

Analyzing the Legality of Military Use of Resources Extracted from the Moon under the Outer Space Treaty

*Tejas Bharadwaj and Harshith Iyer**

Abstract

The Moon contains resources such as Helium-3, Titanium, and Rare Earth Elements, that can potentially be extracted and incorporated into different products.

The Outer Space treaty provides every state the right to extract and use resources from the Moon, however with limitations under the treaty. Under Article IV para 2 of the treaty, all State parties are mandated to 'use' the Moon exclusively for peaceful purposes. However the treaty fails to define the term 'peaceful'. This ambiguity offers opportunity of such extracted minerals to be used for military purposes, i.e. incorporated into weapons, armours, structures etc. by Space powers in the future. In that case, is military use of these lunar resources permitted under the Outer Space Treaty?

Thus to analyse the legality this paper will adopt the rules of interpretation under The Vienna Convention on the Law of Treaties to establish that the term "peaceful" can only be interpreted as "Non-Military" and that any interpretation allowing "Use" of the moon and its resources for military purposes would defeat the object and purpose of the treaty. The paper will also discuss the interpretative evolution of Peace, from Negative Peace i.e. mere absence of war or aggression, to a broader concept of Positive Peace to conclude that military use of resources extracted from the Moon is Non-peaceful and is prohibited under Outer Space Treaty. Finally, the paper will end at a functional approach to tackle the problems posed by the dual use of these Lunar Resources.

* T. Bharadwaj, student, BA. LL.B School of Law, University of Petroleum and Energy Studies, Dehradun, Uttarakhand, India, tejasbharadwaj14@stu.upes.ac.in. H. Iyer, Student, B. Com. LL.B School of Law, University of Petroleum and Energy Studies, Dehradun, Uttarakhand, India, harshith55@hotmail.com.

1. Introduction

The primary interest for Space powers on the Moon is fuelled by its topography. The Moon comprises of natural resources such as Helium-3, Titanium and Rare Earth Elements (REE) that are commercially and strategically valuable.¹ Helium-3 (³He) largely trapped in the lunar soil is valued as an ideal fuel to facilitate safe and non-polluting production of thermonuclear energy with minimal generation of radioactive wastes.² The Moon also hosts hordes of Titanium and Iron ores, 10 times richer than those on Earth.³ These can be used to construct vital components of an air/spacecraft and used as surgical implants in the human body⁴. Another resources found on the Moon are the Rare Earth Elements, a group of 17 elements⁵ that are widely used in Modern Technologies.⁶ The threat of scarcity and growing Resource Nationalism amongst Countries supplying these resources has prompted the Space Powers⁷ to shift the focus towards the Moon to extract and utilize these resources that lie outside the claim of sovereignty of any State.

However the civilian uses of these lunar resources are not the sole incentives for countries to explore the Moon. These resources extracted from the moon can also be utilized for Military purposes.

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- 1 Ian A Crawford, Lunar resources: A Review, 39 *Progr. Phys. Geogr* 137, 142-153 (2015); LRO finds moon filled with titanium ores, SSERVI, NASA, *available at* <https://sservi.nasa.gov/articles/lro-finds-moon-filled-titanium-ores/>.
 - 2 L.J Wittenberg J. F. Santarius & G. L. Kulcinski Lunar Source of 3He for Commercial Fusion Power, 10 *FUSION TECH*, 167 (1986); HELIUM-3 MINING ON THE LUNAR SURFACE, European Space Agency, *available at* https://www.esa.int/Our_Activities/Preparing_for_the_Future/Space_for_Earth/Energy/Helium-3_mining_on_the_lunar_surface.
 - 3 Moon Packed with Precious Titanium, NASA Probe Finds, SPACE.com (October 11, 2011) *available at* <https://www.space.com/13247-moon-map-lunar-titanium.html>.
 - 4 LRO finds Moon filled with Titanium Ores, SSERVI, NASA, *available at* <https://sservi.nasa.gov/articles/lro-finds-moon-filled-titanium-ores/>.
 - 5 “The 17 Rare Earth Elements are Scandium, Yttrium, Cerium, Dysprosium, Erbium, Europium, Gadolinium, Holmium, Lanthanum, Lutetium, Neodymium, Praseodymium, Promethium, Samarium, Terbium, Thulium and Ytterbium.”
 - 6 Critical Materials Strategy, U.S Dep’t of Energy (December 2010) *available at* <https://www.energy.gov/sites/prod/files/edg/news/documents/criticalmaterialsstrategy.pdf>.
 - 7 Michael Sheetz, Harvesting rare-earth metals from the moon will happen this century, NASA Chief says, CNBC (July 19, 2019) *available at* <https://www.cnbc.com/2019/07/18/nasa-chief-bridenstine-on-harvesting-rare-earth-metals-from-the-moon.html>.

