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MANAGEMENT OF OUTER SPACE ECONOMIC RESOURCES – LEGAL AND POLITICAL CHALLENGES

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Abstract. *Outer space resources of celestial bodies are accessible for the leading space-faring nations and their private space corporations. The absence of international legal mechanisms of distribution and management of space resources could lead to a severe international conflict, pollution of celestial bodies, and duplication of space projects. The US interpretation of article II of the Outer Space Treaty, which allows usage of the resources of celestial bodies, leads to competition and even conflict with an alliance of Russia and China. There is a strong need for an above-national vision, which can consolidate the efforts of states and private actors, enlarge their capacity for space exploitation and decrease the tension in international relations.*

Key words. *outer space, space resources, space economy, space resource management*

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Introduction

In the last three years, outer space exploitation by states and private actors has entered a new stage of extracting and managing material resources from celestial bodies. There are several reasons for this shift. Firstly, the successful technological innovation of reusable rockets will allow a much faster and dozens of times cheaper way of sending space objects and personnel in Earth's orbit and on the Moon. Secondly, the attempts of the USA to remain a leader, which is working, in a US-centered format of cooperation triggered a response of China, Russia, India and even the European Union to strengthen their positions and be ready to participate in a competition for the exploitation of near-Earth celestial bodies. Thirdly, the ambitions and capacity development of the US private space industry to perform expensive long-term projects has incentivized competition with governments and private industry from other states.

International legal regulation of utilization of outer space resources

The international legal regulation of usage of outer space has existed since the beginning of international space law as a separate branch. The primary norm is in article II of the Outer Space Treaty, which foresees that "*outer space is not subject of*

national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."[1]

The second relevant international treaty that was supposed to regulate the utilization of the resources on the Moon is in the Moon Agreement. However, the lack of ratifications by leading space-faring nations led to the low status of the treaty and rejection of the legal principles and international institutional mechanisms agreed in it.

The recent position of the President of the USA, expressed in Executive order from April 2020,[2] illustrates an understanding of the US government that article II of the Outer Space Treaty permits appropriation of space resources and complete rejection of the Moon Agreement and objection to its capacity to reflect international legal custom.[3] Mosteshar rightly concludes that this is a unilateral attempt to circumvent the Outer Space Treaty and general international law.[4] Even if we accept the argument, initial bases on the Moon might comply with Art. II of the Outer Space Treaty, in time, that national settlement would violate this norm that prohibits national appropriation and occupation on celestial bodies.[5] The norms of Article II of the Outer Space Treaty have been accepted as international legal custom, and they carry the obligations for non-appropriation and non-occupation of the outer space to all states, private organizations and people.[6]

The future establishment of a facility, also named Moon Base Camp[7], is also a clear violation of Article II of the Outer Space Treaty, as this is a form of occupation and appropriation of parts of the Moon. The purpose of the rejected Moon Agreement[8] was to avoid such initiatives led by a group of countries in competition with other groups of countries. The Russian and Chinese responses to the accords

1 Article II of Outer Space Treaty, 1967
2 Exec. Order No. 13,914, 85 Fed. Reg. 20,381 (Apr. 6, 2020)
3 Mosteshar, Sa'id. "Artemis: The Discordant Accords." *J. Space L.* 44 (2020): pp.596-597
4 Ibid. p.597
5 Salmeri, Antonino. "Developing and Managing Moon and Mars Settlements in Accordance with International Space Law." In Proceedings of the 71st International Astronautical Congress 2020. International Astronautical Federation, 2020, p.4
6 Вылегжанин, А. Н., М. Р. Юзбашян, and М. А. Алексеев. "МЕЖДУНАРОДНО-ПРАВОВЫЕ ПЕРСПЕКТИВЫ ИСПОЛЬЗОВАНИЯ ПРИРОДНЫХ РЕСУРСОВ ЛУНЫ И ДРУГИХ НЕБЕСНЫХ ТЕЛ." (2021).
7 https://www.nasa.gov/specials/artemis-accords/index.html Last access November 30, 2021
8 The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Resolution 34/68 Adopted by the General Assembly. 89th plenary meeting; 5 December 1979.

culminated in deeper cooperation between the two states and a robust Sino-Russian alliance. Both countries initiated the International Lunar Research Station, consisting of a space station in Moon's orbit, a moon base, and mobile rovers and robots on the surface. Other countries are invited to join this initiative as well. It remains to be seen the attitude of India and most European countries.

