

DE JURE NEXUS LAW JOURNAL

Author:

Nishant Vimal

Symbiosis Law School, Hyderabad.

4th Year.

**DETERMINING THE EXTENT OF OUTER SPACE – CRITIQUE ON
THE EVOLUTION OF INTERNATIONAL SPACE LAWS**

“Space offers no problems of sovereignty; By resolution of this assembly, the Members of the United Nations have forsworn any claim to territorial rights in Outer Space or on celestial body, and declare that International Law and United Nations Charter will apply”

- John F. Kennedy

ABSTRACT

Space Law is an area which has still not yet been fully discovered, and hence, regulations and laws concerning it may not be inclusive, but covers major talking points. This research paper aims to shed light on the evolution of laws in space. The reader shall know that the laws in space revolve around Five major treaties with four of them arising from the provisions of the Outer Space Treaty of 1967. The author attempts to analyse the provisions and the spirit of each legislation and provides an in-depth critique of the laws. Specific details have been provided for the concept of Delimitation, which is a very vague and indefinite topic, as jurisdiction cannot be allotted in Outer Space, let alone Delimit it. Evolution of Space laws dates back to the 1950s and the author has attempted to explain it and analyse it for the reader. The author while discussing the drawbacks of the Outer Space Treaty analyses concepts like Delimitation as well and provides the reader an unabridged analysis of the laws concerning Outer Space.

INTRODUCTION TO INTERNATIONAL SPACE LAWS AND ITS EVOLUTION

Scientific knowledge has developed at an increasing rate, and hence the boundaries of research has not only reached the depths of the ocean and the heights of the air space¹, but also beyond air space. The infamous “Space Race” between the United States and the U.S.S.R. at the time of Cold War escalated after U.S.S.R. sent *Sputnik 1* on October 1957. After 1957, there was an extensive use of the outer space and an immediate need for a law that could govern such activities arose. Soviet Union further sent the first man and woman into the space named Yuri Gagarin and Valentina Tereshkova respectively on April 1961 and June 1963 respectively. The single highlight achievement of the Space race came at the part of United States when they sent *Apollo 11* which consisted of 3 astronauts who became the first to land on the Moon. In further decades, Space was used more frequently than before, and the states started to place artificial satellites and different sorts of objects into the space.

It was decided amongst the states that anything beyond the air space would be beyond state control. With such increasing usage of resources available in the space, there needed to be a mechanism to regulate the usage of space resources. Jurists stated that *raison d’etre* of governing principles for activities conducted in Outer Space was because the dangers of state security. After the launch of *Sputnik 1*, states organized several meetings or debates wherein the world community and various jurists around the world began considering the wide range of aspects. In 1961, General Assembly passed the **Declaration of Principles Governing Space**² on 20th December, 1961. This declaration formed the basis for International Space Laws that have formulated into the **Outer Space Treaty, 1967**³, that still remains the governing mechanism for International Space laws.

Article V⁴ is an integral part of the above-mentioned Treaty that considers all astronauts as “**Envoys of Mankind**” as their research and exploration will come into use of all mankind and hence are given utmost assistance in order to return safely. They were given this status in the United Nations General Assembly in 1963 by its resolution⁵.

¹Sukhvinder Singh Dari & Rangam Sharma, *Conflicting Sovereignty issue in outer space: An analysis of the current existing conventions vis-a-vis impediments.*, SPACE LAW AND CONTEMPORARY ISSUES 601.

²DECLARATION OF PRINCIPLES GOVERNING SPACE, (1961).

³OUTER SPACE TREATY, (1967).

⁴ARTICLE V, OUTER SPACE TREATY (1967).

⁵United Nations General Assembly Resolution 1962 (XVII), “States shall regard astronauts as envoys of mankind in outer space, and shall render to them all possible assistance in the event of accident, distress, or

COMMON PROVINCE OF MANKIND

The treaty lays down various principles like **Common Province of Mankind**⁶, which applies for the Outer space that starts after air space ends, so that there is no specific ownership of the territory of Outer Space. Province of Mankind means “right to use and exploration”⁷ wherein it is to be ensured by each signatory state, that they shall peacefully explore space without causing any hindrances to another state. The treaty explicitly forbids any government to claim a celestial resource such as the Moon or a planet. **Article II** of the treaty states that “*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 **Outer Space Treaty** has reiterated that Space and the Moon and other celestial bodies can be used for scientific exploration and shall not come under national appropriation. However, this treaty does not create or lay down any such boundary that separates airspace from outer space. This treaty is often considered to be the *Magna Carta* of laws relating to Outer Space⁸.

