ARTICLE

The Legal Regime of Natural Resources of Celestial Bodies: Current State of the Relevant Russian Laws and Perspectives for a Common BRICS Legal Approach

Alexander Vylegzhanin,
MGIMO University (Moscow, Russian Federation)
https://orcid.org/0000-0003-4833-2525

Mariam Yuzbashyan,
MGIMO University (Moscow, Russian Federation)
https://orcid.org/0000-0003-3231-8489

Georgiy Suvorov,
ELWI (Moscow, Russian Federation)

https://doi.org/10.21684/2412-2343-2025-12-2-5-42

Received: October 13, 2024
Reviewed: November 14, 2024
Accepted: May 5, 2025

Abstract. In view of the current global outer space-related transformation processes, the legal regime concerning the natural resources of celestial bodies has become one of the most challenging issues to coherently resolve at international and, accordingly, national legal levels. This issue is even more evident in the context of the following factors. Firstly, international space law provides for a regime that is applicable to all space activities, but it has yet to establish a special regime specifically addressing the natural resources of celestial bodies. Secondly, in the absence of specific international law rules, contemporary international partnerships on celestial bodies, such as the US-led Artemis Campaign and the Sino-Russia initiative on the International Lunar Research Station (ILRS), do provide for their own vision on the

future use of lunar natural resources: for instance, the United States, along with fifty partner states, follows a proactive legal approach (both for exploration and exploitation) as stipulated in the Artemis Accords, while the alternative ILRS emerging partnership articulates a broader, more general vision of the future in-situ use of lunar resources for the support of the relevant missions. Thirdly, current Russian laws (as well as the Chinese) do not specifically address this issue unlike those of the United States, Luxembourg, the UAE, and Japan. Fourthly, the BRICS cooperation, which includes representatives of both *de facto* competing Moon partnerships, also extends to the outer space domain. And, fifthly, related activities in outer space are economically feasible provided that a balanced multilateral approach is negotiated. Accordingly, based on an analysis of all these factors, this article focuses on determining mechanisms for the convergence, where admissible, of the different legal approaches so that a balanced multilateral regime may be established.

Keywords: international space law; Outer Space Treaty; Moon Agreement; natural resources of celestial bodies; space resources; Artemis Accords; International Lunar Research Station (ILRS); Russian outer space laws; BRICS.

To cite: Vylegzhanin, A., Yuzbashyan, M., & Suvorov, G. (2025). The legal regime of natural resources of celestial bodies: Current state of the relevant Russian laws and perspectives for a common BRICS legal approach. *BRICS Law Journal*, *12*(2), 5–42.

Table of Contents

Introduction

The UNISPACE III (Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space held in 1999) report indicates that, since UNISPACE II (Second United Nations Conference within the series held in 1982):

> [T]he world has witnessed a considerable growth in the commercialization and privatization of space-related activities. That trend has led to significant increases in the number of non-state actors involved in the exploration and use of outer space, as well as the number of different activities in which they are engaged.[1]

Nowadays satellite telecommunications, navigation, positioning, launching, and remote sensing, as well as space tourism[2] are growing private industries. These kinds of space activities fall within the scope of the existing international space law and gradually receive additional national regulation in a number of states. As to the use of natural resources of celestial bodies, which was considered quite feasible for both governmental and private activities in the "not too distant future" a quarter of a century ago at UNISPACE III,[3] in view of recent developments, it has now become one of the most challenging legal issues in this field.

A comprehensive feasibility study on the use of natural resources of celestial bodies entails a complex assessment of diverse factors. Besides technological and economic viability,[4] this issue remains under pressure due to the unresolved

---

1 United Nations Office for Outer Space Affairs. (2000). *Proceedings of the Workshop on Space Law in the twenty-first century* (p. 7, para. 8). https://www.unoosa.org/oosa/oosadoc/data/documents/2000/stspace/stspace2_0.html

2 One of the latest developments in this field is the first commercial spacewalk, completed on September 12, 2024. Polaris Program. (2024, September 12). *Polaris Dawn crew tests new suit and completes first commercial spacewalk*. https://polarisprogram.com/polaris-dawn-crew-tests-new-suit-and-completes-first-commercial-spacewalk

3 United Nations Office for Outer Space Affairs, 2000, p. 7, para. 8.

4 *See, e.g.*, Dallas, J. A., Raval, S., Alvarez Gaitan, J. P., Saydam, S., & Dempster, A. G. (2020). Mining beyond earth for sustainable development: Will humanity benefit from resource extraction in outer space? *Acta Astronautica*, *167*, 181–188; Vylegzhanin, A. N., Yuzbashyan, M. R., & Alekseev, M. A. (2021). Inter-

international legal issues. In essence, international space law neither prohibits the exploitation of mineral resources of celestial bodies nor does it provide for the requisite multilateral regime.[5]

Furthermore, current global trends in space activity development in light of the significant changes in its critical factors, namely contemporary cooperation and competition in outer space, are presenting an array of new challenging issues, including geopolitical and, correspondingly, legal ones.[6] New actors in this field, both governmental and private ones, are represented in various contemporary Moon programs. For instance, in 2024 two diverse missions were successfully completed: in February an American private company accomplished the first commercial spacecraft lunar landing, and in March China's Chang'e 6 mission accomplished the first sample return mission from the lunar far side.[7] More broadly, the two new Moon exploration partnerships – the US-led Artemis campaign supported by the Artemis Accords with more than fifty signatories along with the alternative China–Russia intergovernmental cooperation in establishing the International Lunar Research Station with the increasing participation of more than ten other states as of 2025 (Table 1) – confirm the growing interest of the international community at every level in the potential use of natural resources of celestial bodies. Both partnerships involve collaboration with governmental and private actors in this field, and it is important for a thorough understanding to recognize the *de facto* subject matches in-between the participants, even in cases where direct interstate cooperation is formally restricted because of a prior membership in an alternative program.[8] In the context of subject intersections between the two competing Moon exploration programs, it should further be noted that the partners to the Artemis Accords – Brazil, India, and the United Arab Emirates, on the one side, and partners to the International Lunar Research Station – Russia, China, and South Africa, on the other side, interact within the framework of BRICS cooperation, which also seeks to cover the space activities domain[9] (*see* Table 1 below).

national legal prospects for the use of natural resources of the Moon and other celestial bodies. *Mining Informational and Analytical Bulletin*, *3*(1), 155, 156. (In Russian).

5 Kolosov, Y. M. (2007). Legal regime of the natural resources of the Moon and other celestial bodies. In A. N. Vylegzhanin (Ed.), *International legal basics of using subsoil* (pp. 237–242). Norma. (In Russian); Yuzbashyan, M. R. (2017). The US Space Resource Exploration and Utilization Act of 2015 and international space law. *Moscow Journal of International Law*, *106*(2), 71–86. (In Russian); Vylegzhanin, A. N., & Yuzbashyan, M. R. (2024). The status of natural resources of celestial bodies: novelties indicated by the practice of states. *State and Law*, *1*, 147–158. (In Russian).

6 Yuzbashyan, M. R. (2024). Topical trends in outer space cooperation/competition and perspectives on space law. *Journal of Law and Administration*, *20*(1), 103–119. (In Russian).

7 *See* the full list of major missions to the Moon at National Aeronautics and Space Administration. (n.d.). *Moon missions*. https://science.nasa.gov/moon/missions/

8 *See* the case of China's ILRS cooperation with a UAE (one the partners of the American-led program) non-governmental entity in Yuzbashyan, 2024, p. 108.

9 Yuzbashyan, 2024, p. 109.

Table 1

Signatories to the Artemis Accords, the International Lunar Research Station, and their Membership in BRICS

Artemis Accords[10] **Signatories** (55 as of June 2025)[11]	**International Lunar Research Station Signatories**[12] (13 as of June 2025)[13]	**BRICS Member States** (10 as of June 2025)[14]
Angola, Argentina, Armenia, Australia, Austria, Bahrain, Bangladesh, Belgium, Brazil, Bulgaria, Canada, Chile, Colombia, the Republic of Cyprus, the Czech Republic, Denmark, the Dominican Republic, Ecuador, Estonia, Finland, France, Germany, Greece, Iceland, India, Israel, Italy, Japan, Liechtenstein, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Nigeria, Norway, Panama, Peru, Poland, the Republic of Korea, Romania, Rwanda, Saudi Arabia, Singapore, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, the United Arab Emirates, the United Kingdom, the United States, and Uruguay	Azerbaijan, Belarus, China, Egypt, Kazakhstan, Nicaragua, Pakistan, Russia, Senegal, Serbia, South Africa, Thailand, Venezuela	***Brazil***, **Russia**, ***India***, **China**, **South Africa**, Indonesia, Iran, **Egypt**, Ethiopia, and the ***United Arab Emirates***; + ***Saudi Arabia*** that has not yet officially confirmed its membership at BRICS but participates in its activities.[15] * Subject intersections in-between the Artemis and the ILRS partnerships within BRICS members' cooperation, including in the outer space domain are indicated **in bold**; ** Artemis Accords Signatories are additionally shown in ***italics***; *** ILRS Signatories are additionally **underlined**

Source: Mariam Yuzbashyan

[10] Artemis Accords. (2020). *Principles for cooperation in the civil exploration and use of the Moon, Mars, comets, and asteroids for peaceful purposes*. National Aeronautics and Space Administration. https://www.nasa.gov/wp-content/uploads/2022/11/Artemis-Accords-signed-13Oct2020.pdf?emrc=653a00

[11] National Aeronautics and Space Administration. (n.d.). *List of signatories to the Artemis Accords by date*. https://www.nasa.gov/wp-content/uploads/2024/10/signatories-02.pdf?emrc=ed1116

[12] China National Space Administration & Roscosmos. (2021, June). *International Lunar Research Station (ILRS) guide for partnership*. https://www.cnsa.gov.cn/english/n6465652/n6465653/c6812150/content.html

[13] Currently there is no official consolidated source of information on the International Lunar Research Station Signatories. Relevant information can be found at diverse sources: official websites of China National Space Administration (https://www.cnsa.gov.cn/) or government agencies of other states, such as Roscosmos (https://www.roscosmos.ru/), and other news media with an established reputation.

