

¹⁰⁵ SHOUPIING LI, THE NEW DEVELOPMENT OF SPACE ACTIVITIES IN TWENTY-FIRST CENTURY AND ITS LEGAL REGIMES [21世纪空间活动新发展及其法律规制] 93 (2016).

¹⁰⁶ *Id.*

be collected and removed, and then appropriated by States or private entities.¹⁰⁷ Therefore, the ‘non-appropriation’ principle shall apply to space resources which have been collected and removed from outer space.

2. A “Free but Limited” Mechanism for the Exploration and Utilization of Space resources

Free exploration and utilization of space resources should be upheld in accordance with the Outer Space Treaty, which encourages States and private entities to continue their efforts in the exploration and utilization of space resources and the maximization of the value of space resources.¹⁰⁸ However, such freedom should not be unlimited. The international community should restrict the means, degree, scope of the exploration and utilization, and the attribution of the profits derived from the exploration and utilization to a certain extent.

Article 11.5 of the Moon Agreement provides that the international community should establish an international regime to govern the exploration and utilization when these activities become feasible. It is necessary to start considering possible limits for the means, degree, and scope of the exploration and utilization.¹⁰⁹

Currently, only a few States and private entities have maintained space technologies for the exploration and utilization of space resources. Unlimited freedom in the exploration and utilization of space resources will inevitably lead to substantive unfairness, thereby causing damage to the interests of States which are yet to have necessary space technologies as such.¹¹⁰

There are divergent views in the academic field with regard to the attribution of profits derived from the exploration and utilization of space resources. Some scholars argue that all the interests/profits derived from the exploration and utilization should be shared by all mankind,¹¹¹ while others maintain that States and private entities should have the exclusive rights over the interests/profits (material achievements) from these space activities.¹¹²

Such distinct views demonstrate two different positions with regard to the priority

¹⁰⁷ *Supra* note 4, at 796.

¹⁰⁸ L. Fountain, *Creating Momentum in Space: Ending the Paralysis Produced by the “Common Heritage of Mankind” Doctrine*, 35 CONN. L. REV. 1753-87 (2003).

¹⁰⁹ D. O’Donnell & P. Harris, *Legal Strategies for a Lunar Economic Development Authority*, 21 ANNALS AIR & SPACE L. 121-33 (1996).

¹¹⁰ Yuhai Yin & Mingyue Wang, *A Study of the Concept “Common Heritage of Mankind” in Outer Space Law* [外空法中“人类共同继承财产”概念探析], 24:1 J. BEIJING U. AERONAUTICS & ASTRONAUTICS (Social Science Edition) 26-9 (2011).

¹¹¹ *Supra* note 87, at 149.

¹¹² *Supra* note 105, at 94.

between the common interests of the whole international community and the due interests of States and private entities.

The attribution of the interests/profits derived from the exploration and utilization should be fair and balanced. While taking into account the common interests of the whole international community, the attribution should put proper emphasis on the protection of the due interests of States and private entities.¹¹³

B. Procedural Aspects of an International Regime

Considering the existing international legal regime such as the International Seabed Authority under the UNCLOS,¹¹⁴ it would be possible to establish an “International Space Authority” for a global mechanism so as to specifically govern the exploration and utilization of space resources.¹¹⁵

In order to establish such an international regime, both space-faring nations and non-space-faring nations need to reach a consensus on all the key aspects.¹¹⁶ Although it would take a long time, such an Authority will have significance. In this regard, China is expected to play a leading role in establishing the Authority. It will not only help China significantly promote academic discourse over space affairs, but also provide an advantageous international platform for China and States concerned to effectively respond to the unilateral approach of appropriating space resources, such as the Act.¹¹⁷ Such an Authority will provide the best platform for States and private entities to negotiate the details of such a regime, and to distribute the profits derived from the exploration and utilization.¹¹⁸ For a proper and effective function, the proposed Authority should have its own specific purposes, functions, and decision-making system.

