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Efficiency of Geo Stationary Orbit (GSO) Natural Resources Utilization by Countries

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Abstract: This article will discuss the efficient utilization of Geo Stationary Orbit (GSO). The research of this article aims to find out related to the utilization of GSO by countries that must be done efficiently so as to meet the needs of all mankind. The research method in this article is normative juridical. As a limited natural resource, GSO should be utilized jointly and efficiently so as not to exceed its orbital carrying capacity so as not to cause saturation. The utilization of GSO must be carried out rationally, efficiently and economically so that its access can be utilized equally for the benefit of all mankind by taking into account the needs of developing countries. GSO, which is part of space, is called the province of all mankind, so it cannot be claimed for ownership or sovereignty by the state. To achieve peace, the utilization of GSO must be done for the benefit of every country, regardless of its economic level or technological and scientific progress.

Keyword: GSO, Orbit, Satelit, SDA, Ruang Agkasa, Efisiensi.

INTRODUCTION

Today everyone can utilize and enjoy various natural resources, including the natural resources found in Aerospace. Aerospace consists of airspace and space. Above an altitude of 285.5 meters (two hundred and eighty-five point five meters) there is space above the Indonesian earth whose utilization can be carried out continuously, then at a maximum altitude of 10.67 km (ten point sixty-seven kilometers) there is space that can be used for commercial flights, at an altitude of 18 km (eighteen kilometers) there is an area where Indonesian law can be enforced, finally space which is a humanitarian area located at an altitude of around 36,000 km (thirty-six thousand square kilometers) (Nugraha & Paramita, 2019).

There is a prohibition on claiming sovereignty over space in any form as well as a prohibition on recognizing that space is a humanitarian area or the territory of all humans, this is regulated in article 2 of the Outer Space Treaty of 1967, while the air space regulates that the state has full and exclusive sovereignty (full and intact) over the air space above its territory. as article 1 of the 1944 Chicago Convention. Because space can be utilized by all countries without any limits to their territorial sovereignty, it is necessary to have clear arrangements regarding space.

In the context of utilizing and exploring space for the interests and benefits of all countries and for peaceful purposes, Indonesia has continued to encourage close cooperation with other countries, one of which is cooperation in the field of space technology, this was conveyed by the Deputy Permanent Representative of the Republic of Indonesia Ambassador Mohammad Koba on behalf of ASEAN at the UN SMU Committee IV (Ministry of Foreign Affairs of the Republic of Indonesia, 2019). In addition, Indonesia also organized the Third Space Economy Leaders Meeting (Space20) through the National Research and Innovation Agency (BRIN), an activity that is part of a series of G20 activities is a form of cooperation between G20 member countries to build economic and environment-based space (Administrator, 2022).

The development of space utilization continues to increase, as well as the country of Indonesia which also continues to advance and upgrade its technology to be able to utilize the natural resources contained in space, one of which is the GSO SDA as a place for satellite placement. Indonesia's natural conditions, which are full of volcanoes, greatly affect satellites that are at a close distance, but when placing satellites in the GSO orbit, the position of the satellite is not affected by the side effects of volcanic eruptions, such as hot air gusts, rock vomiting, and ash bursts from volcanoes, which sometimes reach heights of hundreds or even thousands of kilometers (Juristyo, 1985). GSO is located in space at an altitude of 35,871 kilometers above the earth's equator and with the same rotation period as the earth's rotation (Nugraha & Putro, 2022).

Space in Indonesia in 1960 was one of the aspects regulated in agrarian law as in Article 1 Paragraph 6 of Law Number 5 of 1960 concerning Basic Agrarian Law (UUPA) that the space above the earth and water is space and the right to use space is regulated in Article 48 paragraph 1 of UUPA. Unfortunately, the space-related regulations in the UUPA have not kept up with the times and the current state of world technology. Then Indonesia in 2002 ratified the Outer Space Treaty of 1967 as outlined in Law Number 16 of 2002. In addition, Indonesia also ratified the ITU Convention with the enactment of Law Number 11 of 1985. The 1967 Outer Space Treaty and the ITU Convention stipulate that as a limited natural resource, the utilization of GSO must be carried out economically, rationally, efficiently and equitably by considering the needs of developing countries. Currently, Indonesia also mandates space-related regulations, one of which is regulated in Law Number 21 of 2013.