[14] There is no uniform official source of updated information on BRICS membership; *see, e.g.*, https://infobrics.org/news/, or https://brics-russia2024.ru/

[15] TASS Russian News Agency. (2024, June 19). *Riyadh taking part in BRICS, still undecided on full membership – senior diplomat*. https://tass.com/politics/1805457; News Central. (2024, September 10). *Saudi Arabia weighs BRICS membership as crown prince is invited to October summit*. https://newscentral.africa/saudi-arabia-weighs-brics-membership-as-crown-prince-is-invited-to-october-summit/

Bearing in mind that celestial bodies, as well as the natural resources therein, are an indisputable object of international space law and, as asserted by some authors, fall within the scope of "mandatory multilateralism,"[16] the BRICS forum could be considered as an additional instrument for the reconciliation of the positions of states with divergent related approaches.

Undoubtedly, these specific circumstances and trends should be taken into account when researching ways and mechanisms of enhancing related Russian legal policy, both national and international, including in close cooperation with other BRICS countries, and correspondingly in the longer run, with more than a hundred states-members of one of the largest committees in the United Nations – the UN Committee on the Peaceful Uses of Outer Space[17] – that by its nature is able to provide a bona fide multilateralism. In this regard, it should be noted that the necessity to determine a common basis for diverging legal approaches is primarily grounded on economic feasibility, which remains a powerful motivating force even during times of essential transformation in global trends of outer space related to cooperation and competition and correspondingly effective mechanisms for progressive development of international space law.[18]

Accordingly, the first section of this article focuses on the analysis of the legal regime applicable to celestial bodies' natural resources under the United Nations relevant treaties, taking into account the UN General Assembly resolutions, as well as recently developed legal approaches within two *de facto* competing Moon exploration international missions (Artemis and ILRS); and the second section examines the current state and possible ways for development of Russian laws and legal policy as applied to celestial bodies' natural resources, alongside the existing BRICS outer space cooperation, including perspectives for elaboration of a common legal approach among the BRICS member states regarding the use of celestial bodies' natural resources. The research results are presented in the conclusion.

1. International Legal Regime of Natural Resources of Celestial Bodies

1.1. The United Nations Relevant Treaties and Background General Assembly Resolutions

1.1.1. Earliest General Assembly Resolutions Governing Celestial Bodies

The history of forming the legal status of celestial bodies dates back to the late 1950s, when international deliberations on this subject emerged after the launch on

---

[16] Criddle, E. J., & Fox-Decent, E. (2019). Mandatory multilateralism. *American Journal of International Law*, *113*(2), 272, 281.

[17] United Nations Office for Outer Space Affairs. (n.d.). *Committee on the Peaceful Uses of Outer Space: Membership evolution*. https://www.unoosa.org/oosa/en/ourwork/copuos/members/evolution.html

[18] Yuzbashyan, 2024, p. 116.

October 4, 1957 by the Soviet Union of the world's first artificial satellite, Sputnik I. In July 1959, the initially established UN *Ad Hoc* Committee on the Peaceful Uses of Outer Space (set up by the UNGA Res. 1348(XIII) (December 13, 1958)) considered general questions relating to the exploration of celestial bodies. At that time, the focus was on creating fundamental international legal rules for the exploration and use of outer space, considering its strategic and scientific potential. Exploitation of celestial bodies' natural resources was not anticipated as being likely in the near future and thus not a priority. Because of the existing geopolitical, economic, and technological factors of that time, efforts of states formulating rules of international space law were primarily aimed at clarification of the legal status of celestial bodies as a whole and remain rather vague and uncertain with regard to their natural resources. This priority concern was formulated by the *Ad Hoc* Committee as follows: "serious problems could arise if States claim on one ground or another, exclusive rights over all or part of a celestial body."[19]

In December 1959, the UN *Ad Hoc* Committee was replaced[20] by a permanent subsidiary body of the UN General Assembly – the UN Committee on the Peaceful Uses of Outer Space (UN COPUOS) (established by the UN GA Res. 1472 (XIV) (December 12, 1959)).

The notion of "celestial bodies" as a specific object of international law is provided in the UN General Assembly Resolution 1721 (XVI) (December 20, 1961), according to which states are invited to be guided by the following principles: "international law, including the Charter of the United Nations, applies to outer space and celestial bodies"; "outer space and celestial bodies are free for exploration and use by all states in conformity with international law and are not subject to national appropriation."[21] According to Kolosov, "there is no evidence that the term 'celestial bodies' includes their subsurface and that the notion 'use' of celestial bodies encompasses the use of their natural resources; however, nor is there any evidence to the contrary."[22] The initial legal principles of using celestial bodies were further specified in the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space of 1963 (adopted by UNGA Res. 1962(XVIII) (December 13, 1963)) as follows: "[o]uter space and celestial bodies are free for exploration and use by all states on a basis of equality and in accordance with international law" and "are

---

19 United Nations General Assembly. (1959, July 14). *Report of the Ad Hoc Committee on the peaceful uses of outer space* (p. 69). United Nations Digital Library System. https://digitallibrary.un.org/record/840867?v=pdf

20 *See, e.g.*, Jankowitsch, P. (2015). The background and history of international space law. In F. G. von der Dunk & F. Tronchetti (Eds.), *Handbook of space law* (pp. 10–11). Edward Elgar Publishing.

21 United Nations General Assembly. (1961, December 20). *International co-operation in the peaceful uses of outer space* (A, paras. 1(a), 1(b)). United Nations Office for Outer Space Affairs. https://www.unoosa.org/pdf/gares/ARES_16_1721E.pdf

22 Kolosov, 2007, p. 238.

not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."[23]

Interpretation of these principles as applicable to the legal regime of celestial bodies' natural resources might be dichotomous. On the one hand, one might presume that according to these resolutions, the term "use" of celestial bodies covers also the use of their subsurface, thus prohibiting the appropriation of any natural resources thereof; and on the other hand, that these principles might be interpreted as implying a strictly territorial context.[24] Such a dichotomy exists even in treaty rules of international space law.

1.1.2. The Outer Space Treaty as the Kernel of the Legal Regime of the Outer Space Activities

This is confirmed by the analysis of the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (hereinafter the Outer Space Treaty or OST),[25] which is often referred to as "the Magna Carta of Outer Space," not only providing the framework for the regulation of any space-related activities but also laying the foundation for the future development of space law.[26] One cannot underestimate the importance of this treaty (as of October 2024, it is ratified by 117 states, including the major space nations[27]). The Treaty sets out the fundamental principles of international space law and continues to provide a strong legal basis for maintaining the use of outer space, including celestial bodies, for peaceful purposes, as well as for the progressive development of international space law.[28] Its role "as the cornerstone

---

[23] United Nations General Assembly. (1963, December 13). *Declaration of legal principles governing the activities of states in the exploration and use of outer space* (paras. (principles) 2, 3). United Nations Office for Outer Space Affairs. https://www.unoosa.org/pdf/gares/ARES_18_1962E.pdf

[24] Kolosov, 2007, p. 238.

[25] United Nations General Assembly. (1966, December 19). *Treaty on principles governing the activities of states in the exploration and use of outer space, including the Moon and other celestial bodies*. United Nations Office for Outer Space Affairs. https://www.unoosa.org/pdf/gares/ARES_21_2222E.pdf

[26] Xinmin, M. A. (2014, November 17). *The development of space law: Framework, objectives and orientations* (Speech at United Nations/China/APSCO Workshop on Space Law, p. 2). United Nations Office for Outer Space Affairs. https://www.unoosa.org/documents/pdf/spacelaw/activities/2014/splaw2014-keynote.pdf

[27] United Nations Office for Outer Space Affairs. (n.d.). *Status of international agreements relating to activities in outer space*. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/status/index.html; United Nations Treaty Collection. (n.d.). *Status of the Outer Space Treaty*. https://treaties.un.org/pages/showdetails.aspx?objid=0800000280128cbd.

[28] For an analysis of actual issues of the Outer Space Treaty provisions' interpretations, *see, e.g.*, Berkman, P. A., Vylegzhanin, A. N., Yuzbashyan, M. R., & Mauduit, J.-C. (2018). Outer space law: Russia–United States common challenges and perspectives. *Moscow Journal of International Law*, *50*(1), 16–34. (In Russian). For an extensive analysis of the Outer Space Treaty, *see* also, the works of the leading scholars, who were directly involved in the drafting of the UN treaties on outer space, *e.g.*, Cheng, B.

of the international legal regime governing outer space activities" was reiterated in the Declaration on the fiftieth anniversary of the Treaty.[29] Moreover, as it has been suggested, the Outer Space Treaty "belongs to the important law-making treaties of the whole system of contemporary international law."[30] Such assessments of the role of the Outer Space Treaty remain fair even under contemporary global trends in cooperation and competition in this field.

The key legal principle regarding the non-appropriation of outer space, which was initially included in the background UN GA resolutions, was reinforced in Article II of the Outer Space Treaty as follows: "Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." It is suggested that this principle, by establishing an important "non-appropriation" limitation on activities in outer space, binds not only States Parties to the Outer Space Treaty but also other states because principles provided by the 1967 Treaty "are binding as rules of customary law."[31] Article II shall be interpreted together with other provisions of this treaty, in particular with those established by Article I: the "exploration and use of outer space[32] (…) shall be the province of all mankind"; outer space "s*hall be free for exploration and use* by all states without discrimination of any kind. In this regard, it should be noted that according to Kolosov, 'there is no freedom of use of outer space but rather the freedoms of outer space that include the freedom of launch of space objects, the freedom to choose an orbit, etc.,' however "these freedoms are limited by purposes – for peaceful purposes, for scientific investigation, etc."[33] Such an interpretation of relevant treaty provisions is of significance today for the preventing (or refuting

(1968). Le Traité de 1967 sur l'espace. *Journal du Droit International*, *3*, 533–645; Kolosov, Y. M. (2014). *Striving for peaceful outer space* (2nd ed., pp. 25–34). Statut. (In Russian); Kopal, V. (2008). *Treaty on principles governing the activities of states in the exploration and use of outer space, including the Moon and other celestial bodies*. United Nations. http://legal.un.org/avl/pdf/ha/tos/tos_e.pdf; Jankowitsch, 2015, pp. 1–6.