1. The Purposes

Freedom of space exploration should be upheld within some reasonable limits. The proposed International Space Authority should in the first place ensure to exercise

¹¹³ J. Lewis & C. Lewis, *A Proposed International Legal Regime for the Era of Private Commercial Utilization of Space*, 37 GEO. WASH. INT'L L. REV. 745-67 (2005).

¹¹⁴ Yun Zhao, *An International Space Authority: A Governance Model for a Space Commercialization Regime*, 30 J. SPACE L. 277-96 (2004).

¹¹⁵ C. Christol, *An International Regime, Including Appropriate Procedures, for the Moon: Article 11, Paragraph 5 of the 1979 Moon Treaty for the Moon*, 23 PROC. ON L. OUTER SPACE 139-48 (1980).

¹¹⁶ *Supra* note 37, at 509.

¹¹⁷ *Supra* note 7, at 24-5.

¹¹⁸ *Supra* note 115, at 147.

such a freedom, with clear provisions on possible limits.¹¹⁹ Otherwise, excessive intervention or even strict control by the Authority in the exploration and utilization will lead to market distortion and dampen the enthusiasm of exploring and utilizing space resources from private entities.¹²⁰

It is thus suggested that the restrictions to free exploration and utilization of space resources should only be set on the basis of the principle of non-appropriation of space resources and the protection of common interests of all mankind.

Moreover, closely related to the free exploration and utilization, the free-market approach should also be adopted for the issues such as the sharing of space technologies and profits from the exploration. The proposed Authority should not force States or private entities to transfer space technologies and share the profits from space exploration for free or on a certain rate.¹²¹ Instead, they should be free to decide whether to transfer certain technologies or share certain portion of profits, as long as it does not violate the fair competition rules or the 'non-appropriation' principle. Furthermore, the transfer of space technologies should be negotiated on an equal basis, whose rates are set at a reasonable and fair market level in return.¹²²

Such arrangement can provide sufficient protection to the interests of the States and private entities which ensure to continue their venture in outer space. Moreover, it will also help to preserve the common interests of the international community as a whole by obtaining necessary space technologies on a market rate and benefitting on an economic term from relevant space explorations.

2. The Functions

In order to achieve those purposes, an International Space Authority should take up the following two basic functions. One is registration and publication. States concerned and private entities shall report their space exploratory activities to the Authority, which shall register such activities and publicize them to the international community. The content of such registration and publication should include relevant space technologies, the target celestial bodies and resources, and the interests/profits to be derived from the exploration and utilization.¹²³ The registration and publication services shall help to create a transparent regime for space exploration

¹¹⁹ R. Berkley, *Space Law versus Space Utilization: The Inhibition of Private Industry in Outer Space*, 15 WIS. INT'L L. J. 421-44 (1996).

¹²⁰ *Id.* at 437.

¹²¹ R. Hoover, *Law and Security in Outer Space from the Viewpoint of Private Industry*, 11 J. SPACE L. 115-24 (1983).

¹²² *Supra* note 114, at 289.

¹²³ *Supra* note 113, at 765.

and utilization, avoiding unhealthy competition among the States and private entities. Once registered, States concerned and private entities shall have the priority in conducting the activities in the target celestial bodies and resources.¹²⁴ The information maintained with the Authority shall also help States and private entities interested in relevant space technologies to locate related parties for communication and negotiation.¹²⁵

The other is fee levy and management. The proposed Authority, on behalf of the international community, should levy fees on States and private entities involved in the exploration and utilization of space resources. The levy rate is decided following the elements such as: the investment made by States concerned and private entities for the exploration and utilization; the environmental conditions which might be affected by such activities; and the economic situations of other States that may be affected by the exploratory activities.¹²⁶ The fees to be levied by the authority can be offered for the exchange of the right to space exploration and utilization. The Authority shall make use of such fees on behalf of the international community in an equitable manner. Consequently, the levy can supposedly be a leverage to strike a balance between the protection of the interests of the States and private entities involved in the space activities, and the realization of common interests of the international community.¹²⁷

As mentioned above, the proposed regime is essentially to ensure that there is no violation of the ‘non-appropriation’ principle, through which the international community as a whole can benefit from space activities.¹²⁸ Moreover, the Authority should make sure that States concerned and private entities comply with other basic principles of space law, including the principle of peaceful uses of outer space. For example, relevant space activities should not lead to harmful contamination or adverse changes to the environment, but be solely for the peaceful purpose. If violating the above principles, the Authority is suggested to bring relevant cases to the International Court of Justice (“ICJ”).

