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The Commercialization of Outer Space Under the Outer Space Treaty 1967 and Its Implementation on the Development of Space Industry in Indonesia

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***Abstract*—The commercialization of outer space that has taken place intensively in the last two decades has been directing space law to be more responsive to private and commercial issues. Indonesia has been carrying out activities in space since 1976, namely the launch of the PALAPA Communication Satellite series and plans to build a space launch facility that will start operating in 2040. To date, there has been no specific regulation regarding the commercial space activities in Indonesia whereas commercial space activities will cause legal problems that need to be anticipated. This study will explore the regulation on the commercial space activities under the Outer Space Treaty 1967 and its implementation on the development of space industry in Indonesia. This study concluded that the Outer Space Treaty of 1967 implicitly justifies commercial space activities. However, this treaty still requires further elaboration, particularly in the form of regulations on commercial space activities. The establishment of commercial space activities regulations would then encourage the development of space industry in Indonesia as the potential for the development of space industry in Indonesia is very high. This study uses normative legal research, which is primarily based on the secondary data that relates to the commercialization of outer space.**

Keywords—commercialization, outer space, space industry

I. INTRODUCTION

Space commerce or commercialization of space was known as a new term in space activities. Space commercialization refers to activities related to the provision of outer space products or services by private parties [1]. Often the commercialization of space activities is carried out through a privatization process [1]. One of space commercialization that is quite important in terms of economic, political, and technological achievements is the procurement and use of launch services. The involvement of the private sector in space object launch activities can be carried out in various schemes, including the Public-Private Partnership cooperation scheme. Indonesia is one of the countries that is trying to use this cooperation scheme with the Russian Government through cooperation on the exploration and use of outer space for peaceful purposes which was signed on December 1, 2006 [2]. In general, the cooperation between the Governments of Indonesia and Russia covers several fields [3], but this research will focus on the cooperation in procurement and use of launch services, that is planning to build a spaceport (Space Launch Facility) which will involve non-government entities in its implementation.

The construction of the Space Launch Facility is a very complex and *high-cost* activity [4]. This can be seen in terms of the fulfilment of basic and supporting facilities, the selection of small-scale and large-scale aerospace developments, as well as types of static or mobile launch vehicles. Therefore, a good financing scheme is needed because it will affect the motivation and commitment of the participating parties [5].

Prior to the construction of the Space Launch Facility in Biak, Indonesia's space activities seemed to be limited to using satellite launch services and leasing satellite transponders, so that the legal consequences that arose were more related to Indonesia's position as a satellite owner. All communication satellites owned by Indonesia were launched outside the territory of Indonesia. Therefore, it is unlikely that there will be a threat of environmental damage or loss of life in Indonesian territory if the launched satellite get collision. In this context, Indonesia is a launching state with the category of "a State which launches a space object" as stipulated in the Liability Convention 1972. Meanwhile, Indonesia's involvement in the construction of the Space Launch Facility in Biak will place Indonesia as a launching state with the category “a State from whose territory or facility a space object is launched”.

Indonesia's position as a launching state, both in the first category and in the second category has the potential to cause harm to the environment or loss of life in the territory of Indonesia if the launched satellite falls and this will have legal consequences that need to be anticipated. The legal consequences that arise basically come from two sides, namely from international conventions regarding the use of outer space

and from the cooperation itself. The legal consequences arising from the first source are a consequence of Indonesia's position as a party to two international conventions governing the use and utilization of outer space, namely 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* (hereinafter referred to as *the Outer Space Treaty 1967*) and *the 1972 Liability Convention.*

One of the characteristics of commercial space activities is the involvement of non-government entities. Article VI of *The Outer Space Treaty 1967* recognizes the existence of space activities carried out by non-governmental entities. Article VI of *The Outer Space Treaty 1967* states as follows:

> *States Parties to the Treaty shall bear international responsibility for national 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 national activities are carried out in conformity with the provision 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.*