ANALYZING THE LEGALITY OF MILITARY USE OF RESOURCES EXTRACTED FROM THE MOON UNDER THE OUTER SPACE TREATY

Firstly, Helium-3 extracted can be used to make Nuclear Fusion Bombs with minimal radioactive fallout.⁸ Secondly, Titanium from the Moon can be implemented in fighter jets, ballistic missiles, armours, armour piercing projectiles, missile canisters, mortar barrels etc.⁹ Finally, the Rare Earth Elements can be used in various military applications such as Satellite communications, SONAR, RADAR by Armed Forces and Lasers employed on Military Vehicles and weapons.¹⁰

Considering the technological progress of countries it becomes important to ascertain the legality of Military “Use” of Lunar Resources. However before that, it becomes important to understand what is “Use” of the Moon under the Outer Space Treaty?

2. “Use” of the Moon Under Outer Space Treaty

The Outer Space Treaty, 1967 (OST)¹¹ is regarded as the Magna Carta of Outer space¹², establishing broad principles that the “Use” of the Outer Space including the Moon. Currently the OST is ratified by all the Active Space Faring countries¹³ and provides every State the right to explore and use the Moon¹⁴.

- (i) Firstly, the right to “Use” the Moon includes the right to extract and utilize the natural resources of the Moon for scientific and economic purposes.¹⁵ This was evidenced in Negotiating History of OST¹⁶ and

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- 8 Richard B. Bilder, *A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options*, 33 FORDHAM INT'L L.J. 243-99, 254 (2010) Jan Mortier & Benjamin Finnis, *China Leads Race to the Moon*, THE DIPLOMAT (January 7, 2015) available at <https://thediplomat.com/2015/01/china-leads-race-to-the-moon/>.
- 9 J.C. Fanning, *Military Applications for β Titanium Alloys*, 14 Journal of Material Engineering and Performance 686-90 (2005); William A. Gooch, *The Design and Application of Titanium Alloys to U.S. Army Platforms*- presented at Titanium 2010 Military Panel, Florida 3-6 October, 2010.
- 10 Valerie Grasso, *Rare Earth Elements in National Defense: Background, Oversight Issues, and Options for Congress*, Congressional Research Service Report 10 (December 23, 2013); Bert Chapman. *The Geopolitics of Rare Earth Elements: Emerging Challenge for U.S. National Security and Economics*. 6 Journal of Self-Governance and Management Economics, 50-91, 76 (2018).
- 11 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, entered into force Oct. 10, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter OST].
- 12 David Tan, *Towards a New Regime for the Protection of Outer Space as the "Province of All Mankind"*, 25 Yale J. Int'l L. 156 (2000).
- 13 As of June 2019, The treaty is ratified by 109 State Parties including USA, Russia, China, India and Japan.
- 14 OST, Article I.
- 15 Fabio Tronchetti, *The Exploitation of Natural Resources of the Moon and other Celestial Bodies*, 224 (2009); IISL, *Position Paper on Space Resource Mining*,

notably during Apollo and Luna Missions, wherein resources extracted from Moon were transported to earth and utilized without any international objection, thereby becoming an International Practice.¹⁷

- (ii) Secondly, OST is equally applicable to the Moon and all its natural resources regardless of their physical property. Although the OST does not separately mentions “Space Resources”, the applicability is evidenced in domestic legislations namely; *The US Space Launch Competitiveness Act*, which defines “Space resource” as “*an abiotic resource in-situ in Outer Space, an Asteroid resource as a space resource found on or within a single asteroid*”¹⁸ and that the use of these Space resources must comply with the International Obligations of USA.¹⁹

Additionally, Luxembourg’s *Law on the exploration and use of space resources* also mandates the use of Space resources to be in accordance with International Law.²⁰ Therefore all the Lunar Resources found within the Lunar Rocks or Soil of the Moon and are classified as Space Resources and their Use is undoubtedly governed by OST.

