



SPACE COMMERCIALIZATION IN THE PERSPECTIVE OF INTERNATIONAL LAW AND RENEWAL OF INDONESIAN NATIONAL LAW

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Abstract

This research aims to know how is the regulation on commercialization of outer space as regulated in the Outer Space Treaty 1967 as the foundation of utilization of outer space as well as the need to renew Indonesian national law in facing the commercialization of outer space. This research is normative legal research, which applies conceptual and theoretical approaches. Provisions on commercialization of outer space in the Outer Space Treaty 1967 and the Moon Agreement 1972 regulates all forms of activity on the utilization of outer space including commercialization. This regulates in Law Number 21 of 2013 on Space and Presidential Regulation Number 45 of 2017 on Master Plan Regarding Implementation of Space which is targeted within 25 years, started since 2016 until 2040 .

Keywords: *Commercialization, OST, Reformulation*

Abstrak

Penelitian ini bertujuan untuk mengetahui bagaimana pengaturan mengenai komersialisasi ruang angkasa yang diatur dalam *Outer Space Treaty 1967* sebagai landasan hukum penggunaan ruang angkasa dan pembaharuan hukum nasional Indonesia dalam menghadapi komersialisasi ruang angkasa. Penelitian ini menggunakan metode penelitian normatif, yaitu dengan cara melakukan pendekatan konseptual dan pendekatan teoritis. Peraturan mengenai komersialisasi ruang angkasa diatur dalam *Outer Space Treaty 1967* dan *The Moon Agreement 1972* yang mengatur mengenai segala bentuk aktivitas penggunaan ruang angkasa termasuk kegiatan komersialisasi dan dalam hukum Nasional Indonesia diatur dalam Undang-Undang Nomor 21 Tahun 2013 Tentang Keantariksaan dan Peraturan Presiden Nomor 45 Tahun 2017 Tentang Rencana Induk Penyelenggaraan Keantariksaan yang ditargetkan dalam waktu 25 tahun dimulai sejak tahun 2016 sampai dengan tahun 2040.

Kata Kunci: *Komersialisasi, OST, Pembaharuan.*

A. INTRODUCTION

Space law is a law that regulates the relationship between one country and another in determining the rights and obligations of all activities aimed at the use of outer space

that arise for the benefit of all mankind and provides protection for mankind wherever these activities are carried out ¹. In forming regulations regarding air space and outer space, there is an urgency to identify various problems found by examining the legal impact on human use of outer space.

In the use of space, on January 27 1967, the United Nations (UN) created regulations governing the use of space as regulated in the international agreement, namely the *1967 Outer Space Treaty*, for peaceful purposes and to avoid the space arms race which was signed. by many countries and came into force on October 10 1967 ².

There are principles of space law, including the principle of *Non-Appropriation* and the principle of *Freedom of Exploration and Use*. The Principle of *Non-Appropriation* states that outer space, including the moon and other celestial bodies, cannot be recognized for their individual ownership by each country, because the principle of *Freedom of Exploration and Use* confirms that each country is free to conduct space exploration for peaceful purposes, without any discrimination or interference from other countries and without recognition of the sovereignty of each country, because in outer space there is no sovereignty.

Currently, the use of space for commercial purposes has reached new developments related to the shift in the ability to utilize space. The *Non-Appropriation* principle in *the 1967 Space Treaty*, which means that the use of space by countries cannot be claimed as ownership by any country, is slowly finding a new interpretation regarding the boundaries of space ownership because in fact, the interpretation of the *Non-Appropriation principle* is not interpreted by countries. -a country that has become a pioneer in using space as a strict rule regarding the prohibition of claims on space ³.

In claiming ownership of outer space, there are several differences that justify the claim of sovereignty so that this is considered a change in the interpretation of the principle of *Non-Appropriation* of outer space. In article II of *the 1967 Outer Space Treaty* there is no determination of the boundaries between space, the moon and other celestial bodies so that article II of the *1967 Outer Space Treaty* seems to ignore the meaning of space, the moon and other celestial bodies.

Several countries that have the ability to carry out space exploration are known to have taken samples of foreign material originating from space, namely *Geostationary Orbit* or GSO which is located at an altitude of 35,786 km above the earth's equator ⁴. The reason for claiming GSO as state property is because satellites placed on GSO can provide benefits for the provision of satellite services so that they can save operational costs and are able to provide high service accuracy related to data transfer from satellites to the earth.

The principle of *Non-Appropriation* is related to the principle of *Permanent Souverignty Over Natural Resources*, where these two principles discuss ownership of natural resources over an area in that region. In *Permanent Souverignty Over Natural Resources*, the state has sovereignty over its natural resources because these natural resources are

1 Ibid, p. 88.

2 Marcel Rawis, " Chapter II Development of International Law Concerning Space Activities", Scientific paper, p. 1, accessed on Saturday, October 7 2023, at 14:52.

3 Hesti Septianita, Et All " The Principle of Non-Appropriation of OuterSpace in the Commercialization of Space by Private Corporations", UNPAS Journal, 2021, p. 6.

4 Hesti Septianita, Et All, ibid, p. 9.

in the state's territory and are related to the sovereignty of the state concerned, but on the other hand, the principle of *Non-Appropriation* shows that there is the opposite understanding, namely sovereignty over natural resources. does not have to be related to sovereignty over the territory where the natural resources are contained ⁵.

The existence of ownership of space resources, which means that it includes natural resources, means that it includes natural resources such as GSO and mining materials in the form of rocks and minerals contained therein. This is based on *Article 1 The Exploration and Use of Space Resources*, which makes it easier for the country or company to carry out mining in space, the moon and other celestial bodies.

In facing the development of space commercialization, several countries have developed their national laws to regulate the use and utilization of space, and from an international law perspective, each country bears obligations for all activities carried out in space, whether carried out by the government or private companies located under state supervision.

As a developing country, space activities that are currently closely related to Indonesia are the operation of satellites based on altitude. Indonesia is a country located at an altitude of 35,787 km above the equator, so this makes GSO very vital for archipelagic countries to lay communications networks ⁶. The importance of space activities for Indonesia's national interests, namely the use of space exploration for peaceful purposes, the field of telecommunications and space technology, disaster management, *The Sustainable Development Goals* (SDGs) which has the goal of sustainable development which covers social and economic issues such as poverty, hunger, health, education, climate change, water, sanitation, energy, environment and social justice ⁷.

In line with the geopolitical dynamics of the Indo-Pacific which are influenced by space activities between India, China and Japan, where these three countries have the ability to launch their own satellites in their own territorial areas, Indonesia's position is described in the *omni-enmeshment concept*, where this concept describes the position Indonesia and other developing countries are seeking to increase relations between countries in order to fulfill the interests of the country, while the concept of *limited engagement is a concept that illustrates that Indonesia must try to maintain its distance from great power* ⁸ countries.

A *great power* country is a country that has influence and is considered to have dominant power because it is a *great power country* not only advanced in the economic field but also in the military field ⁹. The combination of the two concepts of *omni-enmeshment* and the concept of *limited engagement* produces the *programmatic equidistance concept* which is a depiction of Indonesia's position in general in its strategic environment as a result of the combination of the concepts of *omni-enmeshment* and *limited engagement* which describes Indonesia's position as being in a strategic and critical position.