This article implies an acknowledgment of the existence of commercial aspects in the utilization and use of outer space. In essence, Article VI is related to the issue of state responsibility for space activities, both those carried out by government agencies and those carried out by non-governmental entities, including the private sector. In other words, it regulates the government's authority over the activities of non-governmental entities. Thus, the delegation of responsibilities from the state to private parties as non-governmental entities needs to be regulated in Indonesian national legal instruments which include licensing forms and mechanisms, as well as mechanisms for state responsibility for the activities of non-governmental entities in outer space. Potentially, the development of space industry in Indonesia is very high as Indonesia has been involved in space commercialization activities since 1976 when Indonesia has been carrying out the launch of the PALAPA Communication Satellite series [6]. The construction of the *Space Launch Facility* in Biak will further strengthen Indonesia's involvement in the use and utilization of space and establish it as one of the launching states. Indonesia plans to build a space launch facility and is expected to start operating in 2040. This plan has been stipulated in Presidential Regulation Number 45 of 2017 concerning the Master Plan for the Implementation of Space 2016-2040 [7].

Based on the description above, the study of the legal aspects of space commercialization activities and their implementation on the development of the space industry in Indonesia will be the focus of this research. Indonesia has the Act Number 21 of 2013 concerning Space (hereinafter referred to as Indonesian Space Law) which, among other things, regulates the commercialization of outer space, but still requires further elaboration. Problems that will be discussed in this research are: Firstly, how is the regulation of commercial space activities under the *Outer Space Treaty 1967*? and secondly, how is the implementation of the regulation of commercial space activities under *the Outer Space Treaty 1967* in accordance with the development of the space industry in Indonesia?

II. Research Methods

This study used normative juridical method which is primarily based on the secondary data by way of conducting library research that relates to the commercialization of outer space. While the primary legal materials consist of all the international treaties governing outer space activities (Corpus Juris Spatialis) both directly and indirectly, secondary ones included the references, including books, journal articles as well as conference papers and other documents having correlation with the issues. The technique of analysis data used legal interpretation. Specifically, the international agreements as primary legal materials include: Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 1967 (the Outer Space Treaty) and Convention on International Liability for Damage Caused by Space Objects, 1972 (the Liability Convention).

III. Review on Commercialization of Outer Space and Space Industry in Indonesia

A. An Overview on Commercialization of Outer Space

The discussion on the commercialization of outer space (read commercial space activities) in this chapter is specifically intended to seek legal justification whether commercial space activities have legality or not according to the existing space law. This is important considering that commercial space activities as well as other activities that utilize space are subject to the provisions stipulated in the Outer Space Treaty 1967 [8].

Basically, the Outer Space Treaty 1967 does not have articles that explicitly mention the term 'commercialization'. The standard terminology used is 'exploration and use of outer space' [9]. This happened at least due to two things, first, activities in space were initially carried out almost entirely by the state. Second, the activities of countries in space were originally intended for military purposes (especially the United States and the Soviet Union), so that the current space law paradigm is more inclined to the military paradigm than the commercial paradigm.

Paying attention to how the situation when the embryo of space law is prepared where the role of the state and military aspects is very dominant, it is very understandable if the commercial aspect has not been prominent. However, the absence of commercialization terminology in space law instruments does not necessarily mean that the use of space for commercial purposes is not permitted. Several UN General Assembly Resolutions provide precedents regarding the commercialization of outer space which were later confirmed as legal principles in the Outer Space Treaty 1967 which implicitly justifies the commercialization of outer space. It is said to be implicit because the Outer Space Treaty 1967 is a 'basic legal instrument' for regulating activities in space [10].

The standard terminology used in the Outer Space Treaty 1967 is 'exploration and use of outer space'. The use of the word 'exploration' does not include the notion of 'commercial use'. However, when combined with the word 'use', it can mean a wider possibility of utilization, namely not only for limited exploration purposes, but also including commercial forms. Thus, the use of the word 'exploration' alone can negate the use of space for commercial purposes. When added to the word 'use' offers a substantial argument for the commercial use of space. In this regard Rossenfield as quoted by Hanneke stated as follows [9]: "…the history of the Outer Space Treaty indicates that 'use' was specifically added not merely as an explanation, but as expansion of the limited term 'exploration'".