Indonesia hopes that countries around the world will pay attention to the importance of using GSO based on fair, efficient, economical and rational principles because of its limited nature by submitting a national statement emphasizing the regulation of GSO for the benefit of developing countries in Vienna at the 58th session of the Legal Sub-Committee (Wulandari, 2019). The mandate of space law for the benefit of all mankind regulates relations between states and establishes the rights and obligations of all activities in space. Actions that are not justified in space are recognizing national ownership including celestial bodies which are new advances in the property rights system. There is an imbalance of technological progress on Earth, where there are developed countries that have advanced technology and sufficient financial wealth, and are generally considered developed countries in the global system, and on the other hand, emerging countries that still have low economic resources (Alamsyah et al., 2020). So even though there is a regulation that space should not be considered or claimed as an object of ownership of national claims, there is a first come first served principle that causes the utilization of GSOs to be carried out without regard to the interests of developing countries.

METHOD

The method of approach used in the research of this article is Normative Juridical because this research will explore the arrangements regarding the efficiency of GSO

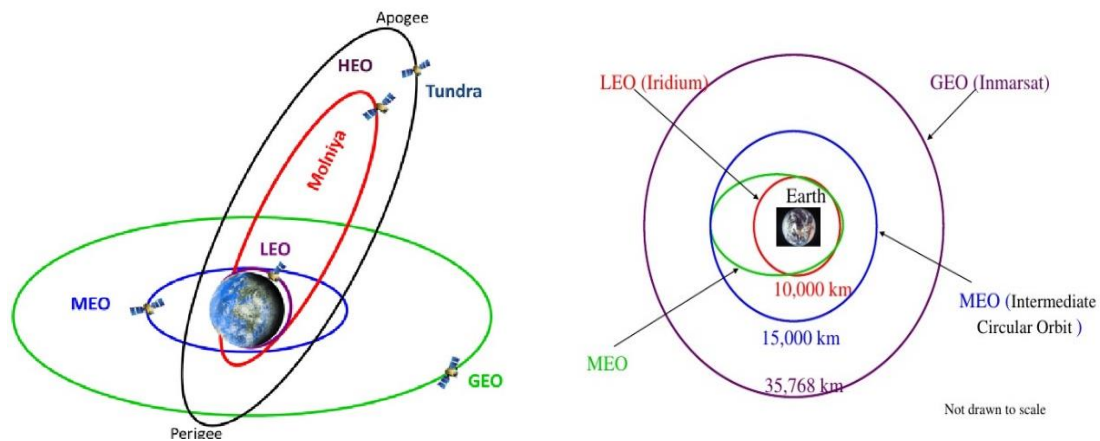
utilization. This research uses secondary data, data related to the efficiency of GSO utilization equally and without discrimination sourced from the results of literature review or review of various literature or library materials related to the problem or research material. The method of analysis used in this research is Qualitative Juridical.

RESULTS AND DISCUSSION

Space is the space outside the earth where the force of gravity drives the motion of objects in it, this is at a distance of about 110 to 120 km and above spatially which includes the ionosphere, magnetosphere, and other celestial bodies (such as meteors, moons, suns, planets, stars, and galaxies), including the space in between (Physical) (Mardianis, 2021). Space does not have state ownership rights so that all countries can use or utilize space as a humanitarian area without claiming their sovereign rights, while each country has sovereign rights over airspace. Discussions regarding the boundaries between space and airspace have been carried out since 1958 until now, but there is no clarity regarding the boundaries of the two. There is a prohibition to claim sovereignty over space in any form and recognition that space is the territory of humanity or the territory of all humans, this is regulated in article 2 of the 1967 Space Treaty while in article 1 of the 1944 Chicago Convention it is stipulated that the air space is regulated that the state has full and exclusive sovereignty (full and intact) over the air space above its territory.

Space or also known as space is part of aerospace and is a space and media and natural resources that must be used for prosperity and preserved in a peaceful manner and purpose. Advances in space science and technology have benefited every country including Indonesia, including support for space-based natural disaster management, environmental observation in space, and the use of remote sensing technology to observe the atmosphere. Currently there are also satellite-based technologies, such as satellite navigation, satellite radio, satellite television, and others, providing real and direct economic benefits through their commercial use, then there are live satellite broadcasts that are very helpful in communication, especially in the modern era because the broadcast is clearer and faster to receive and can send it to adjacent countries, which can help cooperation between adjacent countries (Nnp et al., 2016). But unfortunately, the exploration and utilization of space to achieve welfare, defense and security requires sophisticated, expensive and high-risk science and technology.

