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Cover Page Footnote

GEOSTATIONARY ORBIT SLOT RECONCEPTUALIZATION IN ACCOMODATING THE SOUTH Yaries Mahardika Putro , Ridha Aditya Nugraha , Taufik Rachmat Nugraha Abstract Geostationary Orbit (GSO) located above the equator is deemed as limited resources with strategic position for satellites in outer space. As today, the majority who possess GSO slots are non-equatorial states, in this context developed countries. The distribution of orbital slots in the GSO has been discussed among scholars from the developing states for decades. In the past, the developing states ever formed the “Bogota Declaration” aimed to ensure the developing states possess special rights over the GSO slot. The declaration arose from the distribution of the GSO slot by unequal treatment and dissatisfaction to the International Telecommunication Union (ITU) in global governance context. Concurrently the distribution of the GSO slot is based on a first-come-first-serve basis, recalling satellite technology development in the developing states is crawling; in contrast with developed states in which their satellite technologies are snowballing. This fact commonly disadvantages the developing states in many ways, they have an enormous risk of potential satellite re-entry as an accident for the developing states, equatorial states, and they have limited access to put their satellite above their skies. This article strives to provide recommendation that GSO slot distribution should lead to an unorthodox approach, namely to ensure developing countries have equal rights to GSO. The findings of this study argue that the current international space law regime is excessively “western-centric” and fails in accommodating developing countries’ interests. The special and differential treatment principle could serve as a basis for granting special rights to developing countries to utilize the GSO. Keywords: Developed countries, developing countries, geostationary orbit, satellites. This manuscript submit for Third World Approach International Law (TWAIL) Call for Paper Faculty of Law, Universitas Surabaya Air and Space Law Studies - International Business Law Program, Universitas Prasetiya Mulya The Indonesian Centre for the Law of the Sea (ICLOS) the Faculty of Law, Universitas Padjadjaran

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GEOSTATIONARY ORBIT SLOT RECONCEPTUALIZATION IN ACCOMMODATING THE SOUTH

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Abstract

Geostationary Orbit (GSO) located above the equator is deemed as limited resources with strategic position for satellites in outer space. As today, the majority who possess GSO slots are non-equatorial States, in this context developed countries. The distribution of orbital slots in the GSO has been discussed among scholars from the developing States for decades. In the past, the developing States ever formed the "Bogota Declaration" aimed to ensure the developing States possess special rights over the GSO slot. The declaration arose from the distribution of the GSO slot by unequal treatment and dissatisfaction to the International Telecommunication Union (ITU) in global governance context. Concurrently the distribution of the GSO slot is based on a first-come-first-serve basis, recalling satellite technology development in the developing countries is crawling; in contrast with developed countries in which their satellite technologies are snowballing. This fact commonly disadvantages the developing countries in many ways, they have an enormous risk of potential satellite re-entry as an accident for the developing countries, equatorial States, and they have limited access to put their satellite above their skies. This article strives to provide recommendation that GSO slot distribution should lead to an unorthodox approach. The cosmopolitanism approach might be breakthrough to resolve this issue. The findings of this study argue that the current international space law regime is excessively "western-centric" and fails in accommodating developing countries' interests. The special and differential treatment principle could serve as a basis for granting special rights to developing States to utilize the GSO.

Keywords: *Developed countries, developing countries, geostationary orbit, satellites.*

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I. INTRODUCTION

At the dawn of outer space activities, such dimension was used solely to demonstrate an ideology's superiority over a State. This is reflected in the occurrence of the cold war between the Soviet Union and the United States. To avoid undesirable activities occurring in outer space, the Outer Space Treaty (OST) was signed in 1967 to ensure that all activities conducted in outer space are conducted peacefully and benefit all humanity. As a result, the outer space is no longer used to demonstrate the two countries' superiority to one another;

rather, it is used to meet the needs of humanity on Earth. One of the first stages were the establishment of communication and weather observation satellites.

Other than the Soviet Union and the United States, countries developed each other's technology in order to launch satellite technology into earth orbit. At least four orbits can be used as satellite trajectories: low earth orbit, medium earth orbit, highly elliptical orbit, and geostationary orbit (GSO).[1] The latter is one of the four orbits that is distinct and advantageous in comparison to the other orbits. The GSO commonly used for telecommunication and weather satellite that need a static orbit following the area beneath with the orbital period is identical to earth orbit.[2] This area are hugely benefiting for the operational cost of satellite and the accuracy of data transferring from satellite to ground station and *vice-versa.* The GSO's location directly above the equator benefits countries near the equator such as Indonesia, Brazil, Zaire, Kenya, Columbia, and Ecuador by allowing them to utilize the area for their own benefit. As a result, the equatorial countries negotiated special rights for their countries to use GSO in 1976. The negotiations resulted in a non-binding legal instrument, namely the Bogota Declaration of 1976, with the primary objective of endowing equatorial countries with sovereign rights over the use of GSO. However, this has developed into a polemic, as the OST 1967 stipulates that space is a province of all mankind with no States having the right to own it.

The issue of granting special rights to equatorial countries is still being debated at the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) session to this day. Numerous publications and studies have also examined the GSO's legal status and application to developing countries, particularly those located near the equator.[3] Even, amid Legal subcommittee UNCOPUOS delegation from Colombia noted that the Bogota Declaration 1976 signatories' countries was carefully considering 'with the proper care and seriousness the definition of outer space and the special regime called for by phenomenon of the geostationary synchronous orbit.'[4]

A point of view appears that GSO is a limited natural resource, given the times and the need for countries to be able to obtain a slot in GSO orbit. It is

[1] Adhy Riadhy Arafah, "Sovereign Right Claim on Geo Stationary Orbit (GSO)," *Indonesia Law Review* 2, no. 2 (2012): 163, https://doi.org/10.15742/ilrev.v2n2.16.

[2] Everett C. Dolman, "Geostrategy in the Space Age: An Astropolitical Analysis," *Journal of Strategic Studies* 22, no. 2–3 (1999): 83–106, https://doi.org/10.1080/01402399908437755.

[3] Agama Ferdinand Onwe, "Effects of the Bogota Declaration on the Legal Status of Geostationary Orbit in International Space Law," *Nnamdi Azikiwe University Journal of International Law and Jurisprudence* 8, (2017): 24–34.