29 United Nations General Assembly. (2017, December 7). *Declaration on the fiftieth anniversary of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies* (para. 15). United Nations Office for Outer Space Affairs. https://www.unoosa.org/res/oosadoc/data/resolutions/2017/general_assembly_72nd_session/ares7278_html/1722104E.pdf

30 Kopal, V. (2006). International legal regime on outer space: Outer Space Treaty, Rescue Agreement and the Moon Agreement. In United Nations Office for Outer Space Affairs, *Meeting international responsibilities and addressing domestic needs: Proceedings* (pp. 8, 9). http://www.unoosa.org/pdf/publications/st_space_32E.pdf

31 Vereshchetin, V. S., & Danilenko, G. M. (1985). Custom as a source of international law of outer space. *Journal of Space Law*, *13*(1), 22, 32.

32 Hereinafter, unless otherwise specified, the term "outer space" is used in the meaning "outer space, including the Moon and other celestial bodies."

33 Kolosov, Y. M. (1979). Introductory article. In F. Nozari, *The law of outer space* (pp. 7, 13). Yuridicheskaya literatura. (In Russian).

justification) of any illegal behavior by states and other actors in this field on the Moon and other celestial bodies.

As for a holistic interpretation of Articles I and II of the Outer Space Treaty, it is suggested that they "attribute to outer space the status of *res communis omnium*, an area open to all states but not capable of being appropriated by any of them."[34] Moreover, it clearly follows from the "notion of outer space as an object of common use by the whole of mankind (*res communis omnium*) that the methods and rules of common use could be established through the mutual consent of all the 'users,' i.e. by international agreements."[35] Similarly, outer space is qualified as a "global commons," an area not subject to any individual state's legal authority and jurisdiction yet free for all states to access, as long as they are in compliance with any other applicable rules of international law.[36] This approach is also supported by other wording present in Article I of the Outer Space Treaty. For example, the exploration and use of outer space shall be carried out "for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development," "without discrimination of any kind, on a basis of equality and in accordance with international law."

Article I also provides that "there shall be free access to all areas of celestial bodies," thus logically precluding appropriation of such celestial bodies and any areas thereof by any actors and by any means. In this context, it should be noted that the non-appropriation principle extends to the activity of private entities. For example, no state has a right to grant its companies (or other persons) permission to establish ownership of the Moon or any of its parts. This is clearly confirmed by relevant provisions of the Outer Space Treaty. Notably, under Article VI, states parties shall bear international responsibility "for national activities in outer space," including activities of non-governmental entities, and for ensuring that such national activities "are carried out in conformity" with this treaty. From this it follows that states parties are under obligation to ensure that non-governmental entities, including private companies, which are under the jurisdiction or control of the relevant states, do not violate the provisions of this treaty (encompassing the principle prohibiting national appropriation of celestial bodies). Article VI also requires that states shall authorize and supervise the activities of non-governmental entities in outer space, and that is recommended by the UN to be done through relevant national laws.[37]

---

[34] *See* Tronchetti, F. (2015). Legal aspects of space resource utilization. In F. G. von der Dunk & F. Tronchetti (Eds.), *Handbook of space law* (pp. 769, 779). Edward Elgar Publishing.

[35] Zhukov, G., & Kolosov, Y. (2014). *International space law* (2nd ed., p. 18). Statut.

[36] Von der Dunk, F. G. (2018). Asteroid mining: International and national legal aspects. *Michigan State International Law Review*, *26*(1), 83, 86.

[37] United Nations General Assembly. (2013, December 11). *Recommendations on national legislation relevant to the peaceful exploration and use of outer space*. United Nations Office for Outer Space Affairs. https://www.unoosa.org/pdf/gares/A_RES_68_074E.pdf; United Nations General Assembly. (2019, February 11–22). *Guidelines for the long-term sustainability of outer space activities* (Guideline A.3).

When interpreting the above-mentioned provisions on the international responsibility of states for national activities in outer space, attention should also be drawn to the fact that the notion of "activities in outer space" is not defined in any of the sources of international space law. Such activities should not be solely understood as activities occurring in outer space only; they also imply the use of relevant ground facilities. This might require specification of the corresponding treaty provision in the sense that "[s]uch responsibility covers all space activities," namely "the use of both space and ground facilities of the respective space systems."[38] This approach will be equally essential for establishing responsibility for activities related to the use of natural resources of celestial bodies. However, it should be noted that the existing complexities in reaching consensus (which is a critical component of the decision-making process in the COPUOS, essentially a consensus based-committee, as well as its Legal and Scientific-technical subcommittees since 1962) on many new issues requiring treaty regulation,[39] raise the issue of identifying new ways and methods of finding efficient legal solutions within the framework of international space law.[40]

Article VII of the Outer Space Treaty (which the 1971 Convention on International Liability for Damage Caused by Space Objects[41] or Liability Convention further elaborated on) provides that

> each State Party to the Treaty that launches or procures the launching of an object into outer space (…), and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another state party or to its natural or juridical persons by such object or its component parts on the Earth, in air or in outer space (…).

The term "launching State" was introduced later in Article I(c) of the 1971 Liability Convention. However, Article VII of the Outer Space Treaty has defined the four categories of states cited above as falling under the notion of "launching State" for the first time in international treaty practice.

The 1971 Liability Convention specifies that in case of damage caused "on the surface of the Earth or to aircraft in flight," the states are "absolutely liable" (Art. II); and that in the event of damage being caused elsewhere than on the surface of the Earth, the states shall be liable only "if the damage is due to its fault or the fault of persons

---

United Nations Office for Outer Space Affairs. https://www.unoosa.org/documents/pdf/PromotingSpaceSustainability/Publication_Final_English_June2021.pdf

38 Kolosov, Y. M. (1984). On the problem of private commercial space activities in outer space. In *Proceedings of the twenty-seventh colloquium on the law of outer space* (pp. 66, 68). AIAA.

39 Jankowitsch, 2015, p. 13 (explaining the reasons "why the legislative functions of the Committee and its legal subcommittee have been grinding almost to a complete halt in recent years").

40 Yuzbashyan, 2024, p. 115–116.

41 United Nations General Assembly. (1971, November 29). *Convention on the international liability for damage caused by space objects*. United Nations Office for Outer Space Affairs. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/liability-convention.html

for whom it is responsible" (Art. III). The upper limit of compensation to be paid is not established by the Convention. The absolute liability rule is based on the premise that given the current stage of development of rocket technology, the launching of objects into outer space shall be considered an activity associated with a source of extreme danger; these opinions of Professors Zhukov[42] and Kolosov[43] remain relevant for interpreting the legal regime of mining activities on the Moon and other celestial bodies. In this context, the rules of the Outer Space Treaty establishing state responsibility and liability should be considered as the focal points to be conceptually preserved within subsequent progressive development of international space law. As was earlier noted, private space activities are permitted to the extent that they comply with the applicable rules of international space law.

At a more specific level, it has been suggested "to differentiate between the commercialization and privatization of outer space activities within the existing limits of the peaceful exploration and use of outer space on the one hand" (such as telecommunications, remote sensing, etc.) "and the commercial exploitation of space resources" on the other hand; whereas, according to Kopal, international space law does not prohibit the former categories of space activities and provides for relevant legal principles adopted by UN GA resolutions,[44] meaning that "the legal status of the latter category of activities is different and must be carefully studied for the purposes of future regulation."[45]

When it comes to the current international legal framework, it could be concluded that the Outer Space Treaty defines the main elements of the legal regime of outer space, including the Moon and other celestial bodies, but it does not contain any special rules on the legal regime of natural resources of celestial bodies, and at the same time, nor does it directly prohibit their removal and use. Accordingly, there are two main doctrinal approaches to the interpretation of the cornerstone non-appropriation principle regarding the natural resources of celestial bodies. Some scholars are of the opinion that this principle extends to natural resources because the Outer Space Treaty makes no distinction between outer space and its natural resources, thus considering outer space in a comprehensive manner, including

---

42 Zhukov, G. P. (1966). *The Law of Outer Space* (p. 122). Mezhdunarodnye otnosheniya. (In Russian).

43 Kolosov, Y. M. (2014). *Responsibility and liability in international law* (2nd ed., p. 201). Statut. (In Russian).

44 United Nations General Assembly. (1982, December 10). *Principles governing the use by states of artificial earth satellites for international direct television broadcasting*. United Nations Office for Outer Space Affairs. https://www.unoosa.org/oosa/en/ourwork/spacelaw/principles/dbs-principles.html; United Nations General Assembly. (1986, December 3). *Principles relating to remote sensing of the Earth from outer space*. United Nations Office for Outer Space Affairs. https://www.unoosa.org/pdf/gares/ARES_41_65E.pdf

45 Kopal, V. (2005). Comments and remarks. In United Nations Office for Outer Space Affairs, *Disseminating and developing international and national space law: The Latin America and Caribbean perspective: Proceedings* (pp. 25, 29). http://www.unoosa.org/pdf/publications/st_space_28E.pdf

celestial bodies and the natural resources thereof.[46] Other scholars note that the non-appropriation principle applies only to outer space, including celestial bodies, as a whole and does not extend to the removal and use of resources.[47] The key to a reconciliatory approach may lie in the fundamental distinction, which is not only a terminological but also a conceptual one. For instance, the term "resources," when properly defined, somewhat constitutes substances *in situ*, thus clearly constituting an inherent part of a portion of space and, as a matter of customary international law, following the regime of the portion where they are situated. However, that is not the case with the minerals already extracted: the latter are no longer considered a part or portion of space, and therefore, their appropriation does not violate the non-appropriation principle enshrined in the Outer Space Treaty.

In any event, bearing in mind that the Outer Space Treaty does not contain any special rules for a legal regime of the natural resources of celestial bodies, before their establishment it would be reasonable to rely primarily on the existing binding rules. Interpretation of the relevant Outer Space Treaty provisions allows for the determining of the following basic features of such a regime: (a) the use of the Moon and other celestial bodies[48] shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind (Art. I, para. 1); (b) the Moon shall be free for exploration and use by all states with free access to all areas of celestial bodies (Art. I, para. 2) (according to Kolosov, it is unclear whether "all areas of celestial bodies" cover only the celestial bodies' surface or also include their subsoil[49]); (c) the Moon is not subject to national appropriation by any means (Art. II); (d) the Moon shall be used exclusively for peaceful purposes (Art. IV, para. 2) (this regime is qualified as total neutralization and demilitarization of the

---

[46] *See* Tronchetti, 2015, p. 790 (citing Cocca, A. A. (1970). *ILA report of the fifty-fourth conference* (p. 454); and Grove, S. (1971). Limitations on the principles of freedom of exploration and use in outer space: Benefits and interests. In *Proceedings of the thirteenth collection on the law of outer space* (p. 74)).