Preamble the Outer Space Treaty 1967 also provides a sentence that gives implicitly an indication that the use of outer space for commercial purposes is permitted. The first paragraph of the Preamble says: "recognizing the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes". The use of the word 'progress' specifically supports the conclusion that the progressive use or use of space, even if it is limited to peaceful purposes, is not only permitted but is already one of the objectives of the Outer Space Treaty 1967. Referring to this thought, the use of outer space commercially can only be done if a certain level of progress in the use of space has been achieved.

The legality of this commercial activity will be more focused by analysing Article I and Article VI of *the Outer Space Treaty 1967*. Basically, *Article I the Outer Space Treaty 1967* [11] stipulates the principle of 'freedom of exploration and use' for the benefit of countries (for the benefit of states). This implies that only the state has the right to engage in space activities and not private entities. However, *Article VI of the Outer Space Treaty 1967* [12] recognizes the existence of space activities carried out by non-governmental entities. This article implies an acknowledgment of the existence of commercial aspects in the utilization and use of outer space. This article offers freedom for "non-governmental entities" and responsibilities for "State parties". In essence, *Article VI of the Outer Space Treaty 1967* deals with the issue of state responsibility for space activities, both those carried out by government agencies and those carried out by non-governmental entities, including the private sector. Recognition of the existence of space activities carried out by private parties indicates an acknowledgment of the existence of commercial aspects. The formulation of this article is likely to be considered to accommodate the use of outer space for commercial purposes. The birth of this article can even be seen as a strong incentive for overall recognition of the commercial exploration and use of outer space. At least it is recognized within the framework of *the Outer Space Treaty 1967*.

B. The Development of Space Industry in Indonesia

Indonesia has been involved in outer space activities since 1963 which was marked by the establishment of the Institute for Space and Aviation (LAPAN). This involvement became even more concrete when Indonesia succeeded in launching the telecommunication satellite PALAPA in 1976 which placed Indonesia as the third country in the world to launch a satellite into space. The following are some forms of Indonesia's participation in outer space activities [13]:

- Since 1966 it has been involved in Intelsat's space activities;
- Since 1976 Indonesia has operated the SKSD PALAPA satellites;
- Until now, it has operated several satellite systems for various purposes such as communication, broadcasting, remote sensing, and survey activities [14].

These space activities have not involved the private sector (non-government entities), so it can be understood if the involvement of non-governmental entities in space activities in Indonesia has not been regulated in full and in detail.

The existence of non-governmental entities in space activities began to receive legal recognition and regulation after Indonesia signed a space cooperation with Russia and after Indonesia had a law governing space activities, namely the Act Number 21 of 2013 on Outer Space. Indonesia signed a cooperation in space activities with Russia in 2006. The full name of the agreement is the *Agreement between the Government of the Republic of Indonesia and the Government of the Russian Federation on Cooperation in the Field of the Exploration and Use of the Outer Space for Peaceful Purposes* (hereinafter referred to as the Agreement). The follow-up to this cooperation agreement is to start the construction of the Space Launch Facility in Biak. For Russia, the construction of the space launch facility in Biak is the third space launch facility located outside of its territory after two other launch sites located in Kazakhstan and in Guyana, France [15].

The Agreement as the main agreement that regulates cooperation in the exploration and use of outer space for peaceful purposes between the Government of the Republic of Indonesia and the Government of the Russian Federation uses three institutional terminology that will be involved in the implementation of this cooperation, namely *participant* (actors), *competent agencies* (authorized agency), and *designated organizations* (implementing organizations) [2]. Of the three institutional terminologies used in the Agreement, the

terminology *designated organizations* implicitly acknowledge the existence of non-governmental entities to engage in space activities. According to the Agreement, the term *designated organization* is an entity, organization or legal entity that is a subject of public law or a subject of civil law. The explicit inclusion of the phrase *subject of private law* indicates that the definition of *designated organizations* includes private legal entities or in the sense of Article VI of *the Outer Space Treaty 1967* referred to as non-governmental entities (non-governmental entities). This understanding was confirmed when LAPAN as a *competent agency* from the Indonesian side then appointed a private company, namely PT. ALCN (Air Launch Centra Nusa) to carry out collaborative activities for the procurement and use of launch services within the framework of this cooperation.