[4] UNCOPUOS Legal Subcommittee, *UN Doc. A/AC.L05/C.2/SR.Pdf 1977*, availaible at https://www.unoosa.org/pdf/transcripts/legal/AC105_C2_SR270E.pdf.

appropriate to devise legal and technical provisions governing the use of GSO in accordance with the International Telecommunication Union (ITU) rule of law based on the principles of "efficient and economical use" and "equitable access", as well as on the provisions of "common interests" mandated by the OST 1967 in order to accommodate the interests of equatorial and third countries.[5]

Additionally, the "first come, first served" principle enshrined in the ITU Convention against GSO only provide benefits to developed countries with advanced space technology. Equatorial countries, which are also developing countries, are adamant about obtaining special rights to GSO due to their geographical advantages. The concept of sovereign rights for countries in the Economic Exclusive Zone (EEZ), as codified in the Law of the Sea Convention (LOSC 1982), may provide an avenue for equatorial countries to assert sovereignty in the GSO.[6]

This article tries to provide a new perspective on how the use of outer space, in this context the GSO, can be used fairly for developing countries through a cosmopolitanism approach. Cosmopolitan derived from Greek word "*cosmos"* mean world and *"polites"* mean citizen, in short a cosmopolitan mean a citizen of the world.[7] The cosmopolitanism is a view that strengthening the value of inclusiveness and universality. Correlating the cosmopolitanism to the current space activities, the situation is contradictory whereas the current space activities and its benefit only enjoyed by the developed countries. By examining the space activities through cosmopolitanism lens it will encouraging the developing countries to received equal opportunities and benefits from space activities as in line with the Article 1(1) OST 1967.[8]

Therefore, this article provides solution to utilize the GSO by developing countries through special rights which based on the special and differential treatment principle. As implemented at the World Trade Organization (WTO), the concept of special and differential treatment exclusively belong to developing countries in order to close the gap between developed and developing countries. Also, the application of special rights for developing countries will encourage developing countries to develop its participation in space activities. Therefore, the equitable access notion on ITU Convention

[5] Stephen Gorove, "The Geostationary Orbit: Issues of Law and Policy," *The American Journal of International Law* 73, no. 3 (1979): 444–61.
[6] Arafah, "Sovereign Right Claim on Geo Stationary Orbit (GSO)," 163.
[7] Thomas Pogge, "Cosmopolitanism: A Path to Peace and Justice," *Journal of East-West Thought* 4, no. 1 (2012): 5.
[8] United Nations, "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies," January 27, 1967, https://www.unoosa.org/pdf/gares/ARES_21_2222E.pdf.

1973[9] for utilizing the GSO will be achieve.

II. GEOSTATIONARY ORBIT AT A GLANCE

The GSO is located above the equatorial line with approximately 35786 kilometers[10] above the earth surface.[11] The GSO has approximately located within inclination 0º or in equatorial area.[12] This area are hugely benefiting for the operational cost of satellite and the accuracy of data transferring from satellite to ground station and *vice-versa*, and satellite that placed in the GSO at least have capability to observe up to 28 per-cent of earth surface.[13] A satellite stationed in GSO is positioned in the equator's plane and rotates in the same direction and identical as the Earth rotation for 23 hours 56 minutes that creates fixed position beneath the equatorial line. As a result, a satellite stationed in GSO appears to be stationary in relation to the reference point.[14] One advantage of geostationary satellites over other orbiting communications devices is that the ground station does not require a complicated system for receiving or delivering messages. The antenna is permanently positioned in the direction of the satellite's position in the sky in order to receive or transmit transmissions.[15] Thus, a ground station can be a simple, no-frills antenna that is not constrained by the limits of a sophisticated computer-driven tracking system.[16] Geostationary satellites can communicate with approximately one-third of the planet, or, when combined with a satellite network, it will covered the entire globe.[17]

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[9] ITU, "International Telecommunication Convention-Malaga Torremolinos 1973" (1973).
[10] Christy Collis, "The Geostationary Orbit: A Critical Legal Geography of Space's Most Valuable Real Estate," In *Down to Earth: Satellite Technologies, Industries, and Cultures*, Lisa Parks and James Schwoch eds. (New York: Rutgers University Press, 2012): 61–81, https://doi.org/10.36019/9780813553337-005.
[11] *Ibid*.
[12] Luboš Perek, "The Scientific and Technical Aspects of the Geostationary Orbit," *Acta Astronautica* 17, no. 6 (1988): 589–98, https://doi.org/10.1016/0094-5765(88)90202-0.
[13] Everett C. Dolman, *ASTROPOLITIK Classical Geopolitics in the Space Age* (London: Frank Class Publishers, 2002). *See.* Figure no 2 and 3.
[14] International Telecommunication Union, General Secretariat, "Radio Regulations," 1976, http://handle.itu.int/11.1004/020.1000/1.10.
[15] Georgetown Space Law Group, "The Geostationary Orbit: Legal, Technical and Political Issues Surrounding Its Use in World Telecommunications," *Case Western Reserve Journal of International Law* 16, no. 2 (1984): 223–64.
[16] D Smith, *Space Station: International Law and Policy* (Boulder: Westview Press, 1979).
[17] Milton L. III Smith, "The Orbit/Spectrum Resource and the Technology of Satellite Telecommunications: An Overview," *Rutgers Computer & Technology Law Journal* 12, (1986): 285-304.

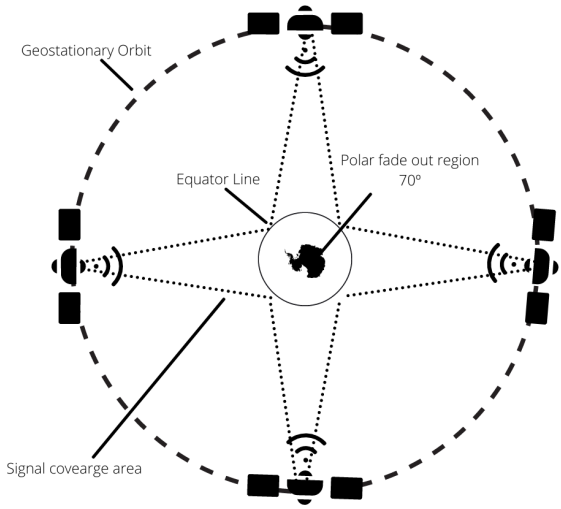

Figure 1 GSO Field of View, by Authors. Adapted from Everet C. Dolman.