[47] *Id*., p. 789 (citing Cheng, 1968, p. 533; Williams, M. (1987). The exploration and use of natural resources in the law of the sea and the law of outer space. In *Proceedings of the twenty-ninth collection on the law of outer space* (p. 198); Jenks, C. W. (1965). *Space law* (p. 275). Praeger). *See* also, Hobe, S. (2005). Current and future development of international space law. In United Nations Office for Outer Space Affairs, *Disseminating and developing international and national space law: The Latin America and Caribbean perspective: Proceedings* (pp. 2, 7). http://www.unoosa.org/pdf/publications/st_space_28E.pdf; Kopal, 2004, p. 28 (noting that "the principle of non-appropriation forbids any national appropriation of outer space, including the Moon and other celestial bodies and any parts thereof, but not a possible alienation of resources that would be conducted under a special international regime that would be established by agreement of the international community"); and Hobe, S. (2016). V. Results. In S. Hobe (Ed.), *Does international space law either permit or prohibit the taking of resources in outer space and on celestial bodies and how is this relevant for national actors?: What is the context, and what are the contours and limits of this permission or prohibition?* (p. 41). International Institute of Space Law, Directorate of Studies (concluding that "space resource mining is not prohibited *per se*")).

[48] Hereinafter the term "Moon" is used in the meaning "the Moon and other celestial bodies," as their legal regimes are identical.

[49] Kolosov, 2007, p. 239.

Moon[50]); (e) any activities of states on the exploration and use of the Moon shall be carried out with due regard to the corresponding interests of all other states (Art. IX, first sentence), and in conducting such activities states shall avoid harmful contamination of the Moon (Art. IX, second sentence); and (f) all stations, installations, equipment, and space vehicles on the Moon shall be open to representatives of other states on a basis of reciprocity (Art. XII). These rules (together with those on state responsibility and liability under international space law) are equally applicable to any potential mining activities of private entities on celestial bodies, both on and below the surface thereof.

A clear and unambiguous application of these principles to the Moon's subsurface and natural resources could be provided, according to Kolosov, either by means of their authentic interpretation that could be enacted in a protocol to the Outer Space Treaty or in decisions of international courts on specific disputes concerning the Moon's natural resources.[51] It remains to be seen how long it would take the international community to come to a clear understanding that such activities that are beyond the scope of national jurisdiction would be economically feasible only if conducted under a multilateral legal framework. In this regard, history confirms that even during times of strong competition and confrontation trends in the field of outer space, the recognition of these factors facilitated the rapid formation and development of international space law. Before analyzing contemporary competing international Moon cooperation initiatives that are not truly multilateral, it is important to consider the last of the five UN treaties on outer space,[52] the only one referring to the notion of "the natural resources of celestial bodies."

1.1.3. The Moon Agreement

The 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies[53] (otherwise known as the Moon Agreement) was adopted in furtherance of the Outer Space Treaty provisions on the status of the Moon.[54] The Moon

50 Zhukov & Kolosov, 2014, p. 35.

51 Kolosov, 2007, p. 239.

52 United Nations. (2002). *United Nations treaties and principles on outer space*. United Nations Digital Library. https://digitallibrary.un.org/record/679408?v=pdf

53 United Nations General Assembly. (1979, December 5). *Agreement governing the activities of states on the Moon and other celestial bodies*. United Nations Office for Outer Space Affairs. https://www.unoosa.org/pdf/gares/ARES_34_68E.pdf

54 The language of the Moon Agreement is followed in this paper when referring to the term "the moon." According to Art. 1, para. 1, "The provisions of this Agreement relating to the moon shall also apply to other celestial bodies within the solar system, other than the Earth, except insofar as specific legal norms enter into force with respect to any of these celestial bodies." Unlike the Outer Space Treaty, the language of which is followed in this paper, the authentic English text of the Moon Agreement does not capitalize the term "moon." Accordingly, the language of the latter is retained in the relevant quotations of the Moon Agreement.

Agreement contains specific rules on the exploration and use of the natural resources of celestial bodies and provides for the obligation to establish an international regime "to govern the exploitation of the natural resources of the moon" as the latter "is about to become feasible" (Art. 11, para. 5).

Unlike the Outer Space Treaty, the 1979 Moon Agreement was not ratified by the major spacefaring nations (none of the current states with their own crewed spaceflight programs, namely Russia, the United States, and China, participate in it), and now, following Saudi Arabia's[55] withdrawal from this treaty on January 5, 2024, only seventeen states are parties to this treaty.[56] Nevertheless, it is worthwhile to consider the Moon Agreement in the context of this paper, at least for the following reasons: (a) its original text was developed with the participation of the major spacefaring nations and was further supported unanimously by General Assembly Resolution 34/68 (December 5, 1979); (b) interpretation of the Moon Agreement might be important for a conceptual understanding of the less detailed corresponding provisions of the Outer Space Treaty; and (c) consideration of the reasons for the limited support of the Moon Agreement by states might be useful for defining new effective rules, particularly at the multilateral level (bearing in mind that any "downstream" levels of regulation in this domain shall be in conformity with the applicable international space law principles and rules).

Regarding the legal status of the Moon and other celestial bodies, some of the Moon Agreement's provisions reiterate relevant provisions of the Outer Space Treaty, while others substantially develop them. For instance, Article 11, paragraph 2 of the Moon Agreement reiterates the "non-appropriation principle" as it is provided by Article II of the Outer Space Treaty. Article 11, paragraph 3, however, expressly extends this principle not only to states and intergovernmental organizations but also to non-governmental organizations, including those established under national legislation, non-governmental entities, and any natural person. Although the same conclusion could be drawn from the interpretation of Articles II and VI of the Outer Space Treaty, it may be beneficial to adhere to the detailed approach of the Moon Agreement in future acts so as to not omit any seemingly simple but important questions that are necessary for an unambiguous common understanding. The same paragraph 3, following this approach regarding prohibited potential methods of appropriation, also provides that the placement of personnel, space vehicles, equipment, facilities, stations, or any installations on or below the surface of the Moon shall not create any right of ownership "over the surface or the subsurface of the moon or any areas thereof."

---

[55] Saudi Arabia is a signatory to the Artemis Accords (*see* Table 1). Seven following states are signatories to the Artemis Accords (outside the multilateral (United Nations) system of international space law) *and also* parties to the Moon Agreement (5th of the five United Nations treaties on outer space): Armenia, Australia, Belgium, Mexico, the Netherlands, Peru, and Uruguay.

[56] United Nations Office for Outer Space Affairs. (n.d.). *Status of international agreements relating to activities in outer space*. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/status/index.html; United Nations Treaty Collection. (n.d.). *Status of the Moon Agreement*. https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXIV-2&chapter=24&clang=_en

Additionally, the Agreement establishes rules for the use of natural resources of celestial bodies both for scientific investigation and exploitation. According to Article 6, paragraph 2, in carrying out scientific investigations, the states parties "shall have the right to collect on and remove from the moon samples of its mineral and other substances." The Agreement does not limit the volume of these "samples" to be removed. So, the question then arises as to whether removal by a state of, for example, large quantities of mineral substances should be legally defined as corresponding to the rights of this state provided in Article 6 or, alternatively, if such an action is to be classified as not "scientific investigations" but rather as an abuse of these rights. In the words of Article 6, paragraph 6, "States Parties shall have regard to the desirability of making a portion of such samples available to other interested States Parties and the international scientific community for scientific investigation." In practice, ironically, it is the states that are not parties to the Moon Agreement, namely, those that possess the capability to collect such samples that actually implement the aforementioned provision.[57] The same paragraph ensures the right of states parties to "use mineral and other substances of the moon in quantities appropriate for the support of their missions." In accordance with the text of the Moon Agreement, the rights outlined under its Article 6, paragraph 2 shall be implemented within the scope of scientific missions. However, it would be reasonable to state that having the possibility of utilizing lunar substances would be no less significant for the support of resource exploitation missions.

Regarding the legal regime of the exploitation of the Moon's natural resources, it should be noted that this issue is expressly within the object of the 1979 Moon Agreement.[58] The preamble of the treaty clearly refers to "the benefits which may be derived from the exploitation of the natural resources of the moon and other celestial bodies." The relevant provisions outlining the main elements of the legal regime of the Moon's natural resources are provided in Article 11. Paragraph 1 of this article establishes that "the moon and its natural resources are the common heritage of mankind." Although the text of this provision (included at the request of developing countries) was finally agreed upon within the consensus-based decision-making of the COPUOS Legal Subcommittee, in the absence of objections by the United States or by the USSR,[59] it continues to be the major reason for the non-

---

[57] For recent cases, *see, e.g.*, Scott, W. (2024, August 23). *NASA shares asteroid Bennu sample in exchange with JAXA*. NASA Public Affairs Specialist Article. https://www.nasa.gov/centers-and-facilities/johnson/nasa-shares-asteroid-bennu-sample-in-exchange-with-jaxa/; China National Space Administration. (2024, April 9). *First Review Meeting for the Chang'E-5 Lunar Samples International Loans*. https://www.cnsa.gov.cn/english/n6465645/n6465648/c10498000/content.html; and Xiaoci, D. (2024, October 19). *China's Chang'e-6 lunar samples make global debut at IAC in Italy*. Global Times. https://www.globaltimes.cn/page/202410/1321483.shtml

[58] Kolosov, 2007, p. 240.

[59] Kolosov, Y. M., & Yuzbashyan, M. R. (2015). Contribution of the Russian (Soviet) jurisprudence to the formation and development of the international space law. *Moscow Journal of International Law*, *98*(2),

participation of these two states as well as the other emerging spacefaring nations in the Moon Agreement.

As mentioned above, Article 1, paragraph 2 reaffirms the non-appropriation principle. The next paragraph 3 expressly establishes that "natural resources in place" shall not become the property of any state or any other participant of the outer space activity. In this context, in the absence of a direct prohibition (neither in the Outer Space Treaty nor in the Moon Agreement), there may be a possible interpretation, as noted above, that the "extracted natural substances" of celestial bodies are not subject to the non-appropriation principle. As a general rule, the exploitation of the natural resources of celestial bodies does not appear to contradict applicable international law rules as long as such activities are carried out in conformity with the relevant international obligations (notably, as established by the Outer Space Treaty) of the corresponding state.