⁵ Melisa Pranata, "Ownership of Mining Materials Based on the Principle of Non-Appropriation and the Exploration and Use of Space Resources", University of Surabaya Article, 2023, p. 7.

⁶ Ridha Aditya Nugraha, "Why Space Law is Important for Indonesia", Law Online, accessed on Saturday, October 14 at 23:01. <https://www.Hukumonline.com/berita/a/mengapa-Hukum-angkasa-important-bagi-indonesia-lt58ca-5ce2be8da/>.

⁷ Nurhayati, "Service to Overseas Communities Mentoring Teachers in Indonesian Schools Kuala Lumpur Sustainable Development Goals", Collaboration Program between the Indonesian Embassy and IAIN Lhokseumawe, 2017, p. 1.

⁸ Deden Habibi Ali Alfhatimy, Et All, "Among the Three Launchpads: Indonesia and the Dynamics of Space Diplomacy in Indo-Pacific Geopolitics", Journal of International Studies, Volume 6, Number 1, November 2021, p. 150.

⁹ <https://repository.upnvj.ac.id/3648/3/BAB%20I.pdf>

Indonesia is a country that participates in space activities which at the same time cannot be separated from the conditions of competition between the three *great power countries*, this is due to the existence of intertwined space activities between Indonesia and the three *great power countries*, so this causes Indonesia to be in a strategic position at the same time. critical¹⁰. Indonesia has launched several satellites launched by the Indonesian government and companies since 1976, this is based on data from the *United Nations Office for Outer Space Affairs* (UNOOSA) or the UN secretariat which is tasked with promoting and facilitating international agreements regarding space. The satellites that were launched by Indonesia were Palapa A1 in July 1967, Palapa A2 in March 1977, and many more.

On June 19 2023, Indonesia has just launched its newest satellite, namely the Republic of Indonesia satellite SATRIA-1 which was successfully launched at Cape Caneveral, Florida, United States. SATRIA-1 is Indonesia's first satellite which is directly controlled by the government to provide equal internet access, educational needs, health, public services, and much more. Regarding the continued use of outer space, Indonesia has ratified *the Treaty and Principle* through Republic Law Number 16 of 2002 concerning the ratification of *the Treaty On Principle Governing The Activities Of States*, this is confirmed in article 1 which reads:

Article 1:

“Raising the Treaty on Principles Governing the Activities of States the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 1967 (Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies) Other Celestial Bodies, 1967) which as attached is an inseparable part of this Law¹¹. “

This is further confirmed in Law Number 21 of 2013 concerning Space in Chapter II article 7 which covers space science, remote sensing, mastery of space technology, launches and commercial space activities¹². Regulations regarding commercial space are reaffirmed in the sixth section, in article 37 paragraphs (1) and (2) of Law number 21 of 2013 which reads:

Article 37 letter paragraph (1):

“Space commercial activities as intended in Article 7 paragraph (1) letter e can be carried out by legal entities established based on Indonesian and foreign laws”

Article 37 paragraph (2):

“Provisions regarding the requirements and procedures for Space commercial activities as referred to in paragraph (1) are regulated in Government Regulations . “

In Government Regulation Number 11 of 2018, there are several article provisions that explicitly regulate the use of Indonesian satellites, including¹³:

10 Viva Budy Kusnandar, “ Satria-1 Successfully Orbited, Indonesia Has 10 Active Satellites Since June 2023 ”, Vlog Katada Media Network, Accessed on Sunday, October 15, at 01:17. <https://databoks.katadata.co.id/datapublish/2023/06/22/satria-1-sukses-mengorbit-indonesia-punya-10-satelit-active-pada-juni-2023>

11 Indonesia, Law of the Republic of Indonesia

Number 16 of 2002 concerning Ratification of the Treaty On Principles Governing The Activities Of States In The Exploration And Use Of Outer Space, Including The Moon And Other Celestial Bodies, 1967 (Treaty Concerning Principles Regulating The Activities Of States In The Exploration And Use Of Outer Space , Including the Moon and Other Heavenly Bodies, 1967

12 Indonesia, Law Number 21 of 2013 concerning Space .

13 Ni Nyoman Ratih Sukmantari & Putu Edgar Tanaya, “ Legal Regulation on the Use of Space for Military Satellite Uses in Indonesia ”, Kertha Desa Journal, Volume 11, Number 1, p. 7.

- 1) Article 1 number 9
- 2) Article 1 number 15
- 3) Article 4 paragraph (2)
- 4) Article 6
- 5) Article 10

In Government Regulation Number 7 of 2023 concerning Mastery of Space Technology, it is explained that the mastery, development, distribution and protection of space technology is aimed at realizing independence and increasing the competitiveness of the nation and state, ensuring the sustainability of space for the benefit of present and future generations, protecting the country. and its citizens from the negative impacts caused, and realizing the implementation of space which is a supporting component of the defense and integrity of the Unitary State of the Republic of Indonesia ¹⁴.

The development of space technology in Indonesia has developed rapidly so that many new technologies continue to appear along with the development of space technology, this is marked by the launch of satellites into geostationary orbit and Indonesia plans to continue space exploration activities for scientific and commercial purposes. space ¹⁵.

Due to the commercial potential and space technology, the Indonesian government has plans to build its own spaceport to provide better opportunities to create economic value from space activities. The construction of its own space station or satellite launch station will be carried out in 2024 under the supervision of LAPAN or the Institute. National Aviation and Space, which was established in 1964, handles matters regarding the development and use of space technology for the national interest.

The space station that the Indonesian government will build is located in Natuna, Riau Islands. The launch station that will be built will become a satellite launch base for space and commercial activities which has the potential to increase development in both the technology sector and the Indonesian economic sector . In the National Long Term Development Plan (RPJPN), the Indonesian government has looked at the use of space to achieve a Golden Indonesia by 2045 which is which is expected to be able to develop the use of space and become one of the largest economic powers in the world ¹⁶.

B. METHOD

The type of research the author uses is normative legal research. Normative legal research is conceptualized as rules or norms which are benchmarks for human behavior that is considered appropriate. The source of normative legal research is secondary data consisting of primary legal materials, secondary legal materials and tertiary legal materials.¹⁷ The approaches used in this research are the international agreement approach (*statute approach*), the conceptual approach *and* the *case approach* .

C. ANALYSIS AND DISCUSSION

¹⁴ Government Regulation, Government Regulation Number 7 of 2023 concerning Mastery of Space Technology, p. 3.

¹⁵ <https://www.atapnews.com/technology/perkembangan-Teknologi-ruang-angkasa-di-indonesia/10619/>

¹⁶ [https://.How is the Development of Indonesian Space Technology \(bumiayu.id\)](https://.How is the Development of Indonesian Space Technology (bumiayu.id))

¹⁷ Amiruddin and Zainal Asikin, Introduction to Legal Research Methods , PT. RajaGrafindo, Depok, 2020, p. 118. Accessed on September 10, 2023, at: 08:00.