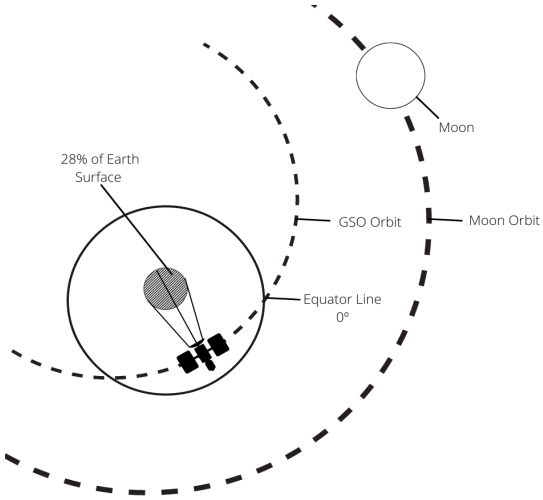

Figure 2 GSO Orbit line, by Authors, Adopted from Everet C. Dolman.

A satellite stationed in GSO space had a three-dimensional corridor through which satellites travel at varying altitudes, speeds, and angles to the equator's plane.[18] While there are obvious physical constraints to this corridor, the primary concern has been to avoid electromagnetic interference with other satellites and radio spectrum users.[19] The minimum separation distance between satellites stationed in GSO may vary according to the criteria used to determine it. The large discrepancy in estimates of the maximum number of satellites capable of occupying GSO may be explained by the variety of possible criteria.[20] The number of satellites that can fit into GSO is unknown. However, it is possible to determine whether or not a particular satellite system, with all physical parameters defined, would cause interference with other satellite systems.[21]

In 1977, nine satellites were placed in GSO, and the total number of satellites in orbit reached approximately one hundred that year.[22] In 2015, the number of satellites in the GSO has increased to 402.[23] The resulting increase in claims to utilize the GSO is likely to exacerbate overcrowding, complicating the determination of priorities and the assignment of functions and uses on a national and international level.[24] The validity of this observation appears to be substantiated, in a broad sense, by the ITU Convention 1973, which, in discussing the technical aspects of using frequency bands for space radio services, refers to the geostationary satellite orbit as one of the "limited natural resources".[25]

Consequently, the GSO is a unique and contentious natural resource due to the combination of these factors. Politically, it is a flashpoint of contention between developed nations, which are established communications powers, and developing nations, which see the continued appropriation of this valuable and finite natural resource as a threat to their future development.

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[18] Michael J Finch, "Limited Space: Allocating the Geostationary Orbit," *Northwestern Journal of International Law & Business* 7, no. 4 (1986): 788–802, https://scholarlycommons.law.northwestern.edu/njilb/vol7/iss4/36.
[19] *Ibid*.
[20] G. A. Jr Hazelrigg, *Political and Legal Implications of Developing and Operating a Satellite Power System*, (Princeton, New Jersey: Econ Incorporated, 1977).
[21] Committee on the Peaceful Uses of Outer Space, "Physical Nature and Technical Attributes of the Geostationary Orbit," Pub. L. No. U.N.Doc.A/AC.105/203, section 5, United Nations General Assembly (1977).
[22] *Ibid*.
[23] Elizabeth Howell, "What Is a Geosynchronous Orbit?" *Space News*, 25 April 2015, https://www.space.com/29222-geosynchronous-orbit.html.
[24] David J Withers, "Effective Utilization of the Geostationary Orbit for Satellite Communication," *PROCEEDINGS OF THE IEEE* 65, no. 3 (1977): 308–17, doi: 10.1109/PROC.1977.10484.
[25] ITU, International Telecommunication Convention-Malaga Torremolinos 1973.

III. COSMOPOLITANISM AS NEW APPROACH IN GLOBAL SPACE GOVERNANCE ON GEOSTATIONARY ORBIT

The initiative for the fair use of GSO did not end with the Bogota Declaration of 1976. However, the efforts of developing countries have continued to this day. Numerous countries actively convey and propose ideas regarding the use of GSO at the UNCOPUOS. In 1996, Colombia formally submitted a working paper to the UNCOPUOS legal subcommittee titled "some considerations concerning the utilization of the geostationary orbit" regarding the fair use of the GSO.[26] The article provides the following suggestion regarding the application of GSO:[27]

a. When the need arises for processes of co-ordination between countries, due to possible radio electronic interference in respect of bands and services not planned by ITU using geostationary satellite orbit must take place, inter alia , in an equitable manner and that, consequent a developing country have equal claims to access to the same orbital position or neighboring position, or when a country which has already had access to the geostationary orbit shall, in the co- ordination procedure, offer all possibilities for the other country to have such access with the minimum of operational restrictions possible.

b. The claim of countries to use frequencies to occupy geostationary orbital positions in the cases provided for above shall be exercised under the conditions set forth in the ITU Radio Regulations and, in any event, account shall be taken of the provisions of Resolutions 18 of the Kyoto Conference of 1994 to guarantee affective use of the geostationary orbit.

c. Best efforts shall be made by the satellite launching State to remove space debris and spent satellites orbit from the geostationary satellite orbit to disposal orbits shortly before the end of useful lives of satellites, in order to ensure the affective and economical use of this orbit.[28]

When examined closely, the Colombian suggestions appear to be more geared toward establishing preferences for developing countries and countries that do not yet have access to GSO. Additionally, this proposal emphasizes that developed countries or countries that already have access to GSO must provide developing countries with access to the orbital position and frequency

[26] Priyatna Abdurrasyid, *Beberapa Bentuk Hukum Sebagai Pengantar Menuju Indonesia Emas 2020* [*Some Legal Forms As An Escort Towards a Golden Indonesia 2020*], (Jakarta: Fikahati, 2008).
[27] Colombia, *Some Considerations Concerning the Utilization of the Geostationary Satellite Orbit* [Vienna: s.n., 1996].
[28] Runggu Prilia Ardes and Ridha Aditya Nugraha, "Assessing the Liability Convention and the Indonesian Space Act in Light of Active Debris Removal," *Hasanuddin Law Review* 6, no. 3 (2020): 199–212, https://doi.org/10.20956/halrev.v6i3.2600.

spectrum they desire, or obtain access to the smallest possible orbital position and frequency spectrum. On top of that, the use of GSO must be adapted to the applicable legal provisions contained in the ITU Radio Regulations and Kyoto Conference Resolution 18, to ensure that it is used effectively and economically.[29]