Indeed, Article 11, paragraph 5 of the Moon Agreement prescribes that states parties "undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible." Article 18 provides for convening a conference of the states parties to the Moon Agreement to consider this regime and envisages the possibility of revision of the 1979 Agreement by the UN General Assembly ten years after its entry into force. Still, neither in 1994 nor at any later time did the UN General Assembly consider it reasonable to convene the conference and to review the Moon Agreement.

Article 11, paragraph 7 outlines the purposes of the international regime to be established as follows:

> (a) the orderly and safe development of the natural resources of the moon; (b) The rational management of those resources; (c) the expansion of opportunities in the use of those resources; (d) an equitable sharing by all states parties in the benefits derived from those resources, whereby the interests and needs of the developing countries, as well as the efforts of those countries that have contributed either directly or indirectly to the exploration of the moon, shall be given special consideration.

The definition of "equitable sharing," as suggested, "proceeds from the assumption that equity is impossible without special consideration of the efforts of states which have contributed to resource exploitation activity on the Moon" and thus is treated as balanced.[60] Nevertheless, this assumption might still cause difficulties in balancing the interests, needs, and efforts of all of the interested states: the countries that

12, 16. (In Russian) (noting that initially at London separate consultations the United States and USSR agreed to stand firmly against the "common heritage of mankind" provision). *See* generally, Marboe, I. (2019, April 1). *Study of the drafting history of the Moon Agreement*. United Nations Office for Outer Space Affairs. http://www.unoosa.org/documents/pdf/copuos/lsc/2019/symp-02E.pdf

[60] Tuerk, H. (2009, March 23). *The negotiation of the "Moon Agreement"* (p. 8). United Nations Office for Outer Space Affairs. https://www.unoosa.org/pdf/pres/lsc2009/symp00.pdf

contribute either directly or indirectly to the exploration of the Moon; developing countries; and other states parties to the Moon Agreement. Moreover, bearing in mind that "the common heritage of mankind" concept stipulates that "certain areas lying outside national jurisdiction, for reasons of scientific and commercial value of the resources contained therein, shall be commonly managed by all states on behalf of mankind,"[61] such "equitable sharing" may reasonably also include the other states that are not parties to the Moon Agreement. This assumption could be additionally supported by the interpretation of the "equitable sharing" provision together with Article 4, paragraph 1 of the Moon Agreement, which stipulates that "[t]he exploration and use of the moon shall be the province of all mankind and shall be carried out for the benefit and in the interests of all countries," which, as noted above, reiterates the principle established by Article I of the Outer Space Treaty.

Additionally, the interpretation of the notion "equitable sharing" might be suggested from a different legal angle. For instance, it is stressed that "equitable" does not mean "equal."[62] Moreover, the "benefit" that might be gained by non-contributing developing countries only due to their economic status "might not necessarily be financial in nature," and this should be contrasted with Article 140, paragraph 2 of UNCLOS[63] referring to "the equitable sharing of financial and other economic benefits derived from activities in the Area," where the expression "activities in the Area" under Article 1, paragraph 3 expressly includes "exploitation of the resources of the Area."[64] In this regard, it should be noted that the "benefits" that the abovementioned category of countries could potentially derive would even more likely be of both a financial and economic nature.

Currently, despite a rather large number of projects and plans on space resource exploitation, their implementation is delayed because of diverse factors, most of all, technological and economic. Thus, according to Article 11, paragraph 5, and Article 18 of the Moon Agreement, in the absence of practical confirmation that exploitation of natural resources "is about to become feasible," there is no ground for convening a conference by the Secretary-General to deliberate on the question of the establishment of an international regime governing the exploitation of the natural resources of the Moon. It is obvious that meeting the condition on feasibility will take time.

---

61 Tronchetti, 2015, p. 784.

62 Freeland, S. (2016). Subsequent state practice. In S. Hobe (Ed.), *Does international space law either permit or prohibit the taking of resources in outer space and on celestial bodies and how is this relevant for national actors?: What is the context, and what are the contours and limits of this permission or prohibition?* (pp. 35–42). International Institute of Space Law, Directorate of Studies; Filho, J. M. (2017, March 27). *Developing countries and the exploitation of space resources* (p. 25). United Nations Office for Outer Space Affairs. https://www.unoosa.org/documents/pdf/copuos/lsc/2017/symp-07.pdf

63 United Nations. (1982, December 10). *Convention on the law of the sea*. United Nations Treaty Collection. https://treaties.un.org/Pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXI-6&chapter=21&Temp=mtdsg3&clang=_en

64 Freeland, 2016, p. 36.

Nowadays, *de facto* competing Moon cooperation initiatives (such as Artemis and ILRS) are primarily focused on the investigation of natural resources of this celestial body, including for the purpose of their future use and exploitation. The Artemis approach includes both purposes, i.e. using space-based resources for deep space exploration (a practice called in-situ resource utilization (ISRU)[65]) and the future commercial exploitation of resources under the Artemis Accords and national laws of participating states. The current list of partner states that have already enacted relevant legislation includes the United States (statute of 2015 and executive order of 2020), Luxembourg (statute of 2017), the United Arab Emirates (the initial statute of 2019 was repealed and replaced by decree law in 2023), and Japan (statute of 2021)). On the other hand, the ILRS approach does not include the objective of exploitation; instead, it is focused only on the investigation and future in-space use of minerals and other substances found on celestial bodies (comparable to ISRU and the rights envisaged in Art. 6 of the Moon Agreement). The main participants of both programs are not parties to the Moon Agreement. Under the complexity of these circumstances, including the increasing risk of related international conflicts, it seems reasonable, firstly, to start substantive negotiations on the future special multilateral regime without delay, subject to the abovementioned condition of "feasibility"; and secondly, to pursue these negotiations beyond the Moon Agreement, but, certainly, in the absence of a comparable alternative, also within the framework of COPUOS and its subcommittees. Since 2021, related issues have been the subject of discussion in the meetings of the "Working Group on Legal Aspects of Space Resources"[66] established under the Legal Subcommittee's agenda item entitled "General Exchange of Views on Potential Legal Models for Activities in the Exploration, Exploitation and Utilization of Space Resources" (included as a new agenda item in 2017[67]).

We will now consider the Artemis and ILRS approaches so as to be able to determine possible grounds for reconciling differing positions under a new special multilateral regime, as well as to assess the potential of the BRICS outer space cooperation in this field.

1.2. Recently Developed Relevant International Initiatives

1.2.1. The Artemis Accords Phenomenon

The need for an internationally acceptable coherent legal regime of the natural resources of celestial bodies became even more urgent in view of the adoption of relevant national laws that provide for property rights to the extracted minerals and

---

[65] National Aeronautics and Space Administration. (n.d.). *Using space-based resources for deep space exploration*. https://www.nasa.gov/overview-in-situ-resource-utilization/

[66] United Nations Office for Outer Space Affairs. (n.d.). *Working Group on Legal Aspects of Space Resource Activities*. https://www.unoosa.org/oosa/en/ourwork/copuos/lsc/space-resources/index.html

[67] For an analysis of the sequence of initiatives and events on the national and international legal levels, *see, e.g.*, Yuzbashyan, 2017, pp. 80–81.

substances of celestial bodies: the 2015 United States Space Resource Exploration and Utilization Act[68] (the U.S. Act of 2015) (and the 2020 Executive Order of the President of the United States on Encouraging International Support for the Recovery and Use of Space Resources); followed by the 2017 Luxembourg Law on the Exploration and Use of Space Resources[69] (the Luxembourg Law of 2017), Japan's Act No. 83 of 2021 on the Promotion of Business Activities for the Exploration and Development of Space Resources,[70] and the United Arab Emirates Federal Decree Law No. (46) of 2023, Concerning the Regulation of the Space Sector (this repealed the initially adopted Federal Decree Law No. (12) of 2019).[71] Through the enactment of these laws, these states provided a "first level of legally-framed support and guarantees"[72] to the domestic outer space mining sector, including mining on and within incipient asteroids.[73] The U.S. Act of 2015 defines the term "space resource" as an "abiotic resource *in situ* in outer space," which includes water and minerals, and the term "asteroid resource" as "an outer space resource found on or within a single asteroid" (51 U.S.C. sec. 51301(1) and (2)). The U.S. Act clearly recognizes not only the right to exploit the natural resources of celestial bodies but also the property rights of U.S. citizens (including both natural and legal persons) over materials that are extracted from the Moon and other celestial bodies in compliance with "the international obligations of the United States"[74] (51 U.S.C. sec. 51303).

As was demonstrated above, the UN treaties on outer space do not contain definitions of the terms provided by the U.S. Act of 2015. In this view, one can only note the semantic similarity of the U.S. Act's wording "resource *in situ*" with the wording

---

[68] Public Law 114-90 – U.S. Commercial Space Launch Competitiveness Act. U.S. Government Publishing Office. https://www.govinfo.gov/app/details/PLAW-114publ90. Sec. 401, 51 U.S.C. sec. 10101 note, under which Title IV of this Act (51 U.S.C. secs. 51301–51303) (2019) could be cited as "Space Resource Exploration and Utilization Act of 2015."

[69] Loi du 20 juillet 2017 sur l'exploration et l'utilisation des ressources de l'espace. Journal officiel du Grand-Duché de Luxembourg. http://legilux.public.lu/eli/etat/leg/loi/2017/07/20/a674/jo. *See* also, the unofficial English translation. http://legilux.public.lu/eli/etat/leg/loi/2017/07/20/a674/jo/en

[70] Japan's Act No. 83 of 2021 (Space Resources Act) was published in the Official Gazette on June 23, 2021. https://kanpou.npb.go.jp/old/20210623/20210623g00141/20210623g001410004f.html

[71] Federal Decree Law No. (12) of 2019 regarding the regulation of the space sector. United Arab Emirates Legislations. https://uaelegislation.gov.ae/en/legislations/1969/archived; Federal Decree by Law No. (46) of 2023 concerning the regulation of the space sector. United Arab Emirates Legislations. https://uaelegislation.gov.ae/en/legislations/2129/download

[72] Von der Dunk, 2018, p. 94.