1. Regulation of the commercialization of space and its natural resources based on the 1967 Outer Space Treaty

In non-legal literature, there are many definitions of natural resources, one of which is that natural resources are natural resources that appear to be used for humans, the economy, or for social conditions. Natural resources are supplies or materials taken from the earth which can be clothing materials, metals, fertilizer, water, geothermal heat, and many more. Until now, there are many definitions of natural resources both nationally and internationally¹⁸. one of the international definitions of natural resources is in article 2 of the 1958 *Convention on the Continental Shelf* which is currently being explained again in article 77 paragraph (4) of the 1982 *United Nations Convention on the Law of the Sea* (UNCLOS).

Contents of Article 77 paragraph (4) UNCLOS 1982:

“ *The natural resources referred to in this part consist of mineral and other non-living resources of the seabed and subsoil together with living organisms belong to sedentary species, that is to say, which organisms, at the harvestable stage, are either immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil* ¹⁹”.

“Natural resources consist of minerals and other non-living resources from the sea and underground together with living organisms belonging to sedentary species, that is to say organisms that are at the harvest stage, either moving on or under the seabed or immobile except in constant physical contact with the seabed or subsoil.”

In 1966, the outer space treaty reached an agreement on legal principles governing the use of outer space by countries in space exploration and exploitation activities. This agreement was opened and signed by the three superpower governments, namely the Russian Federation, England and the United States in January 1967, and came into force in October 1967²⁰.

The launch of space objects is a form of progress in the use of space technology, which directly has a positive impact that can be felt by countries that wish to advance their respective countries' technological capabilities, especially in the field of space science and technology. The process of forming space law is marked by the submission of a series of general assembly resolutions, such as instructions and ways to increase international cooperation, the establishment of basic principles regarding the regulation of space law, and the acceptance of a declaration of legal principles governing the activities of space states. which is based on the nature and region of space²¹.

The 1967 Outer Space Treaty is the legal basis for the international use of space as well as a tool to anticipate legal problems arising from ongoing space commercialization activities, especially in terms of the use of natural resources contained in space, this is

18 Mardianis, “ Legal Status of Natural Resources Outside National Jurisdiction and the Position of Developed Countries in the Field of Space ”, Padjadjaran University Journal, Volume 3, Number 3, 2016, p. 5.

19 United Nation Convention On The Law Of The Sea 1982, Article 77 paragraph (4), p. 54 .

20 United Nation Office For Outer Space Affairs, “ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies ”, Website, Accessed at 01:43, January 17, 2024. <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspace-treaty.html>

21 Amadea Nurul Auliarahma, “ Regulation of Space Utilization According to the 1967 International Space Treaty ”, Lex Administratum Journal, Vol.IX, No. 7, July-September, 2021, pp. 86-87.

one of the most important things is that the use of natural space resources has a very important role for every country that carries out space exploration and exploitation.

During the process of forming the *1967 Outer Space Treaty*, there was confusion between the application of space, whether space could be said to be “*res nullius*” which means that space cannot be claimed by any country or whether space could be said to be “*res communis*” which means *res communis*. This assumes that space is a common property as a form of human heritage. *Res communis* is defined as a concept that can be used in outer space because *res nullius* is considered to have a concept that is very closely related to interests, the application of space can be used without any restrictions and every country is free to claim ownership of outer space, while *res communis* has a concept that is more inclined to the understanding that space is humanity’s heritage, so that space can be used to produce the greatest benefits for the benefit of humanity²².

Utilization of natural space resources is the activity of utilizing natural resources found in outer space such as planets, asteroids, mineral rocks and satellites which are used for the benefit of humanity²³. Currently, the government is not one of the actors capable of carrying out space commercialization activities, but many private companies are participating in space commercialization activities.

Based on article VI of the *1967 Outer Space Treaty*, the state is obliged to ensure that national space activities must be carried out in accordance with the provisions of the *1967 Outer Space Treaty*, in other words *the 1967 Outer Space Treaty* has significant implications for the continuity of exploration and exploitation of natural space resources, this right is due to The state is obliged to permit and supervise every activity whether carried out by government or non-government²⁴.

The contents of article VI *Outer Space Treaty 1967* are²⁵:

“*State Parties to the Treaty shall bear international responsibility for nation activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that nation activities are carried out in conformity with the pro-vision set forth in the present Treaty. 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. When activities are carried on in outer space, including the moon and other celestial bodies, by an international organization, responsibility for compliance with this treaty shall be borne both by the international organization and by the state parties to the treaty participating in such organization*”.

(States party to the treaty will bear international responsibility for the activities of nations in outer space, including the moon and other celestial bodies, whether such activities are carried out by governmental bodies or by non-governmental entities, and for ensuring that such activities nations are carried out in accordance with the

22 Fadhel Muhammad Ikhwanasyah, “Efficiency of International Space Law”, Opinion, March 2022, Accessed on Sunday, January 30 2024, at 11:36 WITA . [Efficiency of International Space Law: Problems Behind the 1967 Outer Space Treaty - Faculty of Law \(uad.ac.id\)](#)

23 Ibnu Sina Chandranegara & Athari Farnani, “State Control over the Utilization of Natural Resources in Space According to the 1945 Constitution”, *Journal of the Constitution*, 2019.

24 Martin Svec, Pert Bohacek, & Nikola Schmidi, “Utilization Of Natural Resources In Outer Space: Social License To Operate as a Souch of Both Legality and Legitimacy”, *Oil, Gas & Energy Law*, 2020, p.4.

25 The United Nations General Assembly, “United Nations Treaties And Principles On Outer Space”, New York, 2002, p 5.

provisions set out in this Treaty. Activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and ongoing supervision by the contracting state in accordance with the treaty. When activities are carried out in outer space, including the moon and other celestial bodies, by international organizations, responsibility for compliance with this treaty shall be borne both by the international organization and by the states parties to the treaty participating in that organization).

The Moon Agreement 1979 regulates the use of the moon and other space objects to gain large profits. One example of the use of natural space resources is in the mining sector, for example mining carried out on the moon, with the aim of exploring the potential of precious metals such as gold and platinum, minerals, and water where water is one of the most valuable minerals in outer space²⁶.

Every country has the right or can freely carry out space research and exploration with the aim of being able to encourage international cooperation between one country and another. There is freedom for anyone to carry out space exploration and exploitation as explained in article I paragraph 2 of the 1967 *Outer Space Treaty* which explains that there are three most basic rights used in space, namely the right to freedom of access, the right to freedom to use, and the right to explore, so that a collaboration emerged between the 1967 *Outer Space Treaty* and the 1979 *Moon Agreement*. In *The Moon Agreement*, it is explained in articles 6 and 9 which contain²⁷:

Contents of Article 6 *The Moon Agreement* 1979:

1. *The shall be freedom of scientific investigation on the moon by all states parties without discrimination of any kind, on the basis of equality and in accordance with international law.*
2. *In carrying out scientific investigations and in furtherance of the provisions of this agreement, and states parties shall have the right to collect on and remove from the moon samples of its minerals and other substances. Such samples may remain at the disposal of those states parties which caused the to be collected and perhaps used by them for scientific purposes. State of such samples available to other interested stated parties and the international community for scientific investigation also use minerals and other substances of the moon in quantities appropriated for the support of their missions.*
3. *State parties agree on the desirability of exchanging scientific and other personnel on expedition to or installations on the moon to the greatest extent feasible and practical*²⁸.