National appropriation

Another purpose of the Outer Space treaty was to ensure that no country claims ownership of any territory of Outer Space and to encourage space exploration by all states in order to help humanity as a whole. This was incorporated in this treaty keeping in mind the principle of Common province of Mankind⁹. The term itself translates to “Common thing” and hence results in stating outer space as a territory where national appropriation does not prevail and any sort of reference to State sovereignty is absent¹⁰. Common Province of Mankind means that an “*area outside national jurisdiction containing valuable resources is besides being incapable of individual appropriation by States, should be managed by all States collectively*

emergency landing on the territory of a foreign state or on the high seas. Astronauts who make such a landing shall be safely and promptly returned to the state of the registry of their space vehicle.”

⁶ARTICLE I, OUTER SPACE TREATY (1967).

⁷Shameeksen, *Principle of common heritage of Mankind in Outer space; A Framework of Ambiguity and Ineffectiveness?* Outer space Law from theory to practice edit by Sandeepa Bhat, ICFAI University press, 2009

⁸ Sandeepa Bhat B, *Space technology and Law: Some unresolved question*, Vol, XXVIII-XXIX Delhi law Review, 2006-07.

⁹ARTICLE I, *supra* note 6.

¹⁰JOHN H. CURRIE, PUBLIC INTERNATIONAL LAW (2nd ed. 2008).

and exploited for the benefit of all States, taking into particular consideration the needs of the less developed ones."¹¹

The Outer Space Treaty does not state a definition for Outer Space *per se*, and hence territorial concerns have been persistent since the first General Assemblies in the 1960s¹². **Article II of the Outer Space Treaty, 1967** prohibits national appropriation by any state over any space territory. States have often resorted to exploiting the loophole by having private enterprises claiming ownership but it has been stated in **Article VI of the Outer Space Treaty** that all *"the activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty."*

WEAPONS IN OUTER SPACE

Outer Space Treaty of 1967, prohibits the placing of weapons of mass destruction (WMD)¹³ in space, it limits the use of the Moon and all other celestial bodies to peaceful purposes only, and establishes that space shall be free for exploration and use by all nations, but that no nation may claim sovereignty of outer space or any celestial body. **Article IV¹⁴** of the Outer Space Treaty provides that *"States Parties to the Treaty undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner."* **LAW JOURNAL**

The **Preamble of the Outer Space Treaty** states that it recognises *"the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes"* and also states *"that the exploration and use of outer space should be carried on for the benefit of all peoples irrespective of the degree of their economic or scientific development"*.¹⁵

¹¹ Fabio Tronchetti, *The exploration of Natural resources of the Moon and other Celestial Bodies*, Martinus Nijhoff publication 2009, London. Pg 83.

¹² UNGA Res. 1721/1961, Part A para. 1(b); UNGA Res. 1962/1963, para. 3. Cf. OST, Art. III.

¹³ ARTICLE IV, OUTER SPACE TREATY, (1967). "...The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military maneuvers on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the Moon and other celestial bodies shall also not be prohibited".

¹⁴ ARTICLE IV, OUTER SPACE TREATY, (1967).

¹⁵ PREAMBLE, OUTER SPACE TREATY (1967).

A landmark development took place as the **FOBS i.e. Fractional Orbital-Bombardment System** of Russia in the 1960s¹⁶. The potential deployment of FOBS was a perfect example of playing with the borders of the principles laid down in the Outer Space Treaty. This Russian Nuclear Weapon-Delivery system was not deployed in the orbit *per se*, and hence did not qualify to being under the ambit of the Treaty i.e. did not violate Article IV of the Outer Space Treaty, 1967. The Russian delivery system was proposed to be functioning in the '*fraction Orbit and not in the full orbit*'¹⁷.