[73] *Id*., pp. 83–84.

[74] For a detailed analysis of the U.S. Act of 2015, as well as the interconnection of corresponding economic processes and their impact on the adoption of the Luxembourg Law of 2017, *see, e.g.*, Yuzbashyan, 2017, pp. 79–81. *See* also, Vylegzhanin, A. N., Yuzbashyan, M. R., & Alekseev, M. A. (2023). International legal outer space policy of the United States of America. *International Trends*, *21*(3), 6–30. (In Russian); and Vylegzhanin, A. N., & Krokhina, P. A. (2024). Legislation of Luxemburg on natural resources of celestial bodies and international law. *Moscow Journal of International Law*, *3*, 17–35. (In Russian).

"natural resources in place" of Article 11, paragraph 3 of the Moon Agreement that clearly extends to the non-appropriation principle (initially established by Article II of the Outer Space Treaty with regards to "outer space, including the Moon and other celestial bodies") to "natural resources in place," and according to its subsequent provisions (specifically, Article 11, paragraph 5 that provides for the establishment of an international regime "to govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible") differentiates the category of "the extracted minerals" from "substances of celestial bodies." Bearing in mind that the United States does not participate in the Moon Agreement, it seems that provisions of the U.S. Act (including its Section 403, containing an important disclaimer of U.S. extraterrestrial sovereignty) might be considered as an interpretation of Articles I and II of the Outer Space Treaty, as it is understood by the United States. This conclusion is also relevant for the three other states that do not participate in the Moon Agreement and follow the corresponding American national legal approach in their own domestic laws.

As stated in the position paper on space resource mining adopted by consensus by the IISL Board of Directors in 2015: "[w]hether and to what extent this interpretation is shared by other States remains to be seen."[75] Currently one can note that besides the enactment of similar national acts by the states mentioned above, the American approach is additionally promoted at the international level. The Executive Order on Encouraging International Support for the Recovery and Use of Space Resources, adopted by the U.S. President on April 6, 2020[76] (by the authority vested in him, notably, under the U.S. Act of 2015), opened this path. In its Section 1, referring to the Space Policy Directive-1 of December 11, 2017 (Reinvigorating America's Human Space Exploration Program), the Order of 2020 stresses the necessity of partnership with commercial entities to recover and use resources in outer space.[77] Further sections of this order denote the international legal uncertainty regarding the regime of space resource exploitation and the non-participation of the United States in the 1979 Moon Agreement. It is also of note, that according to the press release of the White House relating to the Order of 2020, President Trump underscored a commitment to the 1967 Outer Space Treaty.[78]

---

[75] International Institute of Space Law. (2015, December 20). *Position paper on space resource mining* (p. 3). https://iislweb.space/wp-content/uploads/2020/01/SpaceResourceMining.pdf.

[76] U.S. Government Publishing Office. (2020, April 6). *Executive Order 13914 – Encouraging International Support for the Recovery and Use of Space Resources*. https://www.govinfo.gov/content/pkg/DCPD-202000245/pdf/DCPD-202000245.pdf

[77] National Aeronautics and Space Administration. (2020, December 3). *NASA selects companies to collect lunar resources for Artemis demonstrations*. https://www.nasa.gov/news-release/nasa-selects-companies-to-collect-lunar-resources-for-artemis-demonstrations/

[78] Trump White House Archives. (2020, April). *President Donald J. Trump is encouraging international support for the recovery and use of space resources*. https://trumpwhitehouse.archives.gov/wp-content/uploads/2020/04/Fact-Sheet-on-EO-Encouraging-International-Support-for-the-Recovery-and-Use-of-Space-Resources.pdf

The main objective of the Order of 2020 is determined in its Section 3 as "taking all appropriate actions to encourage international support for the public and private recovery and use of resources in outer space" by means of the negotiation of corresponding joint statements and bilateral and multilateral arrangements with foreign states. In other words, the Artemis Accords (Principles for Cooperation in Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes),[79] launched by the State Department and NASA in October 2020, have been specifically designed as a framework of cooperation for its international partners.

As of June 2025, 55 states are signatories to the Artemis Accords (*see* Table 1 in the "Introduction"). Within this framework, the United States, supported by its partner states, suggests "an alternative vision to the classic approach to the development of a legal regime of celestial bodies' natural resources" – an undisputable object of international space law (via multilateral treaties or relevant UN GA resolutions drafted and negotiated at the UN COPUOS and its subcommittees). In this context, it is of note that the Order of 2020 stresses in its Section 1 that the United States does not view outer space as a global common. The concept of "global common" is not literally included in the Outer Space Treaty. However, as per legal writings, Articles I (under which the exploration and use of outer space, including the Moon and other celestial bodies, "shall be the province of all mankind") and II (envisaging the "non-appropriation" principle) of the Outer Space Treaty define "the legal status of outer space as a global common."[80] Accordingly, it raises the following question: to what extent could it be expected that the United States will *de facto* follow their commitments to the Outer Space Treaty?

Under Section 1 (entitled Purpose and Scope), the Artemis Accords "represent a political commitment to the principles," "many of which provide for operational implementation of important obligations contained in the Outer Space Treaty and other instruments." Actually, these principles fall into the following four categories: (a) conforming to the rights and obligations under the existing international space law principles and norms and providing for additional mechanisms for their "operational implementation" (Secs. 3 (Peaceful Purposes), 4 (Transparency), 6 (Emergency Assistance), 7 (Registration of Space Objects), 8 (Release of Scientific Data), 12 (Space Debris)); (b) of technical character (Sec. 5 (Interoperability); (c) of innovative character with the purpose of additional extension of the United States national legal approach but without an acute character in the international legal context (Sec. 9 (Preserving Outer Space Heritage)); and (d) those that promote the American national legal approach on the use and exploitation of space resources (Secs. 10 (Space Resources) and 11 (Deconfliction of Space Activities)).[81]

---

[79] Artemis Accords. (2020). *Principles for cooperation in the civil exploration and use of the Moon, Mars, comets, and asteroids for peaceful purposes*. National Aeronautics and Space Administration. https://www.nasa.gov/wp-content/uploads/2022/11/Artemis-Accords-signed-13Oct2020.pdf?emrc=653a00

[80] *See, e.g.*, von der Dunk, 2018, p. 91.

[81] For a detailed analysis of the Artemis Accords principles, *see, e.g.*, Vylegzhanin & Yuzbashyan, 2024.

The "space resources" approach of the Accords includes the following main elements and related declarations (Secs. 10 and 11). Firstly, the "Signatories emphasize that the extraction and utilization of space resources" "should be executed in a manner that complies with the Outer Space Treaty," and "affirm that the extraction of space resources does not constitute national appropriation under Article II of the Outer Space Treaty." As demonstrated above, this Treaty does establish international obligations and rights applicable to all kinds of space activities, but at the same time does not contain the answer to the main question as to whether the exploitation of natural resources of celestial bodies" is permitted or not. In this regard, before a due multilateral interpretation of Article II of the Outer Space Treaty is provided, an unambiguous qualification of the declared compliance should be considered as impossible. Secondly, the "Signatories intend to use their experience under the Accords to contribute to multilateral efforts to further develop international practices and rules applicable to the extraction and utilization of space resources, including through ongoing efforts at the COPUOS." So, it is high time that the representatives of the international community that do not share fully or partially the American approach implement, at all legally permissible and economically acceptable levels, a more proactive policy so as to be able to negotiate a balanced special multilateral regime. Thirdly, regarding the proposed concept of "safety zones," it should be clearly understood that the implementation of relevant provisions of the Accords, potentially leading to international conflicts on the grounds of obstruction of the rights of "free access to all areas of celestial bodies" (Art. I of the Outer Space Treaty), would not be economically viable without a coherent multilateral regime.

It is also of note that the Artemis Accords, officially considered as "a multilateral, non-binding declaration of principles,"[82] in reality, provide that a legal framework intended for future cooperative activities (such as Memoranda of Understanding, Implementing Arrangements, etc.) should reference the Accords and include appropriate provisions for implementing these principles" (Sec. 2 (Implementation)). Accordingly, the set of principles *de jure* declared as recommendations are, *de facto*, aimed to ensure mandatory compliance with them by the ever-increasing number of signatories to the Artemis Accords.

In this context, the development of alternative approaches at all legitimate levels with the ultimate objective of the balanced establishment of the relevant special multilateral regime becomes even more urgent.

1.2.3. The Sino-Russia Initiative on the International Lunar Research Station

The China–Russia led initiative on the construction of the International Lunar Research Station (ILRS) was released in June 2021. The Agreement between the Government of the Russian Federation and the Government of the People's Republic of China on the Cooperation on the Construction of ILRS (the Russia–China ILRS

[82] Littlejohn, J. (2023, May 5). *Space unites us*. U.S. Department of State. https://www.state.gov/dipnote-u-s-department-of-state-official-blog/space-unites-us

Agreement of 2022) was signed in November 2022, ratified by the Federal Law of June 12, 2024 No. 128-FZ, and entered into force on July 18, 2024.[83] As of October 2024, thirteen states, including China and Russia, are members of the ILRS cooperation initiative (*see* Table 1). Its impact on the development of the outer space legal order, including on the issue of exploration and use of the natural resources of celestial bodies, in conjunction (as well as actual competition) with the alternative American-led Artemis cooperation initiative, was independently revealed and for the first time analyzed in Russia in mid-2022,[84] and a year later in China.[85] Currently, the ongoing competition between the two alternative lunar cooperation initiatives is considered one of the challenging issues of the new space race, given its respective legal effects and other domain-specific implications.

The "ILRS Guide for Partnership,"[86] jointly released by the China National Space Administration (CNSA) and the State Space Corporation "Roscosmos" in June 2021, provides details about the scientific objectives, mission development phases, and cooperation guidelines. It outlines the Joint Working Group that will be responsible for the legal, scientific, and engineering aspects of ILRS. In 2023, China announced the signing of the joint statement by CNSA and the Asia-Pacific Space Cooperation Organization (APSCO)[87] on ILRS cooperation, along with its intention to establish the ILRS Cooperation Organization (ILRSCO) to collaborate on managing the facilities of the station and share research results.[88] In fact, ILRS is "paving the way for a new era of global space collaboration," with over forty institutions from across the world having already signed cooperation agreements with China, indicating that ILRS is "paving the way for a new era of global space collaboration."[89] The key feature of the emerging system

---

83 Agreement between the Government of the Russian Federation and the Government of the People's Republic on the Cooperation on the Construction of an International Scientific Lunar Station of November 25, 2022. Official Publication of Legal Acts. http://publication.pravo.gov.ru/document/0001202407250006?index=1. (In Russian).