Observing the existence of designated organizations, one of which can be in the form of a private legal entity (subject of private law), it can be said that the existence of non-governmental entities in space activities in the Indonesian space regulation system is not independent. That is, its existence depends on government policies, one of which is through appointments such as the appointment of PT. ALCN. When using the terms and criteria as stipulated in Article VI of the Outer Space Treaty 1967, the mechanism adopted by Indonesia fulfils the requirement to provide "authorization" and carry out "continuing supervision" for non-governmental entities that will carry out space activities. In the framework of this Indonesia-Russia cooperation, certain ministries and LAPAN are authorized to authorize and carry out continuous supervision of non-governmental entities they designate. For the term non-government entities, the Agreement uses the term subjects of private law (subjects of civil law). Although the cooperation agreement with Russia did not continue, the plan to build a satellite launch facility into space in Biak is continuing. This year, LAPAN will start construction with an Environmental Impact Analysis (AMDAL). Currently the land claimed to belong to LAPAN is still in the form of production forest which can still be converted. The target is for this construction to be completed in 2023 or 2024 [16].

The existence of non-governmental entities in Indonesian space law became clearer after Indonesia enacted the Space Law on August 6, 2013. The Act recognizes non-government entities as one of the actors or actors in the organization of space activities.

IV. Results and Discussion

A. Legal Consequences of Commercial Space Activities Under the Outer Space Treaty 1967

Commercial space activities raise some legal consequences that need to be anticipated, considering that exploration and utilization of outer space requires space science and technology, *high technology*, high cost, and high risk. Several legal aspects that need to be considered in space activities, especially the activity of providing commercial space launch facilities and services, include the issue of the licensing mechanism, financing schemes, and the issue of the parties' liability for possible damages suffered by other parties in the event of an accident at the time of the accident. space activities.

One of the characteristics of commercial space activities is involving the private sector as the organizer of the activity. In the context of space law, the private sector is known as a non-governmental entity that can be an actor in space activities. As has been explained, the legal aspects of space commercial activities will lead to the issue of legal subjects as the organizers of the activities and the issue of the parties' accountability for possible losses suffered by other parties in the event of an accident in space activities. The terminology of non-governmental entity as stipulated in Article VI of *the Outer Space Treaty 1967* is not a stand-alone term but is closely related to other terms which are also included in that Article. Consequently, to find out how the forms and mechanisms of accountability of non-governmental entities in space activities are, it is necessary to first clarify the meanings associated with the term. For this reason, in discussing non-governmental entities and their accountability systems, it is necessary to understand several related terms, such as *national space activities*, *appropriate state*, and *authorization and continuing supervision*.

The terminology of non-governmental entities is specifically mentioned in Article VI of *the Outer Space Treaty 1967*. However, it does not regulate the responsibility of this entity when carrying out some outer space activities that cause damage to third parties. The Outer Space law explicitly regulates state responsibilities both in terms of *responsibility* and in terms of *liability*. The absence of rules regarding this matter does not mean that it excludes the responsibilities of non-governmental entities, but rather is related to the nature and form of responsibilities.

Space law which is characterized by state character (etatist regime) places the state as a central entity in space activities, including legal responsibility for the losses it causes. States are internationally responsible for their space activities, whether carried out by government agencies or non-governmental entities [12]. In contrast to government agencies that independently without requiring authorization and supervision from the state can carry out space activities, the space activities of non-governmental entities depend on authorization and supervision from the state. Thus, the responsibility of non-governmental entities must be placed in the system of state responsibility in space law. The responsibilities of non-government entities are not carried out directly in the sense that the implementation of these responsibilities is carried out directly with the victim (indirect responsibility). The responsibility is concretely carried out by the state (direct responsibility). In a more specific legal language, this principle of responsibility is referred to as vicarious liability, some also call it *principal's liability' liability*, *employers*, *master-servant liability* [17].

Although it does not fully adopt the principles of vicarious liability, the responsibility of non-governmental entities in

space activities applies the essence of the principle of *vicarious liability*, that is the granting of control rights to the principal or the owner of the authority. Furthermore, the form and mechanism of responsibility of non-governmental entities must be viewed in the context of state authorization and supervision of space activities carried out by non-governmental entities. The responsibilities of non-governmental entities are essentially an integral part of the international responsibilities of each entity that carries out space activities.