- (iii) Finally, Article I of OST distinguishes “Use” from Exploration or Scientific Investigation of the Moon.²¹ While Exploration and Scientific Investigation involves the general/scientific inquiry of subject matters yet to be explored, founded or analysed, “Use” under OST indicates those activities that utilize a particular space segment, towards a particular objective having finality beyond the space

(December. 20, 2015) available at <http://iislwebo.wwwnlls1.a2hosted.com/wp-content/uploads/2015/12/SpaceResourceMining.pdf>.

16 Summary record of the sixty-third meeting of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space, U.N. Doc. A/AC.105/C.2/SR.63 p.8 (1966); Paul G. Dembling & Daniel M. Arons, *The Evolution of the Outer Space Treaty*, 33 J. Am L. & CoM. 419, 431 (1967).

17 Gyula Gal, *Acquisition of Property in Legal Regime of Celestial Bodies*, 39 Proc. on L. Outer Space 45, 47 (1996); Ashley Strickland, Apollo 11 lunar samples were searched for signs of life CNN (July 16, 2019) available at <https://edition.cnn.com/2019/07/16/world/apollo-11-moon-samples-scen-trnd/index.html>; USSR Moon Rock Auction in New York City Nets \$855,000, SPUTNIK (December 2, 2018) available at <https://sputniknews.com/business/201812021070316339-ussr-moon-rock-auction-price/>.

18 The US Commercial Space Launch Competitiveness Act, 51 U.S.C §51301 (2015).

19 *Ibid* § 51303.

20 Luxembourg Law on the exploration and use of space resources, §1 (2017).

21 S Hobe, Article I, I COLOGNE COMMENTARY ON SPACE LAW 35 (Stephan Hobe, Bernhard Schmidt-Tedd & Kai-Uwe Schrogl eds. 2009).

segment.²² In this case, “Use” of the natural resources extracted from the Moon represents even those earth based utilizations of such resources.²³

Thus Right to “Use” under Article I of OST comprises of all Earth-based Utilization of the natural resources extracted from the Moon and thereby such “Uses” are indubitably governed under the OST.²⁴

The 2018²⁵ and 2019²⁶ Reports on ‘General exchange of views on potential legal models for activities in the exploration, exploitation and utilization of space resources’, by UNCOPUOS reflects the current stance of Countries to accept the legality of extraction and Use of the Lunar Resources, however are concerned of ensuring that these resources are utilized for the benefit and in interest of all countries. While commercially it becomes doubtful as to ensure that Benefits reach all countries, at least a general Benefit/interest can be ensured when such resources are exclusively “Used” for “Peaceful Purposes”.

3. Interpreting the Term “Peaceful” under Article IV Paragraph 2 of the Outer Space Treaty

The OST is regarded as a Peace Treaty having the primary objective of reserving the Moon for peaceful activities and to deter any extension of earthly conflicts or arms race into Moon.²⁷

Article IV paragraph 2 of OST states;

*‘The Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes’.*²⁸

But the equivocal interpretation of the term “peaceful” under OST has continually raised debates on the legality of various kinds of Military

22 P de Man, Exclusive Use in an Inclusive Environment The Meaning of the Non-Appropriation Principle for Space Resource Exploitation 80 (2016).

23 See Section A- Introduction.

24 Bin Cheng “Revisited: International Responsibility, National Activities and the Appropriate State”, 26 J.S.L. 19 (1998); H Wassenbergh, “An International Institutional Framework for Private Space Activities” XXIII Annals of Air and Space Law 529 , 533 (1997).

25 Committee on the peaceful uses of Outer Space, Legal Sub Committee, Report on ‘General exchange of views on potential legal models for activities in the exploration, exploitation and utilization of space resources’, U.N. GAOR 57th Sess., U.N Doc. A/AC.105/C.2/L.304/Add.3 (2018).