84 Yuzbashyan, M. R. (2022, June 29). *Topical trends in outer space cooperation/competition and perspectives on space law*. SSRN. https://ssrn.com/abstract=4145994

85 Wu, X. (2023). The International Lunar Research Station: China's new era of space cooperation and its new role in the space legal order. *Space Policy*, *65*, Article 101537.

86 China National Space Administration & Roscosmos. (2021, June). *International Lunar Research Station (ILRS) guide for partnership*. https://www.cnsa.gov.cn/english/n6465652/n6465653/c6812150/content.html

87 Bangladesh, China, Iran, Mongolia, Pakistan, Peru, Thailand, and Turkey are full members of APSCO. Asia-Pacific Space Cooperation Organization. (n.d.). *Member states*. http://www.apsco.int/html/comp1/channel/Member_States/25.shtml

88 Zijian, L. (2023, May 11). *ILRS: Next frontier*. China Science and Technology Network. http://www.stdaily.com/English/WorldNews/202305/2e5aa440a336466f89563e9e1a981af9.shtml. (In Chinese).

89 Xinhua. (2024, September 7). *China's planned lunar research station ushers in new era of global space collaboration*. The State Council of the People's Republic of China. https://english.www.gov.cn/news/202409/07/content_WS66dbeb9dc6d0868f4e8eab63.html

of participation at the ILRS project is that it is not limited to solely intergovernmental interaction (such as between the current thirteen member states), thus providing for a flexible mechanism for widespread support of its approach to space cooperation, including on the challenging legal issues. International cooperation is being intensively developed at diverse levels, such as with intergovernmental organizations (in particular, with APSCO) and with non-governmental entities of a series of states, including in cases in which a direct governmental interaction is formally restricted because of prior participation in the alternative global lunar partnership.[90]

Regarding the legal regime of the natural resources of celestial bodies, the following issues are noteworthy. Firstly, none of the ILRS member states has enacted special national laws (however, cooperation is established with an institution from the United Arab Emirates[91]). Secondly, the ILRS Guide for Partnership defines "lunar resources in-situ utilization" among its scientific objectives. Thirdly, in contrast to the Artemis Accords that have a declared status of "political commitment," the legal framework for ILRS member states cooperation is constituted by intergovernmental agreements. For instance, the Russia–China ILRS Agreement of 2022 addresses the issue of lunar resources in the following way: as cooperation on the use of lunar resources on the surface (under the surface) and (or) in the Moon's orbit (Art. 5, para. 8, "Domains of Cooperation").

In this context, one can note that the ILRS "lunar resources in-situ utilization" approach is comparable to the American vision on In-Situ Resource Utilization (ISRU).[92] The convergence of the relevant positions could be considered as a reasonable starting point for substantive negotiations on the multilateral regime of celestial bodies' natural resources. The above-mentioned (in Table 1) subject intersections in-between the two international Moon cooperation initiatives within the BRICS Space Cooperation mechanisms might be viewed as an additional option in reconciling differing positions.

2. Russian Laws and Russian Legal Policy Relating to Natural Resources of Celestial Bodies and Perspectives for a Relevant Common BRICS Legal Approach

2.1. Relevant Russian Laws and Russian Legal Policy

2.1.1. Natural Resources of Celestial Bodies among the Strategic Priorities of Russia

Despite the fact that discussions concerning the natural resources of outer space have become particularly intense only in the last few years, it was as early as 2013

---

90 Yuzbashyan, 2024, p. 108.

91 *Id*.

92 National Aeronautics and Space Administration. (n.d.). *Using space-based resources for deep space exploration*. https://www.nasa.gov/overview-in-situ-resource-utilization/

that Russia had included this issue in the list of its strategic priorities. Thus, the "Main Provisions of the Russian Federation Space Policy Fundamentals in the Field of Space Activities for the Period until 2030 and Further Perspective" (approved by the President of the Russian Federation on April 19, 2013, No. Pr-906) mentioned the "development of technologies for searching and exploiting resources of the Moon and asteroids" as among the objectives of state policy in the realm of fundamental space research for the period after 2030.

The importance of the natural resources of celestial bodies for Russia can be assessed through the vast material of international research that has been accumulated so far. For instance, according to a study of this issue carried out by experts from the Hogan Lovells international law firm, asteroids might constitute a significant reserve of minerals. Although estimates vary, there are sufficient grounds to assert that some asteroids are rich in highly valuable platinoids (the total value of the resources of just one of such asteroids can range from 25 to 50 billion). Such metals are of considerable importance for the automotive industry, jewelry, pharmaceuticals, and electronics.[93] In addition, the natural resources of the Moon may also be of significant value (though at the moment there are certain doubts as to the profitability of the extraction thereof): among such resources, experts name aluminum, iron, the helium-3 isotope (fuel for thermonuclear reactors of the future),[94] and regolith (an important material for radiation protection).[95] Notably, the Moon also contains significant reserves of water (in the form of glaciers), which could potentially allow making a step toward ensuring autonomy of lunar missions.[96]

In this respect, one cannot fail to note that platinoids are one of the strategic resources for Russia; in fact, Russia ranks among the world leaders in this sector.[97] It is thus not surprising that such platinum group metals as ruthenium, rhodium, palladium, osmium, iridium, and platinum are included in the List of Basic Types of Mineral Raw Materials of Particular Importance (approved by the Instruction of the Government of the Russian Federation of August 30, 2022 No. 2473-r). Be that as it may, the stock of these materials is certainly not limitless on Earth (in fact, some of the said metals are considered especially rare), and sooner or later Russia (just like mankind as a whole) might face the necessity to look for alternative depositories.

---

93 Anderson, S., Christensen, K., & LaManna, J. (2019). The development of natural resources in outer space. *Journal of Energy & Natural Resources Law*, *37*(2), 2–3.

94 Crotts, A. (2014). *The new moon: Water, exploration, and future habitation* (p. 380). Cambridge University Press.

95 Heiken, D. T., Vaniman, D., & French, B. (Eds.). (1991). *Lunar sourcebook: A user's guide to the Moon* (pp. 637, 647–649). Cambridge University Press.

96 Anderson et al., 2019.

97 Leroy, T. (2022, February 24). *Les minerais stratégiques, l'autre richesse de la Russie*. BFMTV. https://www.bfmtv.com/economie/entreprises/industries/les-minerais-strategiques-l-autre-richesse-de-la-russie_AN-202202240437.html

2.1.2. The Regime of Natural Resources of Celestial Bodies: The Russian Legal Framework

The assessment of the extent to which Russia has so far managed to adapt, in the legal dimension, to the modern-day challenges in the competition for the resources of outer space requires the elucidation of a key issue; specifically, determining whether the laws of the Russian Federation, in their current state, enshrine any rules establishing the legal status of natural resources of celestial bodies or contain at least indirect clues to understanding the same.

Although subsoil use in general falls within the areas of joint competence of the Russian Federation and its constituent entities (Art. 72(1) of the Russian Constitution), the entire realm of space activities, due to its particular strategic importance, lies within the purview of the federal authorities (Art. 71 of the Russian Constitution). Therefore, it is primarily federal legislation and federal statutory instruments that are relevant for the issue at hand.

In this regard, it is possible to employ a three-sided approach to the question posed: first of all, to address the general laws related to proprietary rights in order to determine whether extracted space minerals are susceptible to appropriation; secondly, to examine the provisions of statutes and statutory instruments specifically governing relevant space activities; and, thirdly, to briefly review the laws on mining activities to that end.

To start with, the Civil Code of the Russian Federation does not expressly mention extracted space minerals among the objects of civil-law rights (Art. 128), nor does it contain any provisions to the contrary. It is, however, recognized in Russian legal teachings that, generally speaking, once extracted from the deposit wherein they are located, minerals can no longer be regarded as a component of the natural environment, and therefore, from the Russian law standpoint, can be classified as objects of civil-law rights,[98] including the right of ownership. Nevertheless, no clear guidance is seen either in civil law doctrine or, *a fortiori*, in the judicial application of the Russian Civil Code, with regard to space minerals. Therefore, it is the special legislation that requires primary attention.

The foundation for the Russian legal framework of space activities is laid in the Law of the Russian Federation of August 20, 1993 No. 5663-I "On Space Activities" (hereinafter the Space Activities Act). In a similar vein to the program documents referred to above, it is stated in the preamble to the said statute that in the Russian Federation, the exploration and use of outer space, including the Moon and other celestial bodies, are ranked as one of the highest priorities in terms of the national interests of the country. Noteworthy, the Space Activities Act, it can be argued, "humbly opens the door" for economic activities on celestial bodies. Firstly, the legal definition of space activities (Art. 2) comprises "any activities related to direct execution of the

[98] Grishaev, S. P., Bogacheva, T. V., & Svit, Y. P. (2019). *Article-by-article commentary to the Civil Code of the Russian Federation. Part I*. "Consultant Plus" Legal Database. https://www.consultant.ru. (In Russian); Peshkova, Kh. V., et al. (2021). Commentary to the Law of the Russian Federation of February 21, 1992 No. 2395-I "On Subsoil." "Consultant Plus" Legal Database. https://www.consultant.ru. (In Russian)

works for exploration and *use* of outer space, including the *Moon* and *other celestial bodies* [emphasis added]"; given that there is a reference to "other kinds of activities performed with the aid of space technologies," the list of activities specified in the said rule is clearly not exhaustive. Secondly, one of the goals of space activities expressly proclaimed in the statute (Preamble and Art. 3) is "the development of economy" and "fostering the economic development of the country."