Furthermore in 2003, South Africa articulated its position clearly in the UNCOPUOS Scientific and Technical Subcommittee. South Africa agreed in his presentation that because GSO is a limited resource, principles governing its use and utilization, such as equitable use, rational use of the orbit, and equitable access, are expected to benefit developing countries. Additionally, the first come, first served method for utilizing orbital slots at GSO is considered extremely inefficient for developing countries and creates a barrier for countries that are just beginning to develop technology or satellite services in their States.[30]

Apart from South Africa, equatorial countries such as Colombia and Ecuador expressed their views, stating that the use of telehealth and telemedicine services in remote areas requires broadband access to communication satellites in the GSO, despite the fact that these countries are tropical and receive adequate rainfall. As a result, a robust signal is critical for optimizing telehealth and telemedicine services in these countries. Therefore, Colombia and Ecuador emphasized the importance of tropical countries receiving priority allocation of orbital slots in the GSO.[31]

In 2016, at the UNCOPUOS Scientific and Technical Subcommittee's 53rd session, developing countries represented by Chile, Indonesia, Peru and Venezuela actively expressed their views on the use of GSO. The Venezuelan delegation argued in his proposal that his State desperately needed satellite services via the GSO. Currently, community needs such as health, education, and transportation are met through the use of GSO-based satellite service application technology. As a result, equitable access and rational use of the orbit must be maintained and even reaffirmed in order to expand opportunities for developing countries to utilize GSO to meet their community's needs.[32] This is substantiated by statements from Chile and Peru, which emphasize the importance of using GSO services to develop their countries' education and

[29] Anjar Supriadhie, "Rezim Hukum Khusus Atas Orbit Geostasioner (GSO) (Prospek Dan Tantangan) [*Special Legal Regimes Over Geostationary Orbit (GSO) (Prospects and Challenges*]," *Pandecta: Research Law Journal* 13, no. 1 (2018): 63–75, https://doi.org/10.15294/pandecta.v13i1.9220.
[30] UN General Assembly, "Report of the Scientific and Technical Subcommittee on Its Fortieth Session, Held in Vienna from 17 to 28 February 2003" (Vienna, June 11, 2003).
[31] *Ibid*.
[32] *Committee on the Peaceful Uses of Outer Space, Report of the Scientific and Technical Subcommittee on Its Fifty-Third Session, Held in Vienna from 15 to 26 February 2016,* Vienna, 15 February 2016.

health sectors.[33] According to the Peruvian delegation, because GSO's natural orbital position is limited, its use must be rational; thus, GSO use should be non-discriminatory and accessible to all countries regardless of their technical capabilities.[34]

Apart from these countries, Indonesia has a long history of defending its interests in the GSO for developing countries, particularly those located along the equator line. Although the Indonesian Government had committed in 2002 to ratifying the OST 1967, Indonesia's struggle to represent the interests of developing countries in the GSO continues to this day. Indonesia reintroduced its position on the use of GSO for developing countries at the UNCOPUOS Scientific and Technical Subcommittee in 2005. Several factors contribute to Indonesia's interest in conveying its ideas about the use of GSO, including the following:[35]

a. Protecting the Indonesia's long-term use of GSO for telecommunications, broadcasting, and meteorology, as well as the possibility of expanding into other fields.
b. Protecting the Indonesian satellites against all threats and interference from third parties posing a threat to Indonesia.
c. Protecting the GSO from use that could have a detrimental effect on the GSO environment and the Earth, particularly in the Indonesian region.
d. Indonesia retains the option of using the spectrum orbital slot in the GSO at any time it deems necessary for its national interests.
e. Avoiding the use of GSO in any activity that is not peaceful or humanitarian in nature.

The points of commitment were articulated clearly during recent UNCOPUOS scientific and technical subcommittee meetings on GSO agenda items. In 2016, during the UNCOPUOS scientific and technical subcommittee, the Indonesian delegation stated that the current regime for the exploitation and use of GSO orbits tends to favor countries with more advanced technological and financial capabilities. Anticipatory steps are required to halt these countries' potential dominance in the use of GSO and to meet the needs of developing countries and countries with unique geographies.[36] As a

[33] Committee on the Peaceful Uses of Outer Space.
[34] Committee on the Peaceful Uses of Outer Space.
[35] Priyatna Abdurrasyid, "Developing Countries and Use Of The Geostationary Orbit," *Acta Astronautica* 17, no. 6 (1988): 647–52.
[36] Melissa Retno Kusumaningtyas, "Geostationary Orbit (GSO) Dalam Perspektif Hubungan Utara-Selatan [*Geostationary Orbit In North-South Relationship Perspective*]," in *Seminar Nasional Kebijakan Penerbangan Dan Antariksa* (Pusat Studi Kajian Kebijakan Penerbangan dan Antariksa, 2018): 1–9, https://

result, Indonesia proposes to UNCOPUOS that they continue to discuss and recommend to the ITU that they take into account the special needs of these countries in order to ensure equal access to GSO. [37]

This was reiterated at the UNCOPUOS scientific and technical subcommittee meetings in 2017 and 2018, where the Indonesian government argued that in order to avoid negative consequences for developing countries in general, it is hoped that a provision ensuring access to GSOs for their needs can be reached during the GSO discussions.[38] The Indonesia's foreign policy on GSO was consistently stands on the establishment of *sui generis* regime on GSO. It cemented during the 60th Legal Subcommittee at UNCOPUOS 2021 when the Indonesian delegation consistently to encourage UNCOPUOS to discuss the possibility of govern the GSO under *sui generis* regimes that contain equitable access, non-appropriation, rational and economic use and peaceful purposes.[39]

On the same table, the Islamic Republic of Iran has circulating conference paper related to the equitable access to the GSO for developing States. Iran has stated that the current challenges of the GSO is "first come first serve" basis and it is not fulfilling the satisfactory from equitable access point of view in particularly for "new-commers" to the GSO area.[40] Furthermore, another difficulty could be found when a State submitted for modification request, and it would be queued and time consuming bureaucracy at ITU to solve the request.[41]

The efforts made by developing countries demonstrate and confirm that outer space activities are a priority for developing countries at the moment. Additionally, Article 1 of the OST 1967 guarantees that space exploration must be conducted for the benefit of all countries, without regard any discrimination, and on the basis of equality. Article 1 of the OST 1967 serves as a reminder that space exploration activities are not solely for the north, but also south.[42]

Article 1 of the OST 1967 contains at least four outer space freedoms,

puskkpa.lapan.go.id/files_arsip/Melissa_Geostationary_Orbit_2018.pdf.