Outer Space treaty has been formulated keeping in mind the Space Race between United States and the U.S.S.R which were the two states feared to be creating national sovereigns in outer space and hence the principle of province of mankind as well as the restrictions on weaponization of space has been incorporated to ensure that space is not subjected to national appropriation and every country can explore outer space in a free manner.

OTHER TREATIES GOVERNING INTERNATIONAL SPACE LAW

There are many treaties formulated after the Outer Space Treaty which aimed at peaceful exploration of space and any other celestial body. These various treaties have been constituted for the purpose of

RESCUE AGREEMENT

Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space or popularly known as **Rescue agreement** is an international legal instrument created in 1968 through an agreement in United Nations general assembly. The basic purpose of this treaty is to ensure safe return of any astronauts and any space objects launched into the outer space by any state for the purpose of peaceful exploration of outer space and other celestial body¹⁸. This treaty created an obligation upon all signatory countries to ensure maximum assistance to the launching state.

¹⁶R-360 / SL-X-? FOBS - Russian / Soviet Nuclear Forces, , <https://fas.org/nuke/guide/russia/icbm/r-360.htm>.

¹⁷D. Goedhuis, *An Evaluation of the Leading Principles of the Treaty on Outer Space of 27th January 1967*, 15 CAMBRIDGE UNIVERSITY PRESS (1968).

¹⁸Rescue Agreement, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introrescueagreement.html>.

SPACE LIABILITY CONVENTION

Convention on International Liability for Damage Caused by Space Objects or popularly known as the **Space Liability Convention** is a treaty formulated in 1972 which focuses on the aspect of creating liabilities on any state that conducts any activity in outer space and if any space object or the conduct of the launching state causes damage to any other state, then the state shall be completely liable to recover damages caused to that state¹⁹.

The landmark **1928 Chorzow Factory Case**²⁰, the Permanent Court of International Justice ruled that reparation shall be such that wipes out all the consequences and re-establishes the state as in the same way as the state would have continued had the act had not happened. The ICJ in this case had required only 'payment of fair compensation'. A similar feat was seen in the case of **Canada v. USSR**²¹ wherein, the USSR had to weigh all the aspects and then pay C\$ 3 debris. This case was set on the backdrop of Soviet satellite **Kosmos 954** crashing in Canadian territory in 1978.

The return of a space object from foreign territory should be conditioned upon payment of compensation for any damages caused by the landing. Such a condition was urged by **Loftus Becker**, Legal Adviser to the Department of State during the late 1950s, Congressman **Kenneth B. Keating**, and the Counsel to the House Science and Astronautics Committee²². This was observed by Becker when he addressed the 9th Annual Congress of the International Astronautical Federation, The Hague, Netherlands in August 29, 1958.

Apart from the liability convention, even according to Outer Space Treaty, 1967 any state shall be held liable for the damage caused by their space object. This is present in **Article 7²³ and 9²⁴** of the treaty.

Launching State is the state that launches a space object or sends astronauts into the outer space for peaceful purpose. According to the **Article I of the Liability Convention**, it is stated that

¹⁹Liability Convention, , <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introliability-convention.html>.

²⁰ICJ 255 (PCIJ 1928).

²¹(1979) 18 I.L.M 899.

²²Space Law and the Fourth Dimension of Our Age | SpringerLink.

²³OUTER SPACE TREATY, 1967, Art. 7.

²⁴OUTER SPACE TREATY, 1967, Art. 9.

“The term “launching State” means: (i) A State which launches or procures the launching of a space object; (ii) A state from whose territory or facility a space object is launched;”

Space object has been defined in the same provision as well, *“The term “space object” includes component parts of a space object as well as its launch vehicle and parts thereof.”*

This treaty is one of the first attempts at determining the type and degree of liability to be imposed on states in case of any damage to another state through their activities. Article II states **“absolute liability”** on part of the defaulter state towards the state for any damage. This is generally an open and shut case of creating a liability upon a state and there is no such defense in these situations. Also, Article III of this act states that any damage caused to any other state, and if the launching state is the faulty party, they are liable towards the other state.