26 Committee on the peaceful uses of Outer Space, Legal Sub Committee, Report on ‘General exchange of views on potential legal models for activities in the exploration, exploitation and utilization of space resources’, U.N. GAOR 58th Sess., U.N Doc. A/AC.105/C.2/L.309/Add.3 (2019).

27 U.N. General Assembly Endorses Outer Space Treaty 56 Dep’t St. Bull. 41 (1967).

28 OST, Article IV para 2.

activities in the Outer Space and on the Moon.²⁹ This can be attributed to the negotiation and drafting history of OST.

In 1966, the hitherto Space Powers, USA and USSR submitted their draft treaties in UNCOPUOS³⁰ to provide for a demilitarization regime of Outer Space and Moon. While USSR and other UNCOPUOS delegations present were keen to completely demilitarize Outer Space and the Moon, it was negotiated³¹ to ensure that this treaty did not affect their concurrent use of the Outer Space for Passive Military Activities comprising of Satellites for reconnaissance, navigation and surveillance for Nuclear Deterrence.³²

Passive Military activities are not inherently aggressive but are conducted to assist or strengthen the military systems and operations on Earth.³³ The Destructive Impact of Passive Military Activities does not affect the Outer Space but rather is effectuated only on Earth. For the purposes of accommodating passive military activities in Outer Space, the word “Peaceful” in OST was interpreted as “Non-aggressive” by USA³⁴ while USSR initially interpreting the term as “Non-Military”, its objections to operations of Military Satellites eventually subsided.³⁵ Thus the absence of a concrete and common definition of the term “Peaceful”, has unsettled the International Space Community for a long time.

While Outer Space is already militarized with Countries increasingly orbiting Military Satellites or unveiling Space Forces, the Moon remains the only subject that remains tranquil. However in future when resources of the Moon are extracted and used for military purposes on earth, it should not lead to any compromise in interpreting “Peaceful” under Article IV Paragraph 2 of OST to accommodate any of such Passive Military Activities on the Moon, even in absence of International Objections. Thus the term “Peaceful” must be rightly interpreted in order to prevent Moon from Militarization.

Currently there are 2 broad interpretations of the term “peaceful” under Article IV. Under the first interpretation the word “peaceful” is interpreted as

29 Gabriella Sgrosso, *Military Applications and Space Law*, 49 Proc. on L. Outer Space 311, 312 (2006); G.P. Zhukov, *On the Question of Interpretation of the Term Peaceful Use of Outer Space Contained in the Space Treaty*, 11 Proc. on L. Outer Space 36 (1968).

30 United Nations Committee on Peaceful Uses of Outer Space.

31 P.G. Dembling, *Negotiating Issues in Forming the 1967 Treaty on Outer Space*, 40. Proc. on L. Outer Space Colloquium on the Law of outer Space 37 (1997).

32 Deltev Wolter, *Common Security in Outer Space and International law* 17 (2006) [*hereinafter* DELTEV].

33 G. Steinberg, “*The Militarization of Space: From passive support to active weapons systems*”, 14 *Futures* 372, 379 (1982).

34 Senator Albert Gore, Sr., *Treaty on Outer Space: Hearings Before the Committee on Foreign Relations*, U.S. Senate, 90th Congress, First Sess., 59 (Mar. 13, 1967).

35 Setsuko Aoki, *Law and Military Uses of Outer Space*, ROUTLEDGE HANDBOOK OF SPACE LAW 199 (Ram Jakhu & Paul Dempsey eds. 2017).

“Non-Military” while under the second interpretation the term is interpreted as Non-Aggressive.

While the first interpretation of the term completely prohibits all kinds of military activities except those which are expressly permitted under Article IV paragraph 2 of the OST, i.e. Use of Military personal, equipment or facility for peaceful exploration and use of the Moon, the second interpretation permits all Military Activities that are non-aggressive in nature while prohibiting those that are expressly mentioned under Article IV paragraph 1 & 2.³⁶ The problem with the second interpretation is that it gives scope for conducting inherently non-aggressive/passive military activities such as the extraction/mining of the Resources from the Moon for building weapons, armours or military components on earth.