The future of utilization of outer space resources could be supported by the good practices from the institutional mechanism of usage of the seabed resources, specifically the International Seabed Authority.[9] The comparison between the seabed and outer space reveals several common characteristics. They both have the legal status of a common heritage of all mankind; both are not subject to national appropriation and declaration of sovereignty; both have enormous economic potential. Koch argues that the International Seabed Authority provides a precedent for global commons' sustainable and equitable commercial development (the deep seabed).[10] The risks to conducting mining activities on the Moon, Mars, and other celestial bodies are related to these relatively new territories for exploration and mining. Other commercial activities could contaminate and destroy their essential scientific value.[11] Mining mineral resources from celestial bodies is an invasive act, leading to pollution and possible depletion of non-renewable resources.[12] In the case of the International Seabed Authority, the Central Data Repository manages the designation of areas of environmental interest, which are reserved for marine scientific research. Companies interested in commercial activities in those areas are required to receive an extraction license. Koch concludes that a similar embargo on specific sites in outer space could be feasibly considered.[13]

The role of the private space companies in the utilization of space resources

Viikari correctly summarized that the dominating attitude of treating outer space, including celestial bodies, is a mere resource reserve and a dump for the refuse

[9] The United Nations Convention on the Law of the Sea, part XI, section IV, 1982

[10] Koch, Jonathan Sydney. "Institutional Framework for the Province of all Mankind: Lessons from the International Seabed Authority for the Governance of Commercial Space Mining." *Astropolitics* 16, no. 1 (2018): p.7

[11] Ibid. p.16

[12] Sachdeva, G. S. "Space Mines: Dialectics of Legality." *Astropolitics* 7, no. 2 (2009): p.146.

[13] Koch, Jonathan Sydney. "Institutional Framework for the Province of all Mankind: Lessons from the International Seabed Authority for the Governance of Commercial Space Mining." *Astropolitics* 16, no. 1 (2018): p.16

produced by space activities.[14] This attitude is the leading risk with respect to polluting celestial bodies.

Private companies planning to use celestial bodies for tourism are interested in a safe ecosystem and lack of pollution in the long term. On the other side, other companies have commercial plans of exploitation of asteroids or the Moon through the mining of valuable resources. These activities would cause pollution and production of space debris that could jeopardize touristic activities or essential scientific projects. Sreejith is correct in his observation that space science is split into fragments and further divided into scientific projects for bids.[15] It is true that space activities include much more private actors presently than in the past and that space law development depends on commercial actors' interests in outer space.[16] The biggest problem that privatization and commercialization of outer space activities present to the development of international space law and achieving safety in the outer space environment is the lack of a philosophy to utilize outer space in the interest of humankind and its many scientific areas. The increasing commercialization of space activities requires adopting adequate and comprehensive liability rules, covering damages caused by space debris to goods and the environment.[17] In order to avoid the interests behind these different commercial activities colliding, it would be beneficial and practical to adopt governing mechanisms and long-term plans for the utilization of celestial bodies in advance.

A higher above-national vision of utilization of resources

There is a strong need to adopt a higher above-national perspective of governance that includes different commercial and scientific interests. It is also needed because particular locations on celestial bodies carry different scientific importance today regarding various scientific fields. For example, in radio astronomy, specific craters on the far side of the Moon have been identified to become "lunar quiet zones", as defined by ITU.[18] Other locations, such as the

[14] Viikari, Lotta. The environmental element in space law, Martinus Nijhoff, 2008, p.14

[15] Sreejith, S. G. "Unmaking a National Space Legislation for India: Indigenizing Space Law through the Organic Science of the Indian Space Program." J. Air L. & Com. 83 (2018): p. 118

[16] Benkö, Marietta, Kai-Uwe Schrogl, Denise Digrell, and Esther Jolley, eds. Space law: current problems and perspectives for future regulation. Vol. 2. Eleven International Publishing, 2005. p.2

[17] Diederiks-Verschoor & Kopal, An introduction to space law, Kluwer Law International, 2008, p.121

[18] Presently the crater Saha is designated such status after the adoption of ITU recommendation 479-4

Daedalus crater, have been identified as suitable to become a new radio-quiet zone, and a proposal is made for receiving official status as such.[19] Maccone also substantiates that the far side of the Moon needs to be chartered as a special zone with a diameter of 1820 km only for scientific studies. This zone is referred to as Protected Antipode Circle.[20] Mining activities and touristic activities on celestial bodies should not be allowed to occur without regard to the need of other scientific fields, such as radio astronomy. Waste production on the Moon should also be meticulous, not significantly affecting radio frequencies. Touristic activities in outer space should be perceived as an increased risk for the generation of space debris and a source of financial resources necessary to fund orbital space cleanup.[21]

Conclusion

The increasing competition between states in outer space exploitation will lead to tensions and possible conflict in international relations, pollution of celestial bodies, and smaller long-term projects and investments. The alternative of competition is integrating national interests and consolidating the resources to culminate in more extensive space initiatives. The attempts of the USA to dominate in international relations and to set plans for colonization and mining of celestial bodies are in contradiction of Art. II of the Outer Space Treaty. This pattern of behaviour could trigger the next cold war in outer space, which this time will include an alliance between Russia and China to contain the USA and its allies.

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[19] Maccone, Claudio, June 9-11, 2010, COPUOS session.
[20] Ibid.
[21] Akers, Agatha. "To infinity and beyond: Orbital space debris and how to clean it up." U. La Verne L. Rev. 33 (2011): pp. 295-296

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