[37] *Ibid*.

[38] *Ibid.*

[39] Robertus Heru Triharjanto, "Agenda Item 16: Examination of the Physical Nature and Technical Attributes of the Geostationary Orbit and Its Utilization and Applications, Including in the Field of Space Communications, as Well as Other Questions Relating to Developments in Space Commu," *The 60th Session of Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space*, 2021.

[40] Legal Subcommittee, "Committee on the Peaceful Conference Room Paper on the Issue of Equitable Access of the Developing Member States to Geostationary Orbit under the Agenda Item 6 (b) of the Legal Subcommittee Proposed by the Delegation of the Islamic Republic of Iran," 2021.

[41] *Ibid*.

[42] The South refers to countries that have developing economic conditions and particularly explain the Indonesia's economic condition as developing countries which located in southern hemisphere.

including exploration, use, access to outer space, and scientific investigation. Article 1 of the OST 1967 requires that all activities carried out under these freedoms should be for the benefit and interest of the entire States.[43] The *grundnorm* of Article 1 of the OST 1967 is laid on the phrase of "benefit and interests of all countries". The purpose of this article is to ensure that outer space can bring benefit for all mankind.

Furthermore, it reaffirm by that "The Exploration and use must be in the "interests" of all countries. The plural term "interests" seems to indicate that more may be involved than just the vague, general "interest" of all countries. In a sense the plural phrase may perhaps be regarded as a victory for the less developed countries which entertained strong hopes of receiving benefits from man's exploration and use of outer space".[44] Space activities are not exclusively dominated by developed countries, which are, coincidentally, northern countries; nevertheless, of the 80 countries involved in space activities, the United States remains the State with the largest space budget in the world, estimated at $38.7 billion in 2014.[45] Russia came in second with $11 billion and China came in third with $5 billion.[46] However, in 2021, the budget allocated for space activities by the United States increased into $54.5 billion. It followed by China on the second with $10 billion and Russia with $3.5 billion.[47]

Although no State can meet the United States or Russia's space budgets, space exploration activities are not solely for the benefit of the United States or Russia, as demonstrated by the history of the cold war, which precipitated the establishment of an international space law regime.[48] The emergence of developing and new countries in space activities began in the 1990s and early 2000s, when a slew of new "actors" in space activities emerged from developing countries such as the Middle East, Africa, and Asia.[49] These developing countries participate actively in a variety of international space

[43] United Nations, "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies" (1967).
[44] Gorove, "The Geostationary Orbit: Issues of Law and Policy."
[45] Euroconsult, "Government Spending in Space Programs at $66.5 Billion in 2014 - Euroconsult," *Euroconsult*, May 13, 2013, https://www.euroconsult-ec.com/press-release/government-spending-in-space-programs-at-66-5-billion-in-2014/.
[46] *Ibid*.
[47] Euroconsult, "Government Space Budgets Driven by Space Exploration and Militarization Hit Record $92 Billion Investment in 2021 despite Covid, with $1 Trillion Forecast over the Decade," 2022, https://www.euroconsult-ec.com/press-release/government-space-budgets-driven-by-space-exploration-and-militarization-hit-record-92-billion-investment-in-2021-despite-covid-with-1-trillion-forecast-over-the-decade/.
[48] Timiebi Aganaba-Jeanty, "Introducing the Cosmopolitan Approaches to International Law (CAIL) Lens to Analyze Governance Issues as They Affect Emerging and Aspirant Space Actors," *Space Policy* 37 (2016): 3–11, https://doi.org/10.1016/j.spacepol.2016.05.007.
[49] Aganaba-Jeanty, "Introducing the Cosmopolitan Approaches to International Law,"

forums, where they can express their perspectives and interests as third countries. As Jakhu[50] and Huang[51] mention, developing countries actively participate in the development of international space law by expressing their interests in outer space exploration and utilization. Indeed, nearly half of all countries engaged in space activities are developing countries, implying that space activities are a concern for these countries as well.

To reconcile developing countries' lofty ambitions in space activities, they attempt to undermine the effectiveness of Article 1 (1) of the OST 1967, which refers to the "benefits and interests of all countries," by introducing new legal instruments into the space law regime. However, the effort failed, and the resulting legal instrument, the Space Benefits Declaration 1996[52], was only a non-binding legal instrument. As a result, developing countries that participate actively assert that the applicable international legal regime is incapable of addressing the needs and concerns of third countries (southern countries).

From these considerations, a new approach is required in examining the current space law regime from the perspective of developing countries, with the goal of accommodating the needs of all countries engaged in space activities. Naturally, this is also a demand for the contents of Article 1(1) of the OST 1967, in order for it to be implemented uniformly by all States. Thus, the cosmopolitanism approach[53] may be a way to resolve the ambiguity surrounding the phrase "benefit and interest of all countries".

For centuries, the concept of cosmopolitanism has existed. According to Nussbaum, it is centered on the understanding that "our deliberations should be primarily about human problems confronting people in particular concrete situations, not on problems arising from a national identity that is fundamentally different from others".[54] According to Kantian, cosmopolitanism is synonymous with universal hospitality. Universal hospitality comprises of condition and unconditional. The unconditional right relate to the Article 1 of the OST 1967, where the concept of freedom for the benefit of all implies that no one can claim ownership of outer space.[55] Thomas pogge explained that the cosmopolitanism possess three components in common namely individualism,

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[50] Ram S. Jakhu, "Developing Countries and the Fundamental Principles of International Space Law," in *New Direction in International Law: Essays in Honour of Wolfgang Abendroth*, ed. Rafael Gutierrez Girardot, et. al. (Frankfurt: Campus Verlag, 1982), 352–73.

[51] Huang Jiefang, *The Common Principle in Space Law*, (Montreal: McGill University, 1985).

[52] United Nations, "Space Benefits Declaration," accessed 24 January 2022, https://www.unoosa.org/oosa/en/ourwork/spacelaw/principles/space-benefits-declaration.html.

[53] David W. Kennedy, "New Approaches to International Law Bibliography," *Harvard International Law Journal* 35, no. 2 (1994): 417–60, http://nrs.harvard.edu/urn-3:HUL.InstRepos:15858019.

[54] Martha C. Nussbaum, "Patriotism and Cosmopolitanism - Boston Review," *Boston Review*, https://bostonreview.net/articles/martha-nussbaum-patriotism-and-cosmopolitanism/.