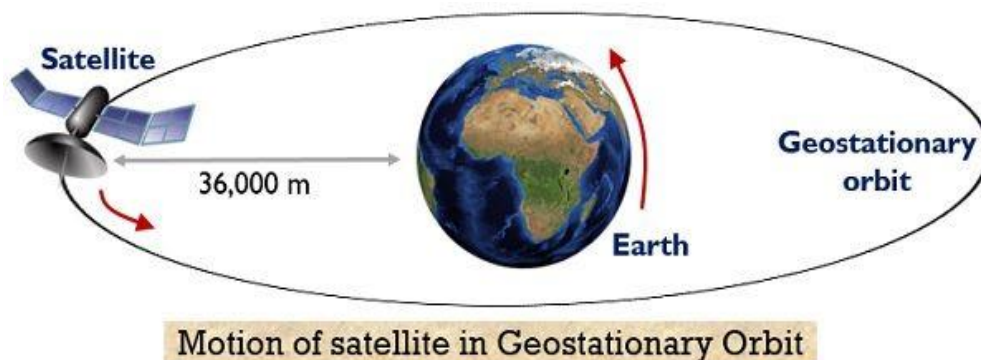
Since 1978, or 46 years ago, the UNCOPUOS forum has discussed the legal aspects of using GSO, the focus of attention is whether it is necessary to establish special rules (unique regulations) for the use of GSO where between developed countries and equatorial countries, there are differences of opinion, developed countries want GSO to be subject to the provisions of the 1967 Outer Space Treaty and ITU regulates the technical aspects of using GSO (perhaps considered unnecessary), but until now there has been no agreement on the Sui generis regime (Mardianis, 2020). Currently in Indonesia, as stipulated in Law Number 21 of 2013 concerning Space, the state's authority in space has been generally regulated. Space as a humanitarian area has benefits that are enjoyed or used by all countries without claiming borders and state sovereignty rights because in space there are no national ownership rights while in air space there are national ownership rights for each country. Space is an expanse or vacuum outside the atmosphere that can provide great benefits for the lives of mankind, one of the benefits of space is as a place to place satellites. Satellite orbit or commonly known as the place where satellites are placed is divided into four types, namely 1) Low Earth Orbit (LEO), 2) Polar Orbit (Polar Orbit), (3) Geostationary Orbit (Geosynchronous / Geostationary Orbit) and 4) Sun-Synchronous Orbit (Dr. Mardanis, 2016).



Source: (Gambar 2, n.d.) dan (Gambar 1, n.d.)

Figure 1. Satellite Orbits

Indonesia's natural conditions are full of volcanoes greatly affect satellites that fly too close to the surface, the side effects of volcanic eruptions, such as hot air gusts, rock vomiting, and volcanic ash bursts, which can sometimes reach heights of hundreds or even thousands of kilometers, can affect satellites that fly too close to the surface this situation can be overcome by placing these satellites in GSO, because the position in GSO is not negatively affected by the earth's surface (Juristy, 1985). Considering the geographical shape of Indonesia, which is an archipelago and is located above the equator, the Indonesian State is very dependent on satellites placed in GSO to fulfill its telecommunications needs. When compared to placing satellites in other orbits, the use of GSO offers several advantages, such as: 1) Broader coverage, 2) Flexibility, 3) Clearer information quality, 4) Earth-defined transmission and antennas, which will be used more efficiently and effectively for countries consisting of various islands, and 5) The ability to facilitate continuous communication between various ground stations using only one satellite (Juristy, 1985). However, since GSO is a limited natural resource (finite natural resource), it can only be occupied by a limited number of celestial bodies. Therefore, it must be used economically and efficiently as placing satellites in a way that exceeds the carrying capacity of the path can lead to saturation.