It means:

1. Freedom of scientific investigation of the moon by all states parties without discrimination of any kind, on an equal basis and in accordance with international law.
2. In carrying out scientific investigations and in furtherance of the provisions of this agreement, States Parties have the right to collect and remove from the moon samples of minerals and other substances. Such samples remain in the hands of the party states that caused them to be collected and may be used by them for scientific

²⁶ The RAND Blog, "Governance in Space: Mining the moon and beyond", blog, accessed Sunday, January 29, 2024, at 8:40 p.m. [Governance in Space: Mining the Moon and Beyond | RAND](#)

²⁷ Regi Rivaldi & Neni Ruhaeni, "Regulation of Mining Activities on the Moon and Other Celestial Bodies According to the Agreement Governing The Activities Of State On The Moon And Other Celestial Bodies 1979 And Their Urgency For Indonesia", *Journal of Legal Studies*, Bandung Islamic University, 2016-2017, p. 6.

²⁸ Agreement Governing The Activities Of States On The Moon And Other Celestial Bodies, Article 6, p 78.

purposes. The state of these samples is available to other interested parties and the international community for scientific investigations as well as using minerals and other substances from the moon in allocated quantities to support their missions.

3. The parties agreed to the desire to exchange scientific and other personnel for expeditions to or installations on the moon to the extent feasible and practicable.

Contents of Article 9 The Moon Agreement 1979:

1. *State parties may stabilize manned and unmanned stations on the moon. A state party stabilizes a station shall use only that area which is required for the needs of the united state and shall immediately inform the secretary-general of the united nation of the location and purpose of that station. Subsequently, at annual intervals that state shall also inform the secretary-general whether the station continues in use and whether its purpose has changed.*
2. *Station shall be installed in such a manner that they do not impede the free access to all areas of the moon of personnel, vehicles and equipment of other state parties conducting activities on the moon in accordance with the provisions of this agreement or of article I of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies* ²⁹.

It means:

1. States parties can stabilize manned and unmanned stations on the moon. A State Party establishing a station may use only the area necessary for the needs of the United Nations and must promptly notify the Secretary-General of the United Nations of the location and purpose of the station. Furthermore, at annual intervals the country must also inform the secretary general whether the station continues to be used and whether its purpose has changed.
2. The stations shall be installed in such a way that they do not impede free access to all lunar areas, vehicles and equipment of other contracting states carrying out activities on the Moon in accordance with the provisions of this treaty or Article I of the Treaty on Principles Governing the Activities of States in Exploration and Use Outer Space, including the Moon and Other Celestial Bodies

The *1979 Moon Agreement* explains that the existence of space exploration and exploitation activities has been justified internationally and provides as much space as possible to carry out all forms of commercial space exploration activities, whether in the form of tourist trips, mining, etc. which are carried out independently, peaceful and can provide maximum benefits for the benefit of humanity. However, in the freedom of exploration released by *The Moon Agreement 1979*, there are restrictions that are given, namely that it is prohibited for loyal countries to continue research or exploration activities carried out in outer space, for example on the moon or other space objects, there is recognition of the ownership of their respective countries. -respectively for objects being researched or mined, this is not permitted in the rules of *The Moon Agreement 1979* ³⁰.

Apart from *the 1979 Moon Agreement*, *the 1967 Outer Space Treaty* also has prohibitions that are not permitted during exploration or research, such as placing “weapons of mass

²⁹ Ibid, p. 79.

³⁰ Regi Rivaldi & Neni Ruhaeni, Op.Cit.

destruction” or “nuclear weapons” in orbit around the earth and celestial bodies. Others, this is because weapons of mass destruction or nuclear weapons contain dangerous substances that can cause explosions or other damage to the orbit surrounding the earth and other celestial bodies in the vicinity. The weapons of mass destruction referred to in *the 1967 Outer Space Treaty* are objects or tools that can be used to destroy a particular object, for example an object that is a target in a mission³¹.

The regulation of natural space resources is based on the *1967 Outer Space Treaty* which aims to prevent the militarization of space, regulates the use of the moon and other celestial bodies, and aims to increase or promote international cooperation in space exploration. Based on *the 1967 Outer Space Treaty*, outer space and objects around it are free to be used for commercial purposes, meaning that activities must be carried out to generate profits for the benefit of all countries based on the principle of non-discrimination, there is a prohibition on ownership of space and space objects, providing licensing and continuously supervising all national activities, exercising jurisdiction and supervision over spacecraft including their crews, providing opportunities for states to carry out supervision using the principle of reciprocity, and providing responsibility in the form of compensation to other parties who are harmed if this occurs. unwanted problems³².

Apart from *the 1967 Outer Space Treaty*, *the 1979 Moon Agreement* also has regulations regarding the implementation of space activities such as the use of space, including the moon and other celestial bodies, can only be used for peaceful purposes, there is an obligation to protect space and other space activities, comply with all forms of procedures and requirements for the exploitation of natural resources in space, and registering spacecraft³³.

In space law, freedom to explore and utilize natural resources is within the scope of one sovereign state and another. In article 2 of *the 1967 Outer Space Treaty*, it is specifically explained that there is a prohibition for all countries regarding national ownership of outer space areas through claims of sovereignty, use, or other procedures. Space belongs to all countries together and cannot be controlled unilaterally in any way or for any reason. It is hoped that space use activities can be used as a blessing for all countries freely without any differences, provide opportunities for each country to explore and hopefully increase peace and international cooperation between one country and another.

The large number of private participation of private entities or bodies is something that is no longer common in the space sector, both in the fields of telecommunications, satellite services, earth observation, space commercialization such as space tourism, and so on. In its implementation, countries are currently starting to reduce costs for space, because to support the sustainability of space activities it is not possible to only rely on costs or budgets from each country, so countries emphasize or collaborate with private agencies in the sustainability of space commercialization. space³⁴.

31 Sachrizal Niqie S, “ Regulation of the 1967 Outer Space Treaty on Research Conducted by the United States on the Planet Mars”, Scientific Articles, April 2014, p.14.

32 Harold Anis & Stefan O. Voges, “ Regulation of Space Utilization According to the 1967 International Space Treaty”, Lex Administratum Journal, Volume IX, Number 7, July-September, 2021, p. 92.

33 Harold Anis & Stefan O. Voges, Ibid.

34 Agit Yogi Subandi, “ Responsibilities of Multinational Companies in Space Activities According to International Law and Space Law”, Bina Mulia Hukum Journal, Volume 1, Number 2, March 2017, p. 153 .

Before making capital investments, private companies pay attention to various elements and aspects, for example projects that have a long period of time, the transfer of funds, obtaining regular income, participation from parties making the transfer such as the government collaborating with private parties, and a business risks and if all elements and aspects have been fulfilled then the private sector can invest. Examples of private entities that have participated in the use of space include *Qatar Telecom Group*, *Singapore Telecommunication Technologies*, *Hutchison Whampoa*, *Virgin Galactic*. These companies focus on the communications sector, which shows that there are many private entities that provide telecommunications services ³⁵.