Further it becomes complicated when through Article III of OST³⁷ Article 51 of U.N Charter³⁸ legalizes Self- Defence for which a State has sovereign right to establish defensive measures including development of space based military capabilities and weapons.³⁹

In that case, is it permissible to conduct those Non-aggressive/Passive military activities that aren't expressly prohibited under Article IV paragraph 2 involving extraction of resources from the Moon and using it for Military purposes on the basis that U.N Charter legalizes Defensive measures and that since they aren't expressly prohibited under Article IV, the limitation upon such activities should not be presumed?

- (i) Firstly, the State sovereignty centric Lotus Principle⁴⁰ that everything not prohibited is permitted, is invalid in the contemporary times and this is of particular importance to Sovereign free area such as Outer Space and the Moon, wherein limitations such as the Common Interest clause, Non-Appropriation clause and Peaceful Purposes clause under OST limits the Freedom of State to explore and use the Moon.⁴¹ Thus the argument that a particular activity not expressly prohibited under Article IV of the OST is therefore permitted can be rendered redundant in the present space age.

36 Article IV Paragraph 2, OST, - *The expressly prohibited activities are “Establishment of Military bases, installations and fortifications, the testing of any type of weapons and the conduct of Military Manoeuvres”.*

37 OST, Article III.

38 U.N Charter, Article 51.

39 John B. Gantt, *“The Concept of Peaceful Purposes”/ “Peaceful Uses” in the Exploration and Use of Outer Space – Some Practical Examples*, 46 Proc. on L. Outer Space 107 (2003).

40 *SS Lotus (France v Turkey) (Merits) 1927 P.C.I.J. (ser. A/B), N° 10 (Sept. 7).*

41 *Deltev Supra* (n.32) at p. 22; Carl Christol, *the International Law of Outer Space* 267 (1962).

- (ii) Secondly, extending the interpretation “*Peaceful*” as “*Non-aggressive*” to the Activities on the Moon under Article IV Paragraph 2 would defeat the Object and Purpose of OST.

Under Article 31(1) of the Vienna Convention on the Law of Treaties⁴² a treaty shall be interpreted in good faith in accordance with the ordinary meaning of the terms of the treaty in their context and in the light of its object and purpose and this rule represents a customary international law.⁴³

Analysing the Ordinary meaning of relevant terms under Article IV Paragraph 2 of the OST;

The term “*Exclusively*” means “*only*”⁴⁴, suggesting that any *Use* of the Moon is to be done solely for peaceful purposes and not otherwise. Further the term “*Purpose*” is defined as “*an intended or desired result, end, aim or goal*” reflecting the intent of using the Moon by the State party⁴⁵. Thus it can be interpreted that the Drafters intended an emphasis to permit only those *Uses* of the Moon that are solely intended for Peaceful Purposes under the OST.

Moving on, the term “*Peaceful*” ordinarily means “*Absence of war or violence and an inclination to avoid conflicts*”.⁴⁶ While it has been assumed that the U.N. Charter classically interprets “*Peaceful*” as *Non-aggressive* i.e. Mere Absence of War/Aggression (Negative peace), such an interpretation overlooks Article 1 of the U.N. Charter. Article 1 of the U.N. Charter provides for the Purposes of the United Nations.

The broad objective of the United Nations is to maintain *International Peace and security*.⁴⁷ The I.C.J has emphasized that *International Peace and Security* is an essential purpose of the United Nations and is important to fulfil other United Nations purposes.⁴⁸

42 Vienna Convention on Law of Treaties, entered into force May 23, 1969, 1155 U.N.T.S. 331, Article 31(1).

43 Kasikili/ Sedudu Idland (Botswana v. Namibia), 1999 I.C.J. 1945 (Dec. 13), 1059; Territorial Dispute (Libya v. Chad), 1994 I.C.J. 6 (Feb. 3) 21.

44 Exclusively, Cambridge Online Dictionary, *available* at <https://dictionary.cambridge.org/dictionary/english/exclusively>.

