

PROCESSING AND RECYCLING OF RESOURCES IN OUTER SPACE: INTERNATIONAL LEGAL ASPECTS

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ABSTRACT. This paper deals with current issues of legal regulation of mining activities on the Moon and other celestial bodies. The Outer Space Treaty 1967 and the Moon Agreement 1979 provisions, relating to these activities, are interpreted in different ways by the outer space participants, which do not contribute to a unified legal approach to the exploration, extraction and utilisation of space resources. To date, one of the most prospective areas of activity in outer space is the exploration of natural resources on celestial bodies. Of course, from an economic point of view, the extraction of natural resources on the Moon and other celestial bodies and their subsequent delivery to the Earth today is not appropriate, since the development of terrestrial resources is much easier, cheaper and more efficient. However, with the advance of technological progress and the decrease in the amount of minerals on Earth, this activity could become beneficial to mankind. In addition, it is also worth noting that the interest in space research is shown not only by the states within its space programmes, but also by private corporations. This paper shows how exploration, extraction and utilisation of space resources is regulated under international space law to date.

Keywords: international space law, natural resources, outer space

ПРЕРАБОТВАНЕ И РЕЦИКЛИРАНЕ НА РЕСУРСИТЕ В КОСМИЧЕСКОТО ПРОСТРАНСТВО: МЕЖДУНАРОДНИ ПРАВНИ АСПЕКТИ

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РЕЗЮМЕ: Този доклад е свързан с актуални въпроси относно правната регулация на минните дейности на Луната и други небесни тела. Разпоредбите на Договора за Космоса от 1967 г. и Лунното споразумение от 1979 г., свързани с тези дейности, се тълкуват по различен начин от участниците в космическото пространство, което не допринася за единен правен подход относно проучването, добива и използването на космическите ресурси. Към днешна дата една от най-перспективните области на дейност в космическото пространство е проучването на природните ресурси в небесните тела. Разбира се, от икономическа гледна точка, извличането на природни ресурси на Луната и други небесни тела и последващото им транспортиране до Земята днес не е подходящо, тъй като разработването на земни ресурси е много по-лесно, по-евтино и по-ефективно. С напредъка на технологичния прогрес и намаляването на количеството на минералите на Земята обаче, тази дейност може да се окаже полезна за човечеството. Освен това, заслужава да се отбележи, че интересът към космическите изследвания проявяват не само държавите в рамките на своите космически програми, но и частните корпорации. Докладът показва как проучването, добивът и използването на космическите ресурси са регулирани според международното космическо законодателство до този момент.

Ключови думи: международно космическо право, природни ресурси, космическо пространство

Introduction

One of the most perspective areas of activity in outer space is the extraction of natural resources on celestial bodies. Of course, from an economic point of view, the extraction of natural resources on the moon and other celestial bodies and their subsequent delivery to the Earth today is not appropriate, because the development of terrestrial resources is much easier, cheaper and more efficient. However, with the advance of technological progress and the decrease in the amount of minerals on Earth, this activity could be beneficial to mankind. Moreover, it is also worth noting that interest in space exploration is shown not only by states in the framework of their space programmes, but also by private corporations.

In addition, this work will address the issues of the legal status of mining and processing plants as a space station on celestial bodies, as it is also a subject of discussion.

The object of this research are the interstate relations arising in the sphere of mining activity on celestial bodies.

The subject of this study are the international conventions, international customs, general principles of law, judicial decisions and doctrines governing inter-state relations arising in the field of mining on celestial bodies.

The purpose of this study is to investigate and analyse the legal status of mining and processing plants in the celestial bodies. To achieve this goal, it is necessary to perform the following scientific tasks:

- ❖ Analyse the right status of natural resources on celestial bodies;
- ❖ Analyse the right status of space stations on celestial bodies.

The legality of extraction of mineral resources

Of the five outer space treaties, only two (the Outer Space Treaty, 1967 and the Moon Agreement, 1979) address the exploration, exploitation and utilisation of space resources. The legal status of the Moon and other celestial bodies is mentioned only in Article I of the Outer Space Treaty, according to which "The exploration and use of outer space, including the moon and other celestial bodies [...] and shall be the province of all mankind.", and that "Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States". In accordance with article IV of the Outer Space Treaty, "The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes". But it should be borne in mind that in this Treaty there is no direct reference to the term "natural resources".

Art. 11 of the Moon Agreement deals specifically with the legal status of the moon and its natural resources. It states that the Moon and its natural resources are the common heritage of mankind, the Moon is not subject to national appropriation, and that the surface or subsoil of the moon, as well as neither the surface nor the subsurface of the moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental organisation, national organisation or non-governmental entity or of any natural person. In accordance with art. 11 States undertake to establish an international regime, to govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible. However, such a regime will not be established in the near future due to the fact that no state applying for the extraction of natural resources by virtue of developed technologies is a party to the Treaty. Only 18 States are parties to the Treaty (and 4 States are only signatories), and its legal force does not extend to the space powers.