The increasing participation of private bodies, *the 1967 Outer Space Treaty* and *the 1979 Moon Agreement* only regulate countries carrying out space commercialization activities so that the *1967 Outer Space Treaty* and *the 1979 Moon Agreement* do not yet have specific regulations to regulate the activities of private bodies carrying out activities. space commercialization. As a result of the absence of regulations that specifically regulate private entities, countries currently utilizing space have created and ratified their national laws to support space activities, for example the United States, with its national law, namely *Commercial Space. Launch Competitiveness Act (CSLCA)* which was created in 2015 which regulates commercial space launch activities in the United States, Russia with its law, namely *the Regulation Of Russian Federation On Space 2004*, Japan with *the Fundamental Act Of Outer Space Treaty 2008*, and many other countries ³⁶.

In the development of each country's national law in regulating space activities, both carried out by government agencies and non-government agencies such as the private sector, it has the potential to cause disputes between countries due to claims over space ownership as a result of freedom in space exploration. without restrictions and discrimination from any country and in any way. In the process of claiming property rights, countries create national laws that regulate space activities as well as regulate the claim of property rights to space. The national law not only regulates government agencies, but also regulates private companies and provides permits for the continuation of space use activities.

The continued use and utilization of space activities is carried out in various fields, such as telecommunications, remote sensing, mining, and most recently, space tourism with the aim of landing on the moon. In the mining sector, there are many natural resources that can be extracted, such as firstly *Type C Asteroids* which have quite abundant water content and contain organic carbon and phosphorus, *secondly Type S Asteroids* which contain lots of metals such as nickel, cobalt and metals such as gold. , platinum and rhodium, and the third is *Type M Asteroids* which contain up to 10 times more metal than Type S Asteroids ³⁷.

³⁵ Ibid, p. 152.

³⁶ European Space Agency, "Space In Member State", Esa Website, Accessed Monday, 26 February 2024, at 22:23 WITA. [ESA - Member States & Cooperating States](#).

³⁷ <https://www.cnnindonesia.com/technology/20210805065254-199-676594/3-jen-tambang-asteroid-yang-bisa-buat-warga-bumi-kaya-raja>.

Private companies have designed satellites, robotics and sophisticated technology to support mining activities carried out in outer space. Several companies already carrying out mining activities are ³⁸:

1. Karman
2. TransAstra
3. AstroForge
4. Asteroid Mining Corporation
5. Origin Space

Japan's law on space is *the Fundamental Act Of Outer Space Treaty 2008* has given permission to private parties to participate in space use activities, this is stated in *Article 10 of the Fundamental Act of Outer Space Treaty Number 43 of 2008* which reads ³⁹:

“Mutual cooperation among the national government, local public organizations, universities, and private business entities will be able to efficiently promote space use and exploitation. Taking this into consideration, the national government shall take policies and measure necessary to strengthen the cooperation among these participants “

(Mutual cooperation between the central government, local public organizations, universities and private business entities will be able to encourage efficient use and exploitation of outer space. Taking this into account, the central government must take the necessary policies and steps to strengthen cooperation among the participants).

In the freedom to explore space as regulated in *the Outer Space Treaty 1967 and The Moon Agreement 1982* , there are principles of international law which are used as a reference in terms of space activities, namely the principle of *Non-Appropriation* which states that every country has the right to explore and exploit space. However, on the other hand, as a result of the freedom of all countries to explore space without any discrimination, a new interpretation of the principle of *Non-Appropriation has emerged* .

Non-Appropriation Principle states that space and other celestial bodies cannot be recognized for their ownership by any country because there is no sovereignty in space. However, along with the activeness of countries and private bodies that have begun to carry out space use activities, the interpretation of the principle of *Non-Appropriation* is slowly changing because there are no restrictions on the use and exploration of space, which has led to countries becoming pioneers in its use. space can claim ownership of space, this is because pioneer countries carry out continuous space exploration without any restrictions and prohibitions, so that there is the potential for violations of the *Non-Appropriation principle* and ignoring the meaning of the *Non-Appropriation principle*.

The principle of *Non-Appropriation* is now increasingly being challenged, this is due to state practices involving private entities and the absence of specific regulations governing the participation of private entities in space activities. Logically, there is no regulated portion of outer space which could then be a reason for countries to claim ownership of outer space. Article II of the *1967 Outer Space Treaty* states that “ *Is not subject to national appropriation by claim of sovereignty, by means of use or occupation by any other means* “. The meaning of this article states that this principle stipulates

³⁸ Margo Steines, “ Top 5 Space Mining Companies ”, Aerospace Website, June 2023, accessed on Monday, February 26 2024, at 22:56 WITA. [Top 5 Space Mining Companies | Built In](#).

³⁹ Japan, Fundamental Act Of Outer Space Treaty 2008, No. 43, p. 4.

that outer space cannot be claimed for its ownership as belonging to a particular party, whether from claims of sovereignty, effective control, or in other ways ⁴⁰.

Non-Appropriation Principle carries the implication that there is a debate about natural space resources, new technological advances that open up commercial prospects in a country. There is a fairly rapid surge in space activities funded directly by private agencies to mine objects such as the moon, Mars and other objects, especially near-Earth asteroids. *The 1967 Outer Space Treaty* regulates prohibitions for states but not private entities participating in these countries and this gives rise to the prejudice that states may heed their obligations and take cover behind private or *non-government entities* ⁴¹.

1. Space Commercialization Issues in Indonesian National Law

Space law is a field of law that is still relatively little known among the wider community in Indonesia, because not all Indonesian people learn about space. Currently, technological development has developed very rapidly, and various countries are looking at the use and utilization of space which can generate profits and can prove the strength that each country has in its technological progress ⁴².

Advances in space science and technology are currently not only used for research and military purposes, but currently the use of space resources is used to meet human needs. As the goals of space utilization shift, the number of actors involved in space use increases, this shows that humans and space have begun to enter the commercialization stage. Commercialization is all forms of activities carried out in space with the aim of generating profits, whether in the form of operating communications satellites, remote sensing , mining and most recently space travel for recreational purposes ⁴³.

Space tourism is considered one of the profitable business opportunities in the era of globalization, this is characterized by the participation of private companies in carrying out space activities, for example *Space Adventures* , a company from the United States founded in 1998 that operates in the field of space travel tourism. space based in Vienna, Virginia, United States. Apart from *Space Adventures* , the private company *Virgin Galactic* is also engaged in space tourism which was founded in July 2005 by Burt Rutan from the *Scaled Composite company* and Richard Brason from the *Virgin Group company* and these two companies formed a collaboration to form a spacecraft company known as *The Spaceship Company* ⁴⁴.

Space commercialization involving the private sector is increasing, especially in developed countries that have adequate space technology capabilities and each country has legal instruments that regulate its respective space activities. Developing countries that want to carry out commercialization activities currently still have limitations in the fields of technology, finance or costs, and human resources ⁴⁵.