45 Richard A. Morgan, *Military Use of Commercial Communication Satellites: A New Look at the Outer Space Treaty and Peaceful Purposes*, 60 J. Air L. & Com. 237,307 (1994).

46 Peaceful, Collins Dictionary, *available* at <https://www.collinsdictionary.com/dictionary/english/peaceful>; *Peaceful*, Little Oxford Dictionary (8th ed. 2002).

47 U.N Charter, Article .

48 Certain Expenses of the United nations (Article 17, Paragraph 2, Of the Charter) Advisory Opinion 1962 I.C.J (Jul. 20) 162 [*Hereinafter* Certain expenses case].

Article 1 of the U.N. Charter definitely interprets the term “Peace” and “Security” as something more than an absence of war/ aggression (*Positive Peace*)⁴⁹ and refers to an evolutionary progress of diminishing any actions that are likely to cause conflicts.⁵⁰ If one reflects on Article 1 of the U.N. Charter, maintenance of International Peace and Security is referred to as the primary purpose whereas the suppression of acts of aggression is referred to as only one of the objectives under collective measures to achieve International Peace and Security. This subordination elucidates that while “Peace” can mean Non-aggressive, the vice versa is not justified and that “Peace” can be also endangered by Acts that are Non-aggressive in Nature.

Considering the Purpose of the United Nations and OST;

The purpose of the United Nations is to develop processes and machineries that sustain peace and deter the use of armed forces/Military. This can be seen in its emphasis on promoting mechanisms for ensuring Disarmament through creation of several Disarmament Treaties and the UNODA in 1998.⁵¹ The United Nations General Assembly (G.A.) has stated that genuine and lasting peace can be created only through the speedy and substantial reduction of arms and armed forces by international agreement leading ultimately to general and complete disarmament⁵². Further the G.A. has also expressed concerns on Hegemonic pursuits of a State representing a serious threat to international peace and Security.⁵³

49 Peace means dignity, well-being for all, not just absence of war – UN officials, United Nations News (September 9 2014) “*Underscoring that peace is more than just the absence of war, United Nations officials today stressed the need for concerted efforts to achieve the common vision of a life of dignity and well-being for all*”.

50 Rudiger Wolfrum, Purposes and Principles, Article 1 in THE CHARTER OF THE UNITED NATIONS: A COMMENTARY 111 (Bruno Simma et al. eds. 3rd edn., 2012).

51 Rebecca Johnson, The United Nations and Disarmament Treaties, UN Chronicles (December 2014) *available at* <https://unchronicle.un.org/article/united-nations-and-disarmament-treaties>.

52 G.A. Res. 34/83, U.N. GAOR, 34th Sess., at 53, U.N. Doc. A/RES/34/83 A-M (1979); *see also* G.A. Res. 34/88, U.N. GAOR, 34th Sess., at 63, A/RES/34/88 (1980)- “*Deeply disturbed by the Fact that International Peace and Security of people continue to be threatened by the Arms Race,.... The continuation of Arms Race conflicts with the interest of economic development and the social and spiritual progress of mankind*”.

53 G.A. Res. 34/103, U.N. GAOR, 34th Sess., at 68, U.N. Doc. A/RES/34/103 (1979)- “*Hegemonism, global and regional in all its different forms, leads to a serious threat to international peace and security*”.

Undoubtedly the OST is a disarmament treaty created under the auspice of United Nations⁵⁴ and subsequent G.A Resolutions have reaffirmed that an Arms Race in Outer Space or the Moon would threaten International Peace and Security.⁵⁵

As evidenced in the preamble⁵⁶ of the OST, it is in the Object and Purpose of OST to ensure that an Exploration and Use of the Moon will further the purposes and principles of the United Nations Charter. This is again echoed in the text of the Article III of the OST, stating that “*Exploration and use of Outer Space, including the Moon shall be carried out in accordance with International law, including the U.N Charter, in the Interest of maintaining International peace and security and promoting International Cooperation and Understanding*”⁵⁷. Thus it can be implied that OST aims to prevent any extension of terrestrial conflicts and arms race into the Moon⁵⁸ and this can be ensured only through a complete Non-militarization of the Moon⁵⁹ in order to achieve the Object and Purpose of U.N Charter as envisaged by OST.