REGISTRATION CONVENTION

Convention on Registration of Objects Launched into Outer Space or popularly known as **Registration Convention** involves the recording of all details about any activity that any state does to explore space. Every signatory state has to record the details like astronauts that will be travelling, type of space object, duration of space travel, weight of space object and etc²⁵. United Nations maintains a Register of Objects launched into Outer Space and hence this convention makes it an obligation upon all signatory states to fill out the details in this register to ensure safe return of the astronauts and the space objects.

MOON AGREEMENT

Agreement Governing the Activities of States on the Moon and Other Celestial Bodies or popularly known as **Moon Agreement** is a treaty that ensures peaceful exploration of all celestial bodies including the Moon. As Outer Space Treaty talks about space being province of mankind, the Moon Agreement states that the Moon and other Celestial Bodies are **common heritage of mankind**²⁶. Wherever the term ‘heritage’ is used, it creates an obligation to protect that object and in this scenario the Moon and other Celestial bodies. Moon Agreement not only gives freedom to states to conduct exploration activities in

²⁵Registration Convention, , <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introregistration-convention.html>.

²⁶ARTICLE XI, ,AGREEMENT GOVERNING THE ACTIVITIES OF STATES ON THE MOON AND OTHER CELESTIAL BODIES (1984).

Moon and other Celestial Bodies but also created liability upon the state for any possible damage.

Moon Agreement is based upon 3 principles that are²⁷:

- Moon should be used for the benefit of all states and all parties of the international community.
- Moon shall not be subject to national appropriation or any sort of claim of sovereignty.
- Prevent the Moon from becoming a reason of a conflict amongst nations, to ensure that the resources should be used only for peaceful purposes.

However, the Moon Agreement has not been ratified by most countries and hence this treaty is also widely regarded as a failure.

DRAWBACKS OF OUTER SPACE TREATY

Outer Space Treaty has been subjected to a large number of criticisms because of its failure to impose stern liabilities or obligations upon states apart from sanctions. Although, the treaty has never been blatantly violated but the fears of its power to act in case of any violation is proving to be the nemesis for the treaty. The major drawbacks are originating from the two basic principles of “ban on WMD and nuclear weapons” and “ban on National Appropriation”.

WEAPONS

Placing weapons of mass destruction has been banned through the Outer Space Treaty, 1967 but in 2007, the Republic of China shot down one of their satellites for the purpose of weather forecasting. This sparked long debates in the international community whether this is a violation of the Outer Space Treaty or not.

On January 11, 2007, China launched a ballistic missile from Xichang Space Launch Center. The payload was a **Kinetic Kill Vehicle (KKV)** that collided with a non-operational Chinese weather satellite, the **Fengyun-1C (FY-1C)**, at an altitude of 863 km (534 mi), completely destroying the satellite²⁸. This is known as a direct **Ascent Anti-satellite (ASAT) attack**, where the KKV does not enter into orbit but instead travels through space on a ballistic arc.

²⁷Moon Agreement, , <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/moon-agreement.html>.

²⁸CelesTrak: Chinese ASAT Test, , <https://celestrak.com/events/asat.php>.

The destruction created a cloud of more than 3,000 pieces of space debris, the largest ever tracked, and much of it will remain in orbit for decades, posing a significant collision threat to other space objects in Low Earth Orbit (LEO)²⁹.

This test was widely seen as a violation of **Article IV of the Outer Space Treaty**³⁰ because of the use of missiles that are considered as WMD and hence this opposed the very spirit of this treaty which focuses on non-militarization of outer space. Although, it was *prima facie* apparent that there has been a violation, the treaty failed to create a mechanism to ensure that the Chinese Government was punished who maintained their stand stating they did not fire the missile to threaten to someone, but instead they launched the missile to take down one of their non-functioning satellite. This has been a major negative point of this treaty as there was a lot of damage to the space through the space debris of the satellite but there was no one held responsible for this act.

However, this treaty does not completely ban every type of weapons in space, but only WMD or nuclear weapons are banned. Setting up of a military satellite in outer space is still a prospect for nations. Any communication system can be installed by the nations to enable the military to view the battlefield in all times during a war or for any other purpose. The *Sententia legis* behind the restrictions on weapons was ideally to discourage any attempts at achieving national superiority.