40 Hesti Septiani,&Et.All, "The Principle of Non-Appropriation of OuterSpace in the Commercialization of Space by Private Corporations", Pasundan University Bandung research report, 2021, p. 22.

41 Ibid, p. 26.

42 Erik Seedhouse, " Spaceports Around The World A Global Growth Industry"; (Springer, 2017), p. 1.

43 Niken Tyasworo & Nana Jumena, "Company Responsibility in Space Commercialization and Its Implications for the 1967 Outer Space Treaty (Study on Space Tourism)", *Journal of International Law*, Volume 2, Number 2, 2021, p. 133.

44 Hesti Puji Lestari, " Getting to know Virgin Galactic, a space tourism company whose services are more expensive than OceanGate ", *Bisnis Com Blog*, July 2023. Accessed on Sunday, 14:58 WITA. <https://technology.bisnis.com/read/20230702/84/1670790/mengenal-virgin-galactic-corporate-wisata-ruang-angkasa-yang-services-more-expensive-than-oceangate>

45 Nuriyah Fara Muthia, " The Effect of Space Commercialization Activities on the Increase in Space Debris (The Effect of Space Commercialization on the Increasing of Space Debris)", Thesis, Faculty of Law, Hassanudin University,

Currently, Indonesia has encouraged various collaborations in the use and exploration of outer space for peaceful purposes, both in the fields of space technology, disaster management and sustainable development (SDGs). The process of advancing space technology requires many factors to achieve sustainable space activities. The existence of national strength factors supported by Indonesia's strategic position is a good asset to support Indonesia's cooperation capabilities.

In 1963, Indonesia formed an agency which became the starting point for the continuation of research and development of Indonesian space technology, and the agency was named the National Institute of Aeronautics and Space or better known as LAPAN. Indonesia's first success in the world of space was the success of making the first rocket, namely Kartika-1, which was made by the Initial Scientific and Military Rocket Development (PRIMA). After this success, LAPAN continued to carry out research and experiments in order to create space technology⁴⁶. However, obstacles were found in the development of space technology carried out by LAPAN, starting from a lack of budget or funds regarding space activities, research projects that could not be carried out, and a lack of support from the government.

1976 was a historic year for Indonesian citizens, because in 1976 Indonesia was able to become the first country to operate a telecommunications satellite. In its first success, Indonesia has ratified 3 principles in international law which are used as guidelines for the use of space, such as *the Outer Space Treaty of 1967*, *The Space Liability Convention of 1972*, and *The Registration Convention of 1975* as a form of good faith and state responsibility towards activities. the space. The continuation of this ratification is a sign of the state's readiness to be responsible for all forms of damage and loss that can be caused by Indonesian legal entities, both government and non-government entities⁴⁷.

Indonesia's first private telecommunications satellite that was successfully launched was the Cakrawala Satellite (Indostar) which is a satellite owned by PT. Media Citra Indostar (MCI) is used for broadcasting. Not only as satellite users, Indonesian private companies also participate in the development of satellite manufacturing technology carried out by PT. Pasifik Satellite Nusantara (PSN) is supported by financing from *Export Development Canada* (EDC), which is a Canadian credit institution. The PSN satellite was built by *Loral Space Systems*, a satellite manufacturing company from the United States. Activities carried out by PT. Pasifik Satellite Nusantara can be said to be a continuation of commercialization activities, because there is an element of profit from the transfer of goods and services⁴⁸.

In 2007 LAPAN succeeded in orbiting its first satellite, named Lapan Tubsat or Lapan A1, this satellite is a microsatellite that succeeded in collaboration between LAPAN and the University of Berlin. In 2015, LAPAN under President Jokowi's administration was encouraged to continue developing and experimenting with advances in Indonesian

Makassar, 2023, p. 47.

46 Sukma Raga, "Indonesia's Interest in Space Utilization Cooperation with China 2015-2020", Thesis, Yogyakarta Muhammadiyah University, 2016, p. 2.

47 Online Law, "The Indosat Polemic and State Responsibility in the Perspective of Space Law", published 19 November 2015, accessed on Monday, 5 February 2024, at 01:12 WITA. <https://www.Hukumonline.com/berita/a/polemik-indosat-dan-respons-respons-negara-dalam-perspekti-Hukum-angkasa-lt564da5bb07046>.

48 Online Law, "The Indosat Polemic and State Responsibility in the Perspective of Space Law", published 19 November 2015, accessed on Monday, 5 February 2024, at 01:12 WITA. <https://www.Hukumonline.com/berita/a/polemik-indosat-dan-respons-respons-negara-dalam-perspekti-Hukum-angkasa-lt564da5bb07046>

national space technology. This is marked by the creation of the Lapan A2 micro satellite which can be used to observe and monitor Indonesia's territorial areas. To maximize the function of the Lapan A2 satellite, LAPAN collaborates with ORARI (Indonesian Amateur Radio Organization) to assist Indonesia in monitoring ship traffic, maritime security operations, fisheries and exploration of Indonesian marine resources via radio waves ⁴⁹.

After the successful launch of the Lapan A2 satellite, Indonesia began launching the Lapan A3 satellite which is used to observe agricultural areas to monitor, integrate and manage data regarding climate and seasons in agricultural areas, especially in the areas of Sumatra and Kalimantan which are currently being widely opened. The A3 satellite has the ability to predict seasons and can predict rain and wind that will cross Indonesia, which can be accessed by farmers to meet their farming schedule needs ⁵⁰.

After experiencing developments, in March 2022 Indonesia built the National Research and Innovation Agency (BRIN) through *Indonesia Space Agency* (INASA), which is an Indonesian space agency engaged in activities related to outer space and space exploration policy, represents Indonesia as a delegate at the UNCOPUOS committee meeting in 2022 and Indonesia has also become an active member. Indonesia's participation in the sustainability of space resource utilization activities can be seen from Indonesia's activeness in various sessions and activities aimed at building progress in space science and technology globally and taking advantage of opportunities for the sustainability of Indonesia's space development ⁵¹.

BRIN has the main task of coordinating with various agencies related to space, both government and non-government. The coordination carried out by INASA is related to the readiness of the Indonesian delegation for Indonesia's participation in the Peaceful Use of Space, such as trials, *working groups*, etc. Indonesia has 3 discussion focuses related to utilization, namely regarding the *Definition and Delimitation of Space*, *Geostationary Orbit* (GSO), and *Small Satellite Activities*. ⁵²

In these three discussions, the first concerns the definition and limitations of outer space, it is necessary to determine a jurisdictional limit of 100-110 KM based on the maximum altitude of the aircraft, the lowest altitude of the spacecraft, and the scientific characteristics of the atmosphere. Then secondly, regarding GSO, *it is hoped that it can be implemented fairly and evenly to take into account the interests of countries, especially countries that have the natural characteristics of GSO. And thirdly, developing countries need more activities or use of small satellites, therefore access to activities from these satellites must be guaranteed, taking into account the development and conditions of mega-constellations and space debris* ⁵³.

Indonesia already has a national law that regulates space commercialization activities, these activities are regulated in Law number 21 of 2013 concerning Space.