- (iii) Thirdly, even within the scope of interpreting OST, it is imperative that any treaty must be read as a whole to give effect to all of its terms and avoid inconsistency and that no word or provision may be treated as or rendered superfluous.⁶⁰ In that case, interpreting the term “*Peaceful*” as “*Non-aggressive*” would render Article IV paragraph 2 as superfluous addition because under the already existent International law and U.N Charter, States parties to OST are refrained from engaging in *Non-aggressive* Activities while exploring and using the Moon under Article III of OST⁶¹. Therefore the subsequent addition of the limitation under Article IV paragraph 2

54 Disarmament Treaties Database, UNODA *available at* <https://disarmament.un.org/treaties/>

55 G.A. Res. 43/70, U.N. GAOR, 43rd Sess., at 70-7, U.N. Doc. A/RES/43/70E (1988); G.A. Res. 36/97C, U.N. GAOR, 36th Sess., at 71, U.N. Doc A/RES/36/97 (1981); G.A Res 61/58, U.N. GAOR, 61st Sess., U.N Doc A/RES/61/58 (2007).

56 VCLT, Article 31(2) – “*The context for the purpose of the interpretation of a treaty shall comprise, in addition to the text, including its preamble and annexes*”.

57 OST, Article III.

58 Pericles Gasparini Alves, Prevention of an Arms Race in Outer Space: A guide to the Discussions in the Conference on Disarmament 1-47 (1992).

59 Bin Cheng Studies in International Space Law 527 (1997).

60 Corfu Channel (United Kingdom v. Albania) (Judgment) 1949 I.C.J. 4 (Apr. 9) at p.24-6; *Certain Expenses* case (Separate Opinion of Judge Sir Percy Spender) *supra* (n.48) at p.186; Admission of a State to the United Nations (Article 4 of the Charter) Advisory Opinion, 1948 I.C.J (May 28) 62.

61 A.G. Koroma, *The Development of International Law and the Peaceful Uses for Outer Space*, 54 Proc. Int'l Inst. Space L. 3, 9 (2011).

implies an additional limitation that the OST does not prohibit only *Non-aggressive* activities but also other activities that constitute breach of *Peace*, with respect to “*Use*” of the Moon.

While narrowly interpreting the term “*Peaceful*” as *Non-aggressive* can never facilitate in achieving “*Peace*”, any broad interpretation of the term can cause in limiting legitimate use of the Moon by States. In that case it is ideal that the term “*Peaceful*” is interpreted as “*Non-Military*” to safeguard the object and purpose of OST, by prohibiting any military activity on the Moon, regardless of whether such an activity on the Moon is *Non-aggressive*, while simultaneously permitting legitimate Civil and Commercial *Use* of the Moon and its Resources. Considering that the resources on the Moon are limited, permitting their extraction and use for Military Purposes would result in Countries competing against each other to acquire these resources in order to enhance their military capability and such competition will lead to Arms Race on the Moon or armed conflicts between the countries for Hegemony and control over the areas and resources on the Moon. Thereby it is only rational if the term “*Peaceful*” under Article IV of OST is Positively Interpreted to achieve of the Purposes of the United Nations of maintaining International Peace and Security. *To conclude*, extracting resources from the Moon and using them for Military Purposes is prohibited under the Outer Space Treaty.

4. A Functional Approach to tackle Dual-Use of the Lunar Resources

The Dual-use of natural resources of the Moon for both civilian and military purposes causes challenges in determining the prohibited activities under OST. This is because the process of extracting the resources on the Moon remains the same for all purposes regardless of its final use on earth. There are possibilities that States in the cover of civilian or scientific activities extract and use such resources for Military purposes i.e. enhancing Military capabilities and potential of Country in realization of a military objective.⁶² It also becomes difficult to differentiate activities that are conducted for Civilian or Military purposes because traditionally Outer Space Activities have had military nexus either with the Astronauts/Crew being Military personnel or Military equipment being used to facilitate the Space Missions etc.⁶³ Similarly in future, the extraction of the resources can be conducted by Military personnel or Robots using Military technologies.