For example, the recent constitution of the **United States Space Force in 2020** as the space warfare service branch of their own Armed Forces poses a threat to the spirit of the Outer Space Treaty, 1967. There is pressure on the United Nations and the General Assembly to provide a clear-cut interpretation of this inclusion of restriction of weapons laid down by the Outer Space Treaty, as there are different interpretations to “Peaceful purposes”. The United States interpret it as “non-aggressive” while the USSR and present-day Russia interpreted it as “non-military”³¹.

²⁹2007 Chinese Anti-Satellite Test Fact Sheet.

³⁰ARTICLE IV, *supra* note 13.

³¹ Thomas R. Adams, Outer Space Treaty: An Interpretation in Light of the No-Sovereignty Provision, 9 HARV. INT'L. L. J. 140 (1968).

NATIONAL APPROPRIATION

In 1976, Colombia, Indonesia, Kenya, Uganda, Zaire, Ecuador and Congo with Brazil as an observer country proclaimed the **Bogota Declaration**³² wherein these countries wanted to claim ownership into the geo-stationary orbit where majority of the satellites function which may have enabled them to claim ownership to the satellites. Their stand was that the stationery satellites shall be considered as within their territory. This declaration was refuted by the International Committee.

Bogota Declaration stated that the geostationary orbit does not come within the ambit of Outer Space and termed it as a natural resource. One notable writer, James Fawcett³³ has spoken about the Bogota Declaration (1976)³⁴, wherein it was regarded that earth satellites in their gravitational link with the earth and the orbital function are still regarded essentially as territorial objects and consequently deep space should be seen as the beginning in relation to the earth beyond the orbit of the most distant satellites³⁵. Some equatorial states claimed that the geostationary satellites were not part of outer space but actually an integral part of the territory below.

This has been claimed as the biggest drawback of the Outer Space Treaty as the ambiguity related to the specifying of where the outer space starts from or where it ends. Various countries have used this unclear law to their benefit and have demanded the ownership over the geo-stationary orbit by claiming it as being different from Outer Space. It is till date unclear whether this sphere over the airspace belongs to Outer Space or is a part of Airspace and hence subject to national appropriation.

Apart from these two issues there are various more drawbacks of this treaty:

1. There is no mention of any procedural laws related to Space laws. Further, No treaty, provides the jurisdiction for any redressal mechanism or any method of settlement of disputes.
2. Till date, no proper definition of outer space has yet been formulated. Nothing has yet satisfyingly resolved and set up limitations between the air space and the outer space.

³²Dan St. John, *The Bogotá Declaration and the Curious Case of Geostationary Orbit – Denver Journal of International Law & Policy*, <http://djilp.org/the-bogota-declaration-and-the-curious-case-of-geostationary-orbit/> (last visited Sep 1, 2019).

³³James Fawcett, *Outer Space* (London, 1984) 15–16.

³⁴Dan St. John, *supra* note 32.

³⁵Stephen Hobe, *Cologne Commentary on Space Law*, 1.

EXTENT OF OUTER SPACE

Outer Space is a territory which has never been specified to be of an exact sphere. It is simply known as a space that exists from Earth till all sorts celestial bodies like Moon, stars or other planets etc. exist.

Kármán line is an attempt to clarify upon the confusion on the ambiguity surrounding the determining the exactness in measuring the Outer Space. In this concept, Outer Space begins at an **altitude of 100 Kilometers i.e. 62 miles above sea level**. This was stated to be the start of Outer Space for legal purposes to keep records of all aerospace records which was also accepted by the FAI i.e. **Fédération Aéronautique Internationale**³⁶. However, there are different perspectives when it comes to differentiating between Airspace and Outer Space. As per the **United States and NASA**, the starting point of Outer Space differs from the previous definition of Kármán Line, as it states that a flight has achieved space flight if it travels at **50 miles above the Earth's surface**³⁷. The need to achieve a common ground still exists as some states recognize Kármán line as the starting point of Outer Space and some recognize the measurement for Outer Space. This has resulted in vagueness in the definition of Outer Space and as well as determining what is the extent of Outer Space and what is its starting point.