Source:(Gambar, n.d.-b)

Figure 2. Orbit GSO

The GSO is a limited, rare, and important natural resource for all countries because its progress is 75 km thick, 150 km wide, and 36,000 km above the Earth's equator. GSO rotates equal to the Earth's rotation period, so the satellite looks like it is somewhere on Earth (Kusumaningtyas et al., 2018). Technology, especially aviation technology, has influenced human life so that people can now fly in space (Aulia & Michael, 2023). Therefore, the Outer Space Treaty and article 33 paragraph 2 of the 1982 Nairobi ITC Convention stipulate that

the utilization of GSO must be carried out rationally, efficiently and economically so that every country has equal access. Furthermore, there are international responsibilities for countries conducting space activities in outer space as referred to in Article 6 of the Outer Space Treaty 1967 that states subject to the Outer Space Treaty 1967 have international responsibility for their state activities in outer space whether such activities are carried out by government agencies or by non-government agencies or by non-government agencies, and to ensure that state activities are carried out in accordance with the provisions set out in the Outer Space Treaty 1967.

While every state has the right to explore and utilize space, no state can claim sovereignty over space or any celestial body. The principle of proportional access flow, also known as the space utilization principle, means that developed and developing countries should have fair and equal access to use and exploit GSO orbital slots (Alamsyah et al., 2020). The rotation of GSO is the same as the rotation of the earth, therefore when viewed from the earth GSO looks like a fixed object because its rotation is the same as the rotation of the earth, then technically between one satellite and another satellite placed in GSO the distance is 2 degrees. GSO has special characteristics that must be used in a logical, balanced, effective and equitable manner. Saturation can result from exploiting GSO without considering these principles. GSO should be considered a special area in space that requires special legal and technical governance.

The use and exploration of space, one of which is GSO, is regulated by the Space Treaty, among others: 1) All countries are free to explore and use space in accordance with international law and based on the principle of equality. States are free to access celestial bodies; Space is not subject to national ownership as the province of all mankind and, for peaceful purposes, the exploration and use of space shall be carried out for the benefit of every country, regardless of its economic level or technological and scientific progress. 5) Protection of astronauts 6) International responsibility of states 7) Jurisdiction and oversight 8) Environmental Protection and Preservation 9) International Cooperation

In order to prevent discrimination and equal utilization of GSO, the International Telecommunication Union (ITU) mandates that it is binding for a country to fill GSO slots within a certain period of time after obtaining the right to place satellites, because if it does not do so in a timely manner, the country will lose the right to use GSO, and ITU will hand over the slot to another country according to the queue list (Nugraha & Paramita, 2019). Satellites placed in the GSO region by developed countries in science and technology have several purposes, one of which is for telecommunications and weather and environmental monitoring, however, often the placement of satellites in this orbit is not used properly, for example the use of spy satellites means the use of satellites for non-peaceful purposes, remote sensing without permission from the country being sensed for natural resource data, and direct broadcasts via satellites for propaganda, these activities can violate the prerogatives of sovereign states (Farhani & Chandranegara, 2019). There are many orbiting satellites in space however, only GSOs are often discussed internationally due to their orbital features, which are defined as limited SDAs that exist only on the Earth's equator and nowhere else.

As a limited and step resource, GSO is important to be utilized efficiently because if GSO utilization is not done efficiently and exceeds its orbital carrying capacity, it can cause saturation in the GSO orbit. GSO should be utilized efficiently, rationally, and economically, and for the benefit of all countries by considering the needs of developing countries. This is because basically, every country is free to explore and use space in accordance with international law and based on the principle of equality. In addition, not only is space the province of all mankind, but it is not owned by any state. To achieve peace, the exploration and use of space should be carried out for the benefit of every country, regardless of its economic level or technological and scientific progress.

CONCLUSION

As a limited natural resource, GSO can only be occupied by a limited number of space objects, so it must be used efficiently and economically to meet the interests of all mankind. From earth, GSO looks like a fixed object because its rotation is the same as that of the earth. Placing satellites on GSO has several advantages over placing satellites on different orbits. These include wider coverage, flexibility, clearer quality of information, earth-placed transmissions and antennas, which will be used more effectively and efficiently for countries made up of various islands, and the ability to use a single satellite to enable continuous communication between various ground stations. As a finite natural resource, GSO is limited in the characteristics that it must be used in a logical, balanced, effective, and equitable manner. Saturation may result from exploitation of GSO without considering these principles. GSO should be considered as a special area in space that requires special legal and technical governance. The utilization of GSOs should also take into account the interests and rights of developing countries.

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