49 Sukma Raga, Loc.cit p. 8.

50 Ibid, p. 10.

51 Indonesian Research and Innovation Agency, "The Role of the Indonesian Space Agency (INASA)-BRIN at the International Level", published 16 June 2022. Accessed on Sunday, 4 February 2024, at 22:36 WITA. <https://www.brin.go.id/news/106181/peran-indonesia-space-agency-inasa-brin-di-angkat-internasional>.

52 National Research and Innovation Agency, "Through Nasa, BRIN Takes Part in Handling National Space Administration", published on May 12 2022. Accessed on Sunday, February 4 2024, at 22:50 WITA. <https://www.brin.go.id/news/103853/via-inasa-brin-rut-menangani-pengelenggaraan-keantariksaan-internasional>.

53 Ibid

Article 7 of Law number 21 of 2013 concerning Space explains that space activities include space science, remote sensing, mastery of space technology, launches and space commercialization activities. Regarding space commercialization activities, it has been explained in article 37 paragraphs (1) and (2) which contains ⁵⁴:

1. Space commercialization activities as intended in article 7 paragraph (1) letter e can be carried out by legal entities established under Indonesian and foreign laws.
2. Provisions regarding the requirements and procedures for space commercialization activities as referred to in paragraph (1) are regulated in Government Regulations.

To support space use activities, Indonesia has a vision and mission that have been regulated in the Attachment to the Presidential Regulation

Number 45 of 2017 concerning the Master Plan for the Implementation of Space, which includes ⁵⁵:

1. Strengthen research and development in the field of space and atmospheric science research and its utilization.
2. Strengthening the implementation of remote sensing.
3. Strengthen research, development and engineering of aviation and space technology as well as utilization towards national independence.
4. Building independence in launching space vehicles through the development of spaceports in Indonesian territory.
5. Encourage space commercialization activities by involving national industry.

The policies implemented to support efforts to achieve the vision and mission of space management include:

1. Mastery of space science through the advancement of space science, including world class atmospheric science in Indonesia.
2. The implementation of remote sensing through the implementation of world-class remote sensing based on meeting national needs, among other things, is carried out through cooperation.
3. Mastery of space technology through advancing mastery of rocket technology, satellite technology, aeronautical technology and national industry based on meeting national needs, among other things, is carried out through cooperation.
4. Organizing launch activities through the construction and operation of space airports including research airports in the territory of the Unitary State of the Republic of Indonesia by involving ministries or non-ministerial government institutions and related regional governments.
5. Growing space commercialization activities through the participation of state-owned enterprises, the industrial and private sectors.

To encourage commercialization of Indonesian space activities by involving national industry, the government is processing a Draft Government Regulation (RPP) which is divided into three, namely the first RPP Space Technology Control which includes permits for the development of rocket technology, technology protection including supervision of imported sensitive technology, list of sensitive technologies, and standards for design, production, testing and operation of spacecraft, the second RPP for Space

⁵⁴ Republic of Indonesia, Law Number 21 of 2013 concerning Space, page 6.

⁵⁵ Republic of Indonesia, Attachment to Presidential Regulation of the Republic of Indonesia Number 45 of 2017 concerning the Master Plan for the Implementation of Space for 2016-2040, *ibid* p. 7.

Commercialization Activities aims to grow industry in the space sector, encourage the entry of commercial investment in the space sector from state-owned enterprises, the industrial sector, private parties both nationally and internationally, and the third is the RPP for the Development and Operation of Spaceports which relates to responsibility for launching satellites in Indonesian territory and the rules for ongoing launch operations⁵⁶.

Regarding launch activities through the construction and operation of a spaceport, Indonesia, through its institution, namely LAPAN, has succeeded in building a small class Sonda rocket launch station in the Cilautereun area, Pameungpeuk District, Garut Regency, West Java. The facilities at the rocket launch station are equipped with permanent and mobile launchers which are used for rocket testing. However, currently the location is densely populated so it is no longer possible to launch a rocket⁵⁷.

The development of a spaceport in Indonesia can produce many benefits which can have positive implications for various sectors, such as the economic sector, technology and industrial sectors. Apart from that, space airports also have benefits for foreign policy, such as holding the *3rd Space Economy Leaders Meeting (Space20)*, where the meeting discussed increasing global space cooperation. At the 62nd session of *the United Nations Committee On The Peaceful Uses Of Outer Space (UNCOPUOS)* in Australia, Indonesia and 92 other countries agreed on a policy to guide the peaceful use of outer space⁵⁸.

The construction of a spaceport is a mandate from Law Number 21 of 2013 concerning space, article 44, which is mandated to LAPAN and BRIN as the institutions that handle space activities. The spaceport development plan must be within the sovereign territory of the Unitary State of the Republic of Indonesia and this development plan has been included in the Master Plan for Space Administration for 2016-2040 with a target that by 2040 Indonesia will have and be able to operate its own spaceport. LAPAN itself has an observation station, a space tracker and 100 hectares of land in the North Biak village area, Papua which is planned to be used as a location for the construction of an Indonesian spaceport⁵⁹.

In addition to building a spaceport, to support Indonesia towards a Golden Indonesia by 2045, Indonesia already has work programs related to space, this is explained in the Attachment to Presidential Regulation Number 45 of 2017 concerning the Master Plan for the Implementation of Space which is targeted for a period of 25 years which starts from 2016 to 2040. The space management planning programs that Indonesia has designed to face space commercialization are divided into three time periods, namely short term, medium term and long term⁶⁰.

Currently, Indonesia has entered the medium-term Space Administration Master Plan which runs from 2016 to 2030 and the Long-term Space Administration Master Plan which starts from 2016 to 2040. The annual targets of the medium-term and

⁵⁶ Auditor, "Indonesia is Creating Three Government Regulations to Support Space Progress", Antara Website, November 2020, Accessed on Monday, February 26 2024, at 01:54 WITA. [Indonesia is making three PPs to support space progress - ANTARA News](#)

⁵⁷ Indirita Hardiana & Ghafardan Fikrana, "The Idea of Building a Spaceport in Indonesia", Secretariat of the Cabinet of the Republic of Indonesia, published 26 November 2022. Accessed on Sunday, 11 February 2024, at 22:56 WITA. <https://setkab.go.id/gagasan-pembangunan-bandar-antariksa-di-indonesia>.

⁵⁸ Indirita Hardiana & Ghafardan Fikrana, *ibid*.

⁵⁹ Indirita Hardiana & Ghafardan Fikrana, *ibid*.

⁶⁰ Republic of Indonesia, Attachment to Presidential Regulation of the Republic of Indonesia Number 45 of 2017 concerning the Master Plan for the Implementation of Space for 2016-2040, *Loc.cit*, p. 19.

term Space Administration Master Plan Long, namely focusing on the development of space science, remote sensing, mastery of space technology such as rockets, satellites, aeronautics, launches, and space commercialization activities such as tourist trips to space⁶¹. In the annual targets of the Master Plan for Space Management, one of them is remote sensing which has been carried out and plays an important role and supports the survival of humanity in various fields including natural resource management, environmental protection, and many more⁶².