62 Military Capability, MILITARY FACTORY *available* at https://www.militaryfactory.com/dictionary/military-terms-defined.asp?term_id=3357; *Military Capability*, DOD Dictionary of Military and Associated Terms 2 (2019); *See* Military Power Potential, Encyclopedia.com (August 27, 2019) *available* at <https://www.encyclopedia.com/social-sciences/applied-and-social-sciences-magazines/military-power-potential>.

63 Robert L Bridge, *International Law and Military Activities in Outer Space* 13 Akron L. Rev. 649, 657 (1980); NASA’s Moonwalking Apollo Astronauts: Where Are They

Further the resources extracted from the Moon can be used to create any commercial/civil products that might aid Military Operations. For example Laptops/Smart Phones created using the Rare Earth Elements extracted from Moon can also aid in Military Activities for communication purposes or the titanium extracted from the Moon can be used as a surgical implant for a Wounded Soldier.

A functional approach needs to be used to distinguish activities of extracting lunar resources that are in furtherance of use for military purposes from those that are for civilian purposes, regardless of the nominal military status of the facilitator⁶⁴ or its secondary/extended purposes. It needs to be ascertained whether such a *Use* of these Lunar Resources enhances the Military capability of a country or fulfils its Military Objectives.

*Protocol Additional to the Geneva Conventions*⁶⁵ define Military Objectives as those by their nature, location, purpose or use make an effective contribution to military actions and these can include weapon factories and extraction industries furnishing raw materials for Military.⁶⁶

While OST does not prevent the use of Military personnel or equipment for scientific research or for any other peaceful purposes on the Moon⁶⁷, Article IV of OST provides a functional approach by prohibiting establishment of military bases, installations, fortifications, the testing of any type of weapons and conduct of Military Manoeuvres on the Moon.⁶⁸

A Military base means a structure facilitating a military activity or military operations, serving as a point of support for such military operations or supply⁶⁹ and a Military Installation refers to equipment that has been established to render utility for Military activities.⁷⁰

Now? SPACE.com (May 28, 2018) available at <https://www.space.com/17317-nasa-apollo-moon-astronauts.html>.

64 Bin Cheng, *Properly Speaking, Only Celestial Bodies Have Been Reserved for Use Exclusively for Peaceful (Non-Military) Purposes, but Not Outer Void Space in INTERNATIONAL LAW ACROSS THE SPECTRUM OF CONFLICT: ESSAYS IN HONOR OF PROFESSOR L.C GREEN ON THE OCCASION OF HIS EIGHTIETH BIRTHDAY*, 75 *International Law Studies* (Michael N Schmitt eds.2000).

65 Article 52, International Committee of the Red Cross (ICRC), Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I) *entered into force* 7 December 1978, 1125 U.N.T.S 3.

66 Marco Sassoli, *Military Objectives*, in Max PLANCK ENCYCLOPEDIA OF PUBLIC INTERNATIONAL LAW (Rudiger Wolfrum eds. 2015).

67 OST Article IV paragraph 2.

68 *Ibid.*

69 S Hobe, *Article IV*, I COLOGNE COMMENTARY ON SPACE LAW 84 (Stephan Hobe, Bernhard Schmidt-Tedd & Kai-Uwe Schrogl eds. 2009) *hereinafter* COLOGNE; H Rumpf, *Military Bases on Foreign Territory*, III ENCYCLOPAEDIA OF PUBLIC INTERNATIONAL LAW 381 (R Bernhardt eds. 1997).

70 *Ibid* COLOGNE, *Article IV* at p.84.

ANALYZING THE LEGALITY OF MILITARY USE OF RESOURCES EXTRACTED FROM THE MOON UNDER THE OUTER SPACE TREATY

A Structure or Installation erected on the surface of the Moon to extract/mine and process the lunar resources for creation of weapons, armours, components for military use becomes a military base/installation contributing to Military Activity directly or indirectly, as it critically supplies and manufactures Weapons and Military components for furthering Military actions.

Thus erection of structures contributing to the Military, on the Moon results in the prohibited establishment of a Military base on the Moon under Article IV OST, regardless of whether any other civilian/scientific activities are performed in those structures.