According to a research in 2007, **Supra-Thermal Ion Imagers** were an instrument which also premeditated that the Outer Space starts at **118 Kilometers i.e. 73 miles above the sea level**. This theory was further proved by the **JOULE-II Sounding Rocket** which was launched successfully January 19, 2007. This instrument measures the difference between the atmospheric pressure caused by the change in winds of Earth's atmosphere and the violent flows of the Outer Space³⁸.

LOW-EARTH ORBIT

There are pathways for every moving object. Through radar, Airplanes are guided through their flight route. Likewise, every space object is required to move at a particular route that is

³⁶100km Altitude Boundary for Astronautics, (2017), <https://www.fai.org/page/icare-boundary>.

³⁷Where is space? | NOAA National Environmental Satellite, Data, and Information Service (NESDIS), <https://www.nesdis.noaa.gov/content/where-space>.

³⁸L. Sangalli et al., *Rocket-based measurements of ion velocity, neutral wind, and electric field in the collisional transition region of the auroral ionosphere: E REGION ION DEMAGNETIZATION*, 114 J. GEOPHYS. RES. n/a-n/a (2009).

on the Orbits. All notable satellites orbit the planets or planets orbit the sun through these paths. One of the most active orbits wherein the International Space Station also operates is the Low-Earth Orbit (LEO)³⁹. LEO is present at an altitude of 180 - 2,000 Kilometers i.e. 1,200 Miles from the surface of the Earth⁴⁰.

The existence of LEO has inevitably resulted in a dispute concerning whether it shall be considered as Outer Space or not. Taking into account the previously mentioned Kármán line as well as the data NASA takes into account, it is pertinent to note that LEO does qualify to being considered in Outer Space hence refuting the Bogota Declaration stated before⁴¹.

Although the fact remains that Outer Space Treaty shall be formulated to clarify about the extent of the region of 'Outer Space', specifying where it starts from as measuring the ending of Outer Space is a territory that humans are yet to fully explore. It is safe to state that the sole existing legal framework does not determine the extent of Outer Space and does not specify a starting limit for Outer Space that may resolve any future disputes arising due to ambiguity relating to delimiting Outer Space.

De Jure Nexus

LAW JOURNAL

³⁹Darcy Elburn, *FAQs*, NASA (2019), <http://www.nasa.gov/leo-economy/faqs>.

⁴⁰Catalog of Earth Satellite Orbits, (2009), <https://earthobservatory.nasa.gov/features/OrbitsCatalog>.

⁴¹See note 32.

SUGGESTIONS AND CONCLUSION

The author would conclude this study by providing appropriate suggestions. The author suggests that:

1. That the liabilities upon states shall be sterner. The governing bodies shall be given power to order economic and financial sanctions upon the country that violates any provision of the Outer Space Treaty, 1967.
2. That there is a need to determine the exactness of the territory of Outer Space. Precisely, there is a need to adjudicate a starting point of Outer Space.
3. That there is a need to ban all sorts of weapons and not just WMD or nuclear weapons.
4. That the international community shall consider the aspect of national appropriation up till the low earth orbit to ensure the standards of all satellites and etc.
5. United States of America must ratify all the Space Treaties in order to set an example for the other nations to ratify them.

This brief insight into the concept of evolution of outer space has been concluded after providing in depth analysis about the same and after providing exhaustive information regarding space laws. It has been observed that Space Laws were the need of the hour because of the increase in space exploration. This article consists of an explanation of the Outer Space Treaty, 1967 and the various other space treaties that were formulated. The author has talked about the Space Race and its role in evolving of outer space and the formulation and increasing the need for framing laws on space. Through his study, the reader will get to know about space laws in detail, about all the treaties and agreements that exist for this field of law. The drawbacks have been critically analysed and how has the ambiguity in this treaty affected the applicability of the Treaty. The author has subsequently derived suggestions for the topic that is deemed fit by the author and hence has concluded this study with the same.