In addition, the Moon Agreement contains many other points for discussion. There are conflicting views of scientists on the concept of *res communis humanitatis*: for example, some argue that the use of celestial bodies requires the actual purchase of parts of these celestial bodies, in particular, in the implementation of mining, while others argue that all natural resources that have been mined in outer space and delivered to Earth can be used for commercial purposes if they are used for the benefit of the world community. In addition, some scientists hold the view that article 11, paragraph 4, of the Moon Agreement does not imply granting additional rights with respect to natural resources, but only applies to such methods of exploration and use of the moon and other celestial bodies as: landing, take-off, deployment of personnel, the creation of manned and unmanned stations, etc.

International treaties in the field of international space law, existing today, cannot give a clear answer to the question of the legal status of natural resources of the moon and other celestial bodies, and paragraph 5 of article 11 of the Moon Agreement from 1979, which involves the adoption of an international regime, has no legal force for space powers. Thus, this work will consider the prospects for the adoption of an international Treaty by the international community that would regulate the legal status of the resources of the moon and other celestial bodies.

Private corporations that need to regulate their activities at the national level are also becoming increasingly influential in the exploration of outer space. National legislation allowing private companies to mine and appropriate resources without claiming ownership of the celestial body itself, such as an asteroid or the Moon, has been adopted in the United States and Luxembourg. These laws have caused a mixed reaction in the international community. Thus, some scientists say, that such actions violate the principle *nemo dat quod non habet*, according to which, States cannot provide their national organisations, non-governmental entities or citizens' rights that they do not have. However, it is worth noting, that the law makes a direct reference to international treaties under which the United States has obligations. The Law of Luxembourg also makes a reference to its international obligations. For example, Russia proposes to ban the mining activities on the Moon and other celestial bodies through the adoption of an implementation agreement.

Summing up what was said above, we can claim, that States do not have an agreement on space resources exploration, exploitation and utilisation regime. Possible solution to this issue might be the following: Accession of the space powers to the Moon Agreement; Adopting a new convention or a Protocol to Outer Space Treaty; Use the Area, Antarctic or Arctic regime; Waiting for the lawsuit at ICJ, concerning mining activities on celestial bodies.

Accession of the space powers to the Moon Agreement. To date, the Moon Agreement has not received proper attention from the space nations, due to the lack of consensus on the international regime of the Moon and other celestial bodies. The cause of the disagreement was para 5 Article 11: The United States wanted to start exploration of natural resources prior to establishing the regime, and the USSR after that. To date, this issue is still controversial.

In addition, the space powers are unlikely to become a party to the Moon Agreement due to the fact that it does not give rise to any rights for them, but only obligations.

Use of the Area, Antarctic or Arctic regime. This variant should be only temporary until the States establish an international regime to govern the exploration of natural resources on the Moon and other celestial bodies. Thus, the regime of the Area can be applied, in accordance with which "the Authority", that will be created by an analogy with Part XI, Section 4 of United Nations Convention on the Law of the Sea 1982, will be established and will organise, carry out and control mining activities on the Moon and celestial bodies.

If the States will decide to use the Antarctic regime, any activities related to mineral resources, other than scientific research, will be prohibited in accordance with Article 7 of The Protocol on Environmental Protection to the Antarctic Treaty.

In case of using "the old Arctic regime", each space power will be given a territory (a sector), on which it will have sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources.

However, it should be noted that the use of these treaties by analogy will not involve all aspects of the governing the exploitation of natural resources in outer space. Thus, there are still uncertainties with mining activities on asteroids because they are small. And this problem may be the most important in the issue of mining activities in outer space due to the fact, that the value of a single asteroid could be somewhere in the trillions of dollars, or even higher.

Raising the issue of the international regime on asteroids, it can be proposed to recognise them in a future treaty as *res nullius* and to allow States, in accordance with the developed procedure, to explore and exploit natural resources on them.

Waiting for the lawsuit at International Court of Justice, concerning mining activities on celestial bodies.

One of the most probable, but at the same time the most controversial way of solving this issue, is to do nothing in the field of making such an agreement among space powers. In this instance we should wait, when one State will start mining activities on celestial bodies and the others will file a lawsuit against it with the International Court of Justice.

In connection with the fact that none of the space nations is a party to the Moon Agreement 1979 the International Court of Justice will proceed from the provisions of the Outer Space Treaty and will interpret articles relevant to this issue.