B. The Implementation of the Outer Space Treaty 1967 in the Development of Space Industry in Indonesia

As mentioned above, the potential for the development of the space industry in Indonesia is very high as Indonesia has been involved in space commercialization activities since 1976. Refer to provisions on the commercialization of outer space under *the Outer the Outer Space Treaty 1967*, commercial space activities can be understood as products or services provided by the private sector, and which are directly dependent on the outer space component. According to Mardianis, the commercialization of space has four characteristics, namely [18]:

- Private capital that is risky in its development and operation;
- The existence of non-government entities as users and potential users;
- The existence of market forces that determine the sustainability of the commercialization of space; and
- Primary responsibility and management responsibility rests with the private sector.

At the practical level, space commercialization activities in Indonesia are divided into two groups, namely the upstream component and the downstream component. Included in the activities in the upstream component are satellite manufacturers, launcher manufacturers, and launch service providers, while activities in the downstream component are space service providers consisting of telecommunication satellite service providers, remote sensing, and global navigation [18].

Several sectors of outer space commercial activity in Indonesia have been around for a long time but have not yet become a growing industry from a business perspective. This is due to the absence of regulations and implementing instruments that guarantee the continuity of this activity. Therefore, the researcher will focus on the implementation of the provisions of the Outer Space Treaty in the Indonesian space laws and regulations to anticipate legal problems that will arise from commercial activities in outer space, especially in space launch facility provider sector.

Indonesia's status which has ratified international space law instruments [19] and various regional and bilateral agreements [20-22] has resulted in the consequences of Indonesia's commitment to the provisions of these legal instruments which is requiring implementation arrangements. The establishment of this implementation arrangement is timely significant for Indonesia as the advance of space science and technology has a very large contribution to the fulfilment of Indonesia's national interests.

The act on outer space in Indonesia was ratified and promulgated in Jakarta on August 6, 2013. The name of the instrument is The Indonesian Act Number 21 of 2013 concerning Outer Space (hereinafter referred to as the Space Law). The implementation of the provisions of international space law as the background for the formation of this law, was later formulated as one of the objectives of the Space Law as stipulated in Article 2, as follows: "This law aims to optimize the application of international agreements on Space in the national interest" [23]. Legal aspects of commercial space activities under *the Outer Space Treaty 1967* has been implemented in the Space Law. Overall, provisions of the Space Law includes materials on space activities, space administration, development, spaceports, security and safety, prevention of falling space objects as well as astronaut search and assistance, registration, international cooperation, responsibility and compensation, insurance, guarantees, and facilities, environmental conservation, funding, community participation, and sanctions [12].

Refer to the materials above, commercial space activities in Indonesia have obtained legality in line with the provisions of the existing space law. However, the provisions of the Space Law still require further elaboration to encourage the development of the space industry in Indonesia.

The elaboration of the provisions in the Space Law regarding cooperation agreements for exploration and use of space, especially the launch vehicle industry is very necessary. The development of the *Space Launch Facility* in Biak as an example of space industry in Indonesia will have several legal consequences. Indonesia will be the party who responsible for possible damages suffered by other parties. However, for the damage suffered by certain parties, the provisions in the *Liability Convention 1972* cannot be applied. These parties are nationals of launching countries or foreign nationals involved in launching celestial bodies into space [24]. To these parties will apply the national laws of the countries related to the launch activity. In connection with the cooperation agreement on space exploration and utilization between the Government of Indonesia and the Government of the Russian Federation, which has placed Indonesia as a launching state in a complete sense, not only as a state launching space satellites but also providing launch facilities, Indonesia must anticipate the coming legal problems on these situation which include responsibility for possible damages suffered by certain parties as mentioned above, including the prosecution mechanism. In addition, this problem will become more complicated as the launch system used is an *air launch system*, so it will involve the air law regime, especially if there is an accident in the launch.

V. CONCLUSION

This study concluded that the Outer Space Treaty of 1967 implicitly justifies commercial space activities. However, this treaty still require further elaboration, particularly in the form of regulations on commercial space activities. Then, the establishment of commercial space activities regulations would encourage the development of space industry in Indonesia as the potential for the development of space industry in Indonesia is very high.

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