BIBLIOGRAPHY

1. HarnamBhayana: Delimitation of Outer Space - (Chapter IV) in International Law in the Regime of Outer Space, (Calcutta: R. Cambay and Co. Pvt. Ltd., 2001)
2. Sandeepa Bhat B.: Space Technology and Law: Some Unresolved Questions - Delhi Law Review, Vol. XXVIII - XXIX, 2006 – 2007.
3. Sandeepa Bhat B.: Review of Trends in Outer Space Law-Making - Sandeepa Bhat B. (ed.), Outer Space Law: From Theory to Practice, Hyderabad: Icfai University Press, 2009.
4. S. Mishra & T. Pavlasek: on the Lack of Physical Bases for Defining a Boundary Between Airspace and Outer Space - Annals of Air and Space Law, vol. 7, 1982.
5. Vladimir Kopal: Introduction to United Nations Treaties and Principles on Outer Space - Proceedings of the United Nations Space Law Workshop on Capacity Building in Space Law, 2003.
6. V.S. Mani, S. Bhatt and V. Balakista Reddy (Ed), Recent Trends in International Space Law & Policy - New Delhi: Lancers Books, 1997.
7. Sukhvinder Singh Dari & Rangam Sharma, Conflicting Sovereignty issue in outer space: An analysis of the current existing conventions vis-a-vis impediments., SPACE LAW AND CONTEMPORARY ISSUES 601.
8. United Nations General Assembly Resolution 1962 (XVII), “States shall regard astronauts as envoys of mankind in outer space, and shall render to them all possible assistance in the event of accident, distress, or emergency landing on the territory of a foreign state or on the high seas. Astronauts who make such a landing shall be safely and promptly returned to the state of the registry of their space vehicle.”
9. Shameeksen, Principle of common heritage of Mankind in Outer space; A Framework of Ambiguity and Infectiveness? Outer space Law from theory to practice edit by Sandeepa Bhat, ICFAI University press, 2009
10. Sandeepa Bhat B, Space technology and Law: Some unresolved question, Vol, XXVIII-XXIX Delhi law Review, 2006-07.
11. JOHN H. CURRIE, PUBLIC INTERNATIONAL LAW (2nd ed. 2008).
12. Fabio Tronchetti, The exploration of Natural resources of the Moon and other Celestial Bodies, MartinusNijhoff publication 2009, London. Pg 83.
13. UNGA Resolution 1721/1961, Part A para. 1(b); UNGA Res. 1962/1963, para. 3. Cf. OST, Art. III.

14. ARTICLE IV, OUTER SPACE TREATY, (1967). "...The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military maneuvers on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the Moon and other celestial bodies shall also not be prohibited".
15. Thomas R. Adams, Outer Space Treaty: An Interpretation in Light of the No-Sovereignty Provision, 9 HARV. INT'L. L. J. 140 (1968).
16. R-360 / SL-X-? FOBS - Russian / Soviet Nuclear Forces, <https://fas.org/nuke/guide/russia/icbm/r-360.htm>.
17. D. Goedhuis, An Evaluation of the Leading Principles of the Treaty on Outer Space of 27th January 1967, 15 CAMBRIDGE UNIVERSITY PRESS (1968).
18. CelesTrak: Chinese ASAT Test, , <https://celestrak.com/events/asat.php.2007> Chinese Anti-Satellite Test Fact Sheet.
19. Dan St. John, The Bogotá Declaration and the Curious Case of Geostationary Orbit – Denver Journal of International Law & Policy, <http://djilp.org/the-bogota-declaration-and-the-curious-case-of-geostationary-orbit/>.
20. James Fawcett, Outer Space (London, 1984) 15–16.
21. Stephen Hobe, Cologne Commentary on Space Law, 1.
22. 100km Altitude Boundary for Astronautics, (2017), <https://www.fai.org/page/icare-boundary>.
23. Where is space? | NOAA National Environmental Satellite, Data, and Information Service (NESDIS), <https://www.nesdis.noaa.gov/content/where-space>.
24. L. Sangalli et al., Rocket-based measurements of ion velocity, neutral wind, and electric field in the collisional transition region of the auroral ionosphere: E REGION ION DEMAGNETIZATION, 114 J. GEOPHYS. RES. n/a-n/a (2009).
25. Darcy Elburn, FAQs, NASA (2019), <http://www.nasa.gov/leo-economy/faqs>.
26. Catalog of Earth Satellite Orbits, (2009), <https://earthobservatory.nasa.gov/features/OrbitsCatalog>.