In order to formulate space management policies, Indonesian national law needs to consider various issues such as environmental conditions such as the impact of space debris resulting from space activities, strategic regional conditions including politics and law, the influence of global economic developments, developments in science and technology, technology, and opportunities for regional and global cooperation. In efforts to prepare strategies or plans to develop and increase the use of space, space management needs to pay attention to basic capital which includes natural resources, human resources, geographical position, mastery of space technology, and capabilities in space activities.

Indonesia has prepared plans to maximize the use of outer space which have been regulated in the Attachment to Presidential Regulation Number 45 of 2017 by considering the basic capital and strategic environment. The plans contained in the Attachment to Presidential Regulation Number 45 of 2017 are the government's efforts to encourage progress in space technology, such as the development and improvement of technology in the fields of space science, remote sensing, the use of space technology such as rocket launches and aeronautical technology, and space commercialization activities in terms of spacecraft business development⁶³.

Government Regulation Number 7 of 2013 concerning Control of Space Technology covers the control and protection of space technology, security and safety standards and procedures in mastering space technology and the role of the community in mastering space technology. The progress of science and technology is currently growing, one of which is Information Communication Technology (ICT) which involves a collection of current technologies which are often referred to as the Internet of Things (IoT)⁶⁴. IoT broadly refers to an ecosystem such as objects, devices, end nodes that are interconnected and equipped with communication, computational sensing and actuation capabilities. One example of IoT development is the Honeycomb Sandwich Panel which is a new construction that has advantages such as light weight, high compression strength, environmental friendliness, water resistance, and many more⁶⁵.

61 Republic of Indonesia, Attachment to Presidential Regulation of the Republic of Indonesia Number 45 of 2017 concerning the Master Plan for the Implementation of Space for 2016-2040, Loc.cit, pp. 44-54.

62 Zunnuraeni, Minollah, & Et.all, " Regulation of Remote Sensing in International Law and Protection of the Sovereignty and Interests of Developing Countries ", Journal of Aviation and Space Policy Studies, Volume 1, Number 1, April 2020, p. 51.

63 Republic of Indonesia, Attachment to Presidential Regulation of the Republic of Indonesia Number 45 of 2017 concerning the Master Plan for the Implementation of Space for 2016-2040, Loc.cit, p. 14.

64 Jonathan Kua, Seng W. Loke, & Et. All, " Internet of Things in Space: A Review Of Opportunities and Challenges from Satellite-Aided Computing To Digitally-Enhanced Space Living ", Website of the National Library of Medicine National Center For Biothecnology Information, accessed on Tuesday, March 19 2024, at 21:29 WITA. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8662413/>

65 Polypropylene Honecomb Sandwich Panel , HolyCore Website, Accessed on Tuesday, March 19 2024, at 21:24 WITA. <https://id.holycorematerial.com/honeycomb-panel/pp-honeycomb-panel/polypropylene-honeycomb-sandwich-panels.html>

Based on Government Regulation Number 7 of 2023 concerning Mastery of Space Technology, conventionally it consists of 6 (six) main systems, namely ⁶⁶:

1. Earth Control Segment (*Ground Control Segment*)
2. 3C Connection Segment (*Command, Control, and Communication link segment*)
3. Space Segment (*Space Segment*)
4. Data Connection Segment (*Data Link Segment*)
5. User Segment (*User Segment*)
6. Launcher Segment (*Launch Segment*)

To pursue their national goals in the space sector, countries have two ways to go, namely entering as members of the relevant unilateral regime or assisting with national regulations regarding ensuring the security and safety of sensitive space technology. Especially for Indonesia, the provision of space sensitive technology is a major obstacle, because Indonesia is not a member of the unilateral regime on the grounds that the regime is not under the purview of the United Nations (UN), and the implementation of the regime is not yet in line with Indonesian national law, especially customs law and the procurement system. government goods and services ⁶⁷.

In the ongoing space commercialization activities, currently there is still little involvement of private companies in the world of Indonesian space. This is different from the practice of other countries, one of which is India, which is a developing country, but in the space sector, India is one step ahead compared to other developing countries, for example Indonesia. In India, the involvement of private companies in the sustainability of space activities has increased. In 2019, the Indian space industry contributed \$7 billion or 2 % of the global space industry, so *Antrix Corporation* , which is a private company, estimates that this industry will grow to \$50 billion by 2024 if given the right policies and support. The names of private space companies or startups owned by India which currently have the highest ranks supporting space activities are *Skyroo Space* which specializes in launches, *Bellatrix Space* which focuses on research, development and orbital maneuvers, *Dhruva Space* which covers satellite platforms, launch solutions, orbital deployment and ground services, *Pixels* focused on capturing images of the earth from orbit, and many others ⁶⁸.

Apart from India, Japan has also given permission to private companies to participate in space use activities, one of the companies operating in the space sector is *ISPACE* which is a company that develops global resources with the vision of “Expanding Our Planet, Expanding Our Future” which functions specifically to design and build a moon landing with the aim of expanding and creating a sustainable world by providing high frequency and low cost transportation services to the moon ⁶⁹. Regarding the promotion of activities related to the exploration and development of space resources, it has been regulated in the *Act on the Promotion of Business Activities for the Exploration and*

⁶⁶ Government Regulation, Government Regulation Number 7 of 2023 concerning Mastery of Space Technology, pp. 31-32.

⁶⁷ Ibid .

⁶⁸ Space Impulse, “Top Private Space Companies in India and Industry Landscape”, Article Space Impulse, July 2023, accessed on Monday, February 26 2024, at 03:07 WITA. [Top Private Space Companies in India & Industry Landscape \(spaceimpulse.com\)](https://spaceimpulse.com)

⁶⁹ Website, “Ispace Receives License To Conduct Business Activity on The Moon From Japanese Government” Article Ispace, accessed on Monday, February 26 2024, at 03:25 WITA. [ispace Receives License to Conduct Business Activity on the Moon from Japanese Government | ispace \(ispace-inc.com\)](https://ispace-inc.com)

Development of Space Resources 2021 which regulates a clear legal framework related to Japan's space commercialization activities ⁷⁰.

D. CONCLUSION

1. Space commercialization is not specifically regulated in the *1967 Outer Space Treaty* and the *1982 Moon Agreement*. However, space commercialization activities must be based on international principles contained in the *1967 Outer Space Treaty*, namely the principle of *Non-Appropriation* and the principle of *Freedom of Exploration*. However, this principle is not yet able to cover the regulation of all space commercialization activities due to the increasing involvement of private agencies in the sustainability of space activities.
2. Indonesia already has a number of regulations and policies as a basis for regulating space commercialization activities, such as Law number 21 of 2013 concerning outer space, Presidential Regulation Number 45 of 2017 concerning the Master Plan for the Implementation of Space, and most recently Government Regulation Number 7 of 2023 concerning Control. Space Technology. Provisions on space technology are one of the obstacles for Indonesia because Indonesia is not a member of the unilateral regime on the grounds that the regime is not under the purview of the United Nations (UN), and the implementation of the regime is not yet in harmony with Indonesian national law, especially customs law and the goods and services procurement system. government.

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⁷⁰ Japan, *Act On The Promotion Of Business Activities for the Exploration and Development of Space Resources*, December 2021.

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