[55] Aganaba-Jeanty, "Introducing the Cosmopolitan Approaches to International Law," 8.

universality and generality.[56] One of the components, which is the universality component is ideal for developing countries to re-emphasize the provisions of Article 1 (1) of the OST 1967 which highlighting the value of inclusiveness, as well as the status of space as a province of all mankind.

It is undeniable that space exploration is a high-cost endeavor, and parties must be able to "pay to play" in order to be successful. As a result, anyone who invests heavily in this activity will achieve such great results, however the concept of "equality" in space activities will be impossible to achieve. In this case, while equal value for all is a desirable concept for space development, it does not always enable States to realize their full potential, particularly if they do not understand the true rationale or objectives for space engagement.[57] Fundamentally, equality entails giving equal merit to the claims of all parties without regard for discrimination.[58]

IV. GEOSTATIONARY ORBIT: STATUS QUO AND RECONCEPTION

A great deal of hope is found in UNCOPUOS's role as global space governance. UNCOPUOS is the apex of global space governance for the address scene. The efforts of developing countries to advocate for the equitable use of GSO at UNCOPUOS demonstrate their ability to advocate for cosmopolitanism in space activities. Indeed, the "first come, first serve" mechanism that applied in GSO was not relevant to the cosmopolitanism approach. The "first come, first serve" concept only suitable for the states that possessed advance space technology. Whereas the cosmopolitanism approach strengthening the value of universality and inclusiveness. Based on this approach, every states should have equal opportunity to orbiting its satellite in GSO. Therefore, the utilization of GSO must be seen from the situation and condition that happened in developing countries.

Even though the cosmopolitanism approach on space might provide a point of view of equality to all countries. However, it needs a mechanism to trigger developing countries to engage in space activities and enjoy its benefit. The lack of advance technology in space by developing countries might be the justification of the domination spacefaring nation on GSO. The special and differential treatment principle can be understood as a catapult to accommodate the interest of developing countries in the GSO utilization. As

[56] Pogge, "Cosmopolitanism: A Path to Peace and Justice," 11.
[57] Bhikhu Parekh, "Cosmopolitanism and Global Citizenship," *Review of International Studies* 29, no. 1 (2003): 12, doi: https://doi.org/10.1017/S0260210503000019.
[58] *Ibid*.

implemented at the international trade activities, the World Trade Organization (WTO) give developing countries special rights and allow other members to treat them more favorably. Developing countries have different needs and capabilities than developed countries; consequently, the WTO attempts to accommodate the interests of all countries in the practice of liberalization by granting developing countries more flexibility.

In the context of the WTO, the implementation of WTO agreements is difficult for many developing countries. The difficulty lies in adjusting the costs of trade liberalization with the desire to reap all of the benefits of WTO membership. Therefore, the Marrakesh agreement's preamble states that "there is need for positive efforts designed to ensure that developing countries, and especially the least developed among them, secure a share in the growth in international trade commensurate with the needs of their economic development."[59] In practice, there are at least some provisions in the WTO agreements that support the implementation of the principle of special and differential treatment, such as the provisions under which WTO member countries must protect the interests of developing member countries, then flexibility in the application of commitments and policy instruments, particularly between developing countries with developed countries, such as the understanding that developed country members "do not expect reciprocity for commitments made by them in trade negotiations to reduce or eliminate tariffs and other trade barriers" of developing country members. In addition, technical assistance is a form of implementation of the special and differential treatment principle in which the WTO secretariat and developed countries members assist developing countries in implementing WTO objectives.[60]

The special and differential treatment principle promote justice, not equality. Article 1 of the Outer Space Treaty of 1967 mandates that "... outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination..." This article implies that developing countries, in addition to developed nations, have the right to conduct space exploration. However, there are no concrete implementation provisions in the *corpus juris spatialis internationalis* to achieve the article's objectives, such as special and differential treatment in the WTO. Due to, it must be emphasized once more that exploration activities in space or GSO are not inexpensive and require adequate space technology. Moreover, the capabilities of countries wishing to participate in GSO exploration are

[59] World Trade Organization, "WTO | Legal Texts - Marrakesh Agreement," accessed June 11, 2022, https://www.wto.org/english/docs_e/legal_e/04-wto_e.htm.

[60] Andrew D. Mitchell and Tania Voon, "Operationalizlng Special and Differential Treatment in the World Trade Organization: Game Over?," *Global Governance* 15, no. 3 (2009): 343, https://doi.org/10.1163/19426720-01503004.

vary. It was based on the premise that developing countries are inherently disadvantaged in their participation in the GSO.[61]

The application of special and differential treatment principle in GSO designed to encourage the developing countries to develop their space activities and to enable them to access slot of orbit in the GSO. Consequently, with the use of the principle of special and differential treatment in the GSO, provisions such as the obligation of developed countries to protect the interests of developing countries in order to continue gaining access to the use of GSO, non-reciprocity commitments, action and instrument policies from developed countries in assisting developing countries to utilize GSO, and technical assistance from both international institutions and developed countries are required.. It can be understood that there is similarity in the application of this principle in international trade activities with space activities, particularly on the utilization of GSO whereas normatively, this principle exclusively belong to developing countries which have different economic power with developed countries.

Thus, it could be an idea for the regulations of GSO to consider the principle of special and differential treatment as legal basis for developing countries to be granted special rights for the use of GSO. Additionally, this principle does not violate the provisions regarding space as a province of all mankind, whereas the previous concept initiated by equatorial countries through sovereign rights does not comply with the province of all mankind provisions in space law.

As is well known, the current space law regime has been unable to close the gap between developed and developing countries. The OST 1967 "benefit and interest of all countries" provision and the ITU Convention's 1973 "equitable access" provision have failed to accommodate the interests and needs of developing countries in the use of GSO. Thus, by incorporating special and differential treatment into the regulation of GSO utilization, it is possible to break the years-long stalemate. However, implementing special and differential treatment in the use of GSO requires additional effort to ensure proper implementation.

GSO commonly used by spacefaring countries, that have capabilities to make and operated their satellites, and it is slightly different from space emerging countries that need waiting many years to have new satellite and sometimes those countries are could not fulfilling their obligation to the ITU

[61] Aniekan Ukpe and Sangeeta Khorana, "Special and Differential Treatment in the WTO: Framing Differential Treatment to Achieve (Real) Development," *Journal of International Trade Law and Policy* 20, no. 2 (2021): 85, https://doi.org/10.1108/JITLP-08-2020-0052.

regarding slot orbit.