3. The Decision-making Process

If an international legal regime fails to strike a balance between the interests of space-

¹²⁴ P. Nescos, *The Proposed International Sea-Bed Authority as a Model for the Future Outer Space International Regime*, 5 ANNALS AIR & SPACE L. 549-74 (1980).

¹²⁵ *Supra* note 114, at 289-90.

¹²⁶ *Id.* at 291-92.

¹²⁷ J. Zell, *Putting a Mine on the Moon: Creating an International Authority to Regulate Mining Rights in Outer Space*, 15 MINN. J. INT'L L. 489-519 (2006).

¹²⁸ *Supra* note 124, at 557.

faring nations and non-space-faring nations, it will inevitably not garner full support from the international society.¹²⁹ The decision-making process is thus important because it justifies the power base of the proposed Authority. For successful operation, the Authority's decision-making process should meet the following terms.

Firstly, the Authority should be represented as widely as possible; the membership shall be open to both space-faring and non-space-faring nations.¹³⁰ The Assembly should be convened to elect main staff and annual budget. The voting formula of "two-thirds majority" shall be adopted for the enactment or amendment of the constitutional documents. The Assembly should set up a secretariat and other internal operational bodies to carry out daily functions, including registration and publication, and preparing draft budget.

Secondly, a Council shall be set up to serve as the main decision-making organ of the Authority.¹³¹ As regards the membership of the Council, the Authority can make useful reference. Equitable geographical distribution of the members in the Council shall also be another important factor to be considered.¹³² The Council should adopt the voting formula of "two-thirds majority" for such matters as the determination of the violation of the 'non-appropriation' principle; the transfer of relevant space technologies and the rate of fees to be levied on a certain entity; decisions or suggestions on certain actions by the States or private entities; and decision to bring disputes to the ICJ.

V. Conclusion

Due to the rapid development of space technologies and the expanding human demands for space resources, more States and private entities are expected to engage in the exploration and utilization of space resources in the near future. The existing space legal regime unfortunately fails to provide clear and useful guidance on the legal nature and ownership of space resources, which is most detrimental to the orderly development of space exploration and utilization. Under such a circumstance, the US already adopted its own national law to promote space exploration by private

¹²⁹ K. Cook, *The Discovery of Lunar Water: An Opportunity to Develop a Workable Moon Treaty*, 11 GEO. INT'L ENVTL. L. REV. 647-706 (1999).

¹³⁰ *Supra* note 124, at 558.

¹³¹ *Id.*

¹³² *Supra* note 114, at 289.

entities. As argued, this is not the most ideal situation. More important is to start serious consideration of possible legal regime for commercial exploration of space resources.

The international cooperation in outer space has been widely acknowledged as a fundamental principle for space activities. China, as a major space-faring nation should be responsible for improving the current space legal regime and establishing an international regime for the exploration and utilization of space resources. In response to the unilateral approach of the US, China should instead work together with the members in the international society to set up a regime. It can strike a balance between the interests of specific States and private entities on the one hand, and the common interests of the international community on the other. An International Space Authority should be set up to represent the whole international community to manage space resources. While the situation of outer space may not be the same as that in the deep seabed, useful reference can still be made to the International Seabed Authority, which has been functioning for more than two decades, in the process of establishing the International Space Authority. An International Space Authority would be the best model to oversee the space exploratory activities and ensure orderly development of space commercialization.