However, it should be noted that in this case, such a decision may not satisfy any of the parties because the decision of the International Court of Justice will not contain the will of any state.

Adopting a new Convention or a Protocol to Outer Space Treaty. Taking into account the fact that the space powers are unlikely to join the Moon Agreement, this option might be the best solution to this issue.

This Convention or Protocol to the Outer Space Treaty will have to contain provisions on the legal status and regime of mineral resources, rules for their extraction, taking into account the characteristics of the lunar environment, other provisions relating to extraction and provisions on the authority to be established for the purpose of the organisation, carrying out and control of the mining activities on the Moon and celestial bodies.

Thus, it can be concluded that international treaties in the field of international space law existing today cannot give a clear answer to the issues of the legal status and regime of the lunar resources. In any case, space powers should find a solution to this issue due to the fact that mining activities on celestial bodies may already begin in the near future.

Legal status of a mining entity in the celestial body

In accordance with international space law, the exploration and use of outer space, including the moon and other celestial bodies, is the province of all mankind. In addition, the Moon and its natural resources are the common heritage of mankind. Thus, all States have equal access to parts of the celestial bodies and their natural resources.

However, this does not exclude the need for state control over such mining and processing plants, in order to ensure the necessary safety and security, as well as the avoidance and resolution of any conflicts and disputes between States. States must be able to lawfully carry out "some form of ownership", different from the rights of ownership of these stations, but that is not "full sovereignty". Thus, such possession must be permissible in the event that the state does not exercise "full sovereignty".

The above is enshrined in article VIII of the Outer Space Treaty, which provides that "A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body".

The main part of this provision relates to the period preceding space missions and originates in the attribution of law enforcement jurisdiction over a vessel on the high seas to the flag state. In addition, international air law recognises a similar principle for aircraft in international airspace law. Jurisdiction in international law means "law and enforcement of laws and regulations concerning persons and objects ". However, the competence of control is something more than a technical possibility. The state of registry may "adopt technical regulations for the mission of a space mission" and, if necessary, "direct, stop, modify and correct elements of a space object and its mission". The act of registration of a space object is the exclusive source for the exercise of "jurisdiction and control over such object and persons as in the case of ships or aircraft, although the space object has no nationality by registration other than that of ships or aircraft ".

Space activities have a strong impact on the environment. This applies not only to the pollution of the Earth during the production of launch vehicles and their launches into outer space, but also to the negative impact on the environment of celestial bodies and on outer space as a whole. Emissions from a mining and processing plant, arising in the course of its activities, will have an additional negative impact on the environment of the celestial body.

The most negative impact on the environment of outer space has space debris, various kinds of nuclear pollution, space stations with a crew, as well as astrobiological pollution. Abandoned space objects have the potential to pollute outer space with all of the above elements. The threat of space debris is the most likely: according to experts, there are about 100000 space objects of different sizes in the earth's orbit. About 10000 objects are tracked, and less than 1000 of them are operational.

Although there is no single concept of space debris in international space law, some definitions have been developed within the framework of the activities of international organisations: the international Academy of Astronautics, the scientific and technical Subcommittee of the Committee on the Peaceful Uses of Outer Space, and the Inter-Agency Space Debris Coordination Committee. The most general and understandable definition is given by the Inter-Agency Space Debris Coordination Committee, according to which space debris are all artificial objects in earth orbit or in the atmosphere that are not functional.

At the same time, such abandoned enterprises may interfere with the radio communications of operating satellites and other spacecraft and disrupt the receiving frequency bands on which sensitive devices such as ground radio telescopes operate. The damage that such a space object may cause may range from a minor damage to the total loss of the spacecraft. It can also lead to contamination with radioactive and other harmful substances. The potential damage caused by even the smallest particle of space debris circulating in outer space is due to the fact that the impact speeds in orbits are enormous; on average, debris moves several times faster than a bullet.

It is worth noting that the question of classifying an object as space debris is in many cases more complex than it might seem at first glance. Under the 1967 Outer Space Treaty, the state on whose registry a space object is located has the authority to exercise jurisdiction and control over that object. It was suggested that the provision implied that only the state of registration had the right to determine whether its space object

was functional. While other States may perceive a space object as completely useless, in fact it may, for example, be in reserve for future activities, carry valuable classified information or be of any other interest to other States. Therefore, the criterion of "functionality" may not be the most appropriate one to distinguish between space debris and other space objects; even seemingly non-functional space objects may be valuable assets.

However, it should be understood that a state that leaves such an abandoned enterprise would violate the Space Treaty provision, which enshrines the principle of free exploration and use of outer space and free access to all areas of celestial bodies on the basis of equality and non-discrimination.

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