Furthermore, there is many attempts from global south that GSO should be securing from commercialization. The first idea appear with the analogizing the EEZ The notion from the idea is to bring the "sovereign rights" over the GSO, that underlying States have the rights to regulated all related matters to the GSO utilization which is interpreted as economical structure. However, this notion likely unfitted and will contrary to the non-appropriation principle in the OST 1967 since any manmade space object fall under quasi-jurisdiction. The non-appropriation principle prohibits States or any jurisdictional bodies to obtaining sovereignty on the outer space. This phrase could be viewed *cælum liberum* that the spirit coming from the high seas on the law of the sea. Meanwhile, the GSO cannot be possesses by any mean, but every State regardless its economic or scientific degree have the equal right to access and use of outer space.

Furthermore, in ITU Convention 1973 in Article 33 para 2 mentioned the GSO as the natural limited resources[62] because is uniqueness and the limited area to put the satellite on GSO orbit. Thus, "resources" in the EEZ and GSO have an equivalent value because "resources" is not only referred to as "material" or tangible objects, but it includes the "spatial" or "area" which have economic implications to the underlying States.

According to its limitation and uniqueness, GSO has been and consistent have challenges by developing States and particularly equatorial States to have 'extensive' rights to ensure equitable access to the GSO slot orbit.

Some views have been made carefully to answer this issue to answer this concern. First is "sovereign rights", as referred to the EEZ.[63] This view stated that equatorial States or GSO underlying States have the extended right to use the GSO slot orbit exclusively for economic purposes since it referred to the EEZ idea, nevertheless the coastal state does not 'have' the ownership of the zone[64] but a qualification to explore and exploit the natural resources including for fisheries while other States have no rights to do so except there was an agreement or consent from the coastal States.[65]

Furthermore, the GSO will be equivalently interpreted as "natural resources" to the EEZ area, which results in the underlying state having the right to control the use of GSO slot orbit above it is territorial. In the EEZ context, clear coastal States have several rights to conduct such as;

[62] ITU, International Telecommunication Convention-Malaga Torremolinos 1973.
[63] Arafah, "Sovereign Right Claim on Geo Stationary Orbit (GSO)."
[64] *Ibid*.
[65] LOSC 1982 Article 62 (2), 69, and 70 (1982).

building an artificial island, installation and structures for economic such as mentioned in Art 56 LOSC 1982 (LOSC 1982), marine scientific research and protection and perseveration of the environment. Moreover, this particular measure is called "sovereign rights," but it is not limited to the governing natural resources matter; coastal States still have the right to perform their enforcement jurisdiction.[66]

The utilization of the EEZ is not subject to the ownership matter by the coastal States. Yet, other States such as land lock States and geographically disadvantaged States could access natural resources. This EEZ approach seems likely hardly be applied in outer space, since Art 1 OST mentioned: "outer space is a province of all mankind", mean or *res communis omnium* which mean a things of entire community and the essence of the Art 1 on OST 1967 means no one State could exercise the sovereign rights in outer space.[67] Furthermore, this principle is concerned about the outer space as a zone and responsibility to the territory[68] rather than property of material such as moon mining extraction etc. Furthermore there is a statement regarding province of all mankind notion in Art 1 OST 1967:

> *"By itself the common control of humanity over outer space and celestial bodies does not deal with appropriation and property. It only means that the rules over outer space and celestial bodies can only be made by Humanity as a whole. No State ... can rule exploration and use of outer space, or can exercise any territorial jurisdiction over it without the agreement of Humanity."*[69]

Furthermore, Article 1 of the OST 1967 believes that outer space should be beneficial and interest for all countries, it means no country could take their action without any consent from the international community. International community or "agreement of Humanity" could be represented through UNCOPUOS. This idea varies from the EEZ and its sovereign rights view, in which a coastal State has the right to regulate the related economic matters in the EEZ.

Moreover, the analogy of the EEZ seems cannot be fitted in either concept or reality. The latter shows EEZ is uninterrupted zone which measure with maximum 200 miles from coastal baseline, however the situation varies

[66] Yoshifumi Tanaka, *The International Law of the Sea*, 3rd Edition (Cambridge University Press, 2019), 152.
[67] Louis de Gouyon Matignon, "The Res Communis Concept in Outer Space," *Space Legal Issues*, (2019), 3.
[68] Carol R. Buxton, "Property in Outer Space: The Common Heritage of Mankind Principle vs. The 'First in Time, First in Right' Rule of Property Law," *Journal of Air and Commerce* 69, no. 4 (2004): 689.
[69] *Ibid*.

when EEZ zone is adjacent water with other States. Otherwise, the GSO have interrupted by two different zone in advance called Low Earth Orbit and Medium Earth Orbit.

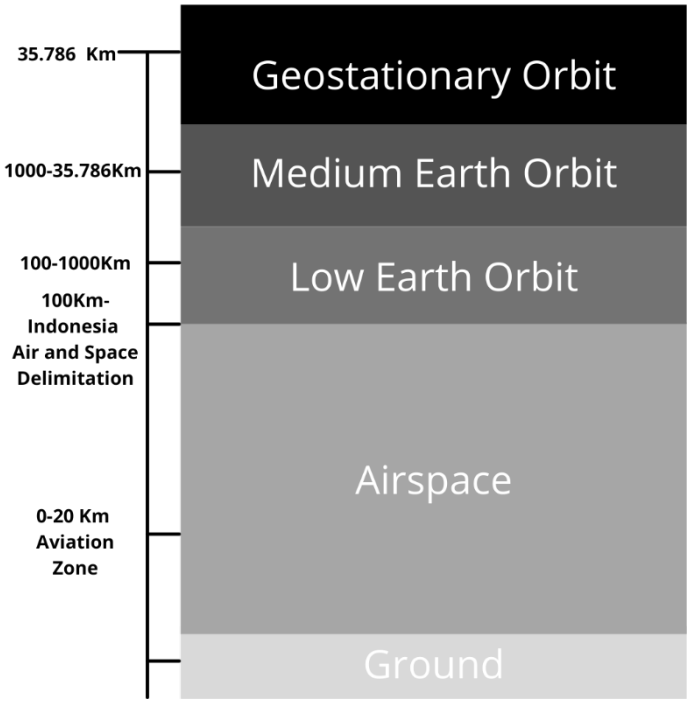

Figure 3 Vertical Zone, by Authors

Yet there is a major confusion how could we measure the "vertical EEZ" if there was interrupted by two different zone, in adding there is no single understanding where the demarche line between air space and outer space. Furthermore, the EEZ is a hybrid regimes between *mare liberum* and *mare clausum*[70] while the GSO fall under *cælum liberum* only. Thus the background of establishment the EEZ also different.

However, the needs of the GSO slot for developing States, equatorial States, and in this case, Indonesia as the largest archipelagic nation in the world should be carefully examined. As geographically Indonesia have a wide area and those areas would be demanding on space technology. The

[70] Alexander Prölß, *United Nations Convention on the Law of the Sea: A Commentary*, ed. Amber Rose Maggio, Eike Blitza, and Oliver Daum, 1st Edition (München: C.H. Beck Hart Nomos, 2017), 74.

current practice in the ITU for GSO orbital slots is not efficient and could hamper developing States like Indonesia for orbital placement. The "Special Rights" over the GSO could be introduced as solutions to the GSO orbit slot. The special right would be prioritizing the equatorial States and developing States to register the places orbit without waiting too long and cutting the bureaucracy process.

As one of the solutions, ITU could preserve several GSO slots orbit at least one up to three slots dedicated for equatorial countries depending on how large those States are based on geographical situation or urgent needs. [71] A waiting list which take side the south. However, these rights must come with a guarantee from the interested States to fill the reserved orbit within the specified time. The reasonable waiting time for developing States must be seven to ten years, recalling their economic and scientific aspects. Furthermore, ITU have the right to cease its orbital slot request and put the developing country on the blacklist for "reserving countries " for period of time failing to fulfil the special right granted.

Hence, if those State could not preserve its slot due to acceptable reason, ITU could pass the GSO orbit to be utilize to another States temporarily and after the period of time is pass, ITU should be asking the underlying States if they wish to launch their satellite to its GSO slot orbit. Those GSO orbital slots regulations shall remain under ITU. There is no sovereign right exercise on the GSO, with hopefully non-appropriation principle and province of all mankind principle remain preserved.

Furthermore, beside the debating over the GSO orbit, there is a major opportunity and challenges with the Low Earth Orbit (LEO) constellation. At the moment, there is no international legal regime for orbital assignments for LEO.[72] Therefore, countries could launch the LEO satellite merely pursuant to its national legislation, which the possibility LEO will be overcrowded and have "Kessler Syndrome[73]" effect are soaring, and could be harmed underlying States and other active satellite in orbit.

LEO has more advantage to provide cellular-like data service to mobile

[71] Ridha Aditya Nugraha and Kartika Paramita, "Mempererat Regional ASEAN Melalui Tatanan Hukum Keantariksaan: Peluang Dan Tantangan Bagi Indonesia [*Strengthening the ASEAN Region through the Space Law Order: Opportunities and Challenges for Indonesia*]," *Jurnal Hukum & Pembangunan* 49, no. 3 (2019): 636, https://doi.org/10.21143/jhp.vol49.no3.2191.

[72] Greg Ritchie and Thomas Seal, "Why Low-Earth Orbit Satellites Are the New Space Race," *The Washington Post*, October 7, 2020, https://www.washingtonpost.com/business/why-low-earth-orbit-satellites-are-the-new-space-race/2020/07/10/51ef1ff8-c2bb-11ea-8908-68a2b9eae9e0_story.html.

[73] Kessler syndromes mean if there was an accident or collision to one satellite on the LEO the result will be catastrophic and causing more collision and produce dangerous debris for active satellite and underlying States.

data users anywhere including the rural area, disaster management, SAR communication, location and position service, environmental monitoring through real-time imaginary data,[74] because LEO has more convenient and have the lowest latency approximately 24 millisecond[75] to send the signal from ground station to the satellite, and this could primary support infrastructure for future shipping service including to support the operation of marine autonomous surface ship (MASS) that need constant and rapid internet signal since, MASS will operated autonomously and using Artificial Intelligence (AI).[76] Satellite in LEO could improve the way of life and the economic activities of underlying State, also to mention the low-cost compared with GSO satellites. The challenge for south in facing such disruption is lacking of space awareness and human resource with space law and policy expertise.[77]

V. CONCLUSION

The GSO's uniqueness and strategic location continue to spark controversy among countries. Due to its location above the equator line, equatorial countries such as Brazil, Colombia, Ecuador, Kenya, and Indonesia desire special benefits to its use. Article 33 of the 1973 ITU Convention States that GSO is a "limited natural resource," then its use must be effective and efficient in order for countries to have equitable access to it.

It motivates developing countries other than those in the equatorial line to advocate for justice when it gets to the use of GSO. As Chile, Venezuela, South Africa, and, most recently, Iran did during the 2021 UNCOPUOS session. Although Article 1 (1) of the OST 1967 and Article 33 of the ITU Convention have attempt to accommodate developing countries' interests in the fair use of outer space, in practice, the domination of developed countries still remain.

Furthermore, the current regime of space law is disproportionately "western centric." Given that space activities are inextricably linked to high-cost and high-technology, there is a critical need for regulations that can mitigate potential of inequality in space activities. The principle of special and

[74] Ted Stevens, "Regulation and Licensing of Low-Earth-Orbit Satellites," *Santa Clara Computer and High Technology Law Journal* 10, no. 2 (1994): 401.

[75] S. Joseph Campanella and Timothy J. Kirkwood, "Faster than Fiber: Advantages and Challenges of LEO Communications Satellite Systems" *AIP Conference Proceedings* 325, no. 39 (1995): 37, doi: https://doi.org/10.1063/1.47249.

[76] Sanja Bauk, *et. al*., "Autonomous Marine Vehicles in Sea Surveillance as One of the COMPASS2020 Project Concerns," *Journal of Physics: Conference Series* 1357, no. 1 (2019): 4, doi: https://doi.org/10.1088/1742-6596/1357/1/012045.

[77] Ridha Aditya Nugraha et al., "Air and Space Law Education: Preparing for the Future in China, Indonesia, Italy and Thailand," *Hasanuddin Law Review* 7, no. 3 (2021): 183, doi: https://doi.org/10.20956/halrev.v7i3.3197.

differential treatment could serve as the basis for the GSO regulatory regime, as it would cover developed countries' practice of domination in its use. As lesson learned from WTO, this principle could allow the concept of special rights to be granted to developing countries in order to accommodate their interests in utilizing the GSO. Indeed, these principles and concepts relevant the OST 1967, which regulates that outer space as the province of all mankind.

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