Nevertheless, for now the only provision that might appear relevant to the subject under discussion is contained in Article 17, paragraph 5 of the Space Activities Act, whereby "The rights of jurisdiction and control over a space object, as well as ownership rights over such object, are without prejudice to the legal status of the area (part) of outer space, surface, or *subsoil* [emphasis added] of the celestial body that it occupies." In fact, this is the only reference to the subsoil of celestial bodies in the Act, and the will of the legislator to leave its status thereof outside the scope of the Act – to be governed by other rules, primarily the norms of international law – is evident from the very text of the cited provision. As noted in the commentary to the Space Activities Act, what is meant in this rule is that the sovereignty of the Russian Federation does not extend to the surface and subsoil of the celestial bodies,[99] a rule that clearly stems from the above-cited Article II of the Outer Space Treaty. Still, the issue of the acquisition of rights of private ownership over minerals extracted from the subsoil of the celestial bodies has received no clear regulation in this Act. Neither do other Russian statutes and statutory instruments in the field of space activity contain anything substantial in this regard.

Turning to the third facet of our legal analysis, the basis of the Russian legislation governing mining activities is constituted by the Law of the Russian Federation of February 21, 1992 No. 2395-I "On Subsoil" (hereinafter the Subsoil Act). This statute regulates all the basic issues associated with the exploration and development of mineral deposits, protection of subsoil, and the initial processing of extracted minerals. The legal definition of "subsoil" is provided in the Preamble to the Subsoil Act:

> The subsoil is the part of the *earth's crust* located below the soil layer, and in its absence – *below the earth's surface* [emphasis added] and the bottom of water bodies and watercourses, extending to depths accessible for geological study and development.

Thus, it is made clear that the extraction of minerals on celestial bodies, as well as the legal status thereof, is excluded from the scope of the main statute on mining activities.

To summarize, there are currently no specific legal acts in the Russian Federation concerning proprietary rights with regard to minerals extracted from the subsoil of celestial bodies and space mining in general. Upon a thorough examination of the

---

[99] Batyaev, A. A. (2009). *Commentary to the Law of the Russian Federation of August 20, 1993 No. 5663-I "On Space Activities" (article-by-article)*. "Consultant Plus" Legal Database. https://www.consultant.ru. (In Russian)

Russian legislation, all that one can see in this regard is the "no-prejudice" clause in the main statute on space activities and an express exclusion of this issue from the main statute on mining activities. Therefore, as of now, Russia obviously lags behind such countries as the United States, Luxembourg, the UAE, and Japan in terms of space mining laws.

2.2. Current International Legal Approach of Russia and Perspectives for its Perfection

2.2.1. The Analysis of the Russian Outer Space Policy as Presented in the UN

At the international level, Russia has consistently opposed the approach taken by the United States and their allies with regard to space resources. In 2017, during the 56th session of the Legal Subcommittee of the UN COPUOS, the Russian delegation expressed its extreme concern in connection with the interpretations of the generally accepted norms and principles of international space law put forward by individual countries. Russia emphasized the unacceptability of encroaching on the established international legal regime of space activities to satisfy the ambitions of individual states; subsequently an appeal was made to the Legal Subcommittee to clearly define the subject of the prospective international legal framework. This position of the Russian Federation gained considerable support from a number of other states.

Later on, the aforementioned Artemis Accords instantly provoked a negative reaction on the part of Roscosmos, which, in the opinion of space law expert P. Achilleas, marked the end of the Russia–U.S. cooperation within the framework of ISS and served as a prerequisite for enhancing joint efforts with the alternative partner, China.[100]

Finally, in 2022, Russia deposed before the Working Group on Legal Aspects of Space Resource Activities its detailed position on the legal status of mineral resources of celestial bodies. For the sake of brevity, its main viewpoints can be epitomized in the following theses:

1. The principle of non-appropriation enshrined in Article II of the Outer Space Treaty must be understood as applying to the entirety of activities conducted in outer space.

2. The principle of non-appropriation extends not only to the acts of sovereign states but also to the conduct of private entities; implicitly, Russia was guided by the understanding that the phrase "*by any other means*" contained in the wording of the prohibition upon national appropriation contained in the said Article must lead to the conclusion that the said interdiction should be interpreted as broadly as possible.

3. Any act of appropriation conducted by whatever actor amounts to an encroachment upon the guaranteed freedom of other interested parties' access to any part of outer space.

---

[100] Achilleas, P., & Sourbès-Verger, I. (2022). L'exploitation des ressources de la Lune au coeur de la nouvelle diplomatie américaine. In *Annuaire français de relations internationales 2022* (pp. 739–754). Panthéon-Assas.

4. Since outer space, including the Moon and other celestial bodies, from the international law standpoint constitutes a *res communis*, neither the surface of celestial bodies nor the subsoil thereof can be regarded as the property of any state, international organization, state organization, non-governmental institution, private company, or individual.

5. All space resources form an integral part of outer space; this is true of resources located on the surface of a celestial body as well as those extracted from its depths – both are "organically associated with a certain physical volume (space) of the celestial body itself."

6. "A space resource, even after its extraction (removal), does not lose its unique natural extraterrestrial origin, unlike a resource mined on Earth"; such extraction does not engender proprietary rights over a space resource;

7. National legislative initiatives of certain states aimed at bestowing mining and ownership rights over the mineral resources of celestial bodies, including asteroids, upon private actors go against the well-established principle that the national laws of any state cannot extend to territories outside its jurisdiction and ultimately may lead to "ambiguous interpretations of the non-appropriation of outer space principle, blurring the purpose of 1967 Outer Space Treaty Article II."

At the same time, Russia recognized the need to develop a regime for the utilization of natural resources from celestial bodies but stressed the necessity of its adoption on a "benefit-sharing" basis, rather than catering to the needs and ambitions of individual states, and highlighted the necessity to ensure "the equal and equitable sharing of the benefits arising from the exploitation" of such resources.[101]

It is hard to avoid the impression that such a position as presented by Roscosmos suffers from a number of deficiencies.

First of all, *de lege lata*, the position overlooks the fundamental distinction existing in international law, which was already briefly discussed above: the distinction between the natural resources of celestial bodies as such (*in situ*) and already extracted minerals, the appropriation of which does not seem to be prohibited by the current international law. There is no legal substantiation as to why these two types of minerals should be regarded within one and the same category.

Secondly, *de lege ferenda*, such an approach might lead to undesirable and even somewhat preposterous results from a practical perspective. Although seemingly recognizing the lawfulness of mining activities as such, namely the extraction of the minerals of celestial bodies, and arguing the unacceptability of acquiring ownership rights in this fashion, Roscosmos's stance – while following terms from the U.S. laws – may give rise to a paradoxical situation for the Russian economy. One may imagine

---

[101] Committee on the Peaceful Uses of Outer Space. (2023, March 20). *Russian Federation – Input to the Working Group on Legal Aspects of Space Resource Activities*. United Nations Office for Outer Space Affairs. https://www.unoosa.org/res/oosadoc/data/documents/2023/aac_105c_22023crp/aac_105c_22023crp_20_0_html/AC105_C2_2023_CRP20E.pdf

a company having extracted a certain amount of minerals from the Moon or an asteroid, but this material, in Roscosmos's view, remains *res extra commercium* and is not subject to economic operations. In other words, it cannot be validly transferred to a processing plant, it cannot be validly delivered to its end user, and likewise, it cannot be given as security to a bank providing project finance to the relevant space mining facility. As per Russian law, which recognizes the well-established principle *nemo dat quod non habet*, any contract of sale or other act aimed at the disposal of an asset carried out by its non-owner or another unauthorized person is invalid.[102] Undoubtedly, such an approach goes against the potential interests of Russian commercial entities and aggravates the oft-cited problem of an inadequate, weak legal and administrative framework of the Russian Federation for commercialization of outer space activities.

Thirdly, in the above-cited position paper, Roscosmos apparently calls for the establishment of a fully internationalized regime for space mining activities. However, without casting any doubts upon the necessity of a multilateral framework, it should be pointed out that a *fully* internationalized regime, without offering any opportunities for national commercial exploitation, is not likely to gain universal support. By way of an example, the initial regime for deep seabed mining, established in Part XI of the United Nations Convention on the Law of the Sea (UNCLOS), based on the ideas of dirigisme and authorizing appropriation and disposal of the resources of the international seabed area only within strictly defined limits and in accordance with the procedures of the special organ, received harsh opposition on the part of such powers as Germany, the United Kingdom, and the United States. Eventually, it proved to be virtually a dead letter and was largely superseded by the 1994 Agreement relating to the Implementation of Part XI of the UNCLOS, which opted for a more market-oriented regime.[103] This "lesson from history" should be borne in mind when developing the framework for space mining.

Therefore, we believe it is imperative for the Russian government to develop a new, clear-cut approach, both in national legislation and in official statements made at the international level. Clearly, the efforts aimed at establishing a universal regime based on the existing norms of international law should by no means be discarded; however, at the same time, the potential interests of the national economic operators of our country should not be ignored either.

2.2.2. Towards Perfecting Russian Outer Space Legal Policy

The key proposal for improvement consists in creating a comprehensive national legal framework that is also both clear and comprehensible for addressing space

---

[102] *See, e.g.*, Resolution of the Arbitrazh (Commercial) Court of the Moscow Circuit of December 13, 2021 No. F05-30865/2021 in case No. A41-81910/2020. (In Russian); Resolution of the Arbitrazh (Commercial) Court of the Ural Circuit of January 30, 2023 No. F09-9942/22 in case No. A07-11155/2020. (In Russian).

[103] Vitzthum, W. G., & Proelß, A. (Eds.). (2013). *Völkerrecht* (6th ed., pp. 611–612). De Gruyter.

mining activities. However, it appears that these steps would be reasonable only after the clarification of the international law position regarding the status of natural resources of celestial bodies. Furthermore, the prospective legislative reform should not be confined to a determination of the status of the mineral resources of celestial bodies only.

First of all, once the main condition noted above is met, adopting a federal law authorizing space mining as such and endowing Russian nationals (individuals and legal entities) with the rights over the space minerals obtained, including the right to possess, own, transport, use, sell, and otherwise dispose of such minerals, would seem to be the next necessary step. Thus, they would finally become a full-fledged object of civil turnover. A significant drawback of the American legal framework that should be addressed in the prospective Russian legislation is the conceptual confusion; for example, the United States Law of 2015 employs such terms as "asteroid resource" and "space resource," whereas international space law only speaks of "natural resources of celestial bodies." Moreover, as mentioned above, the distinction between (a) natural resources (*in situ*) and (b) extracted minerals should be borne in mind: that is to say, proprietary and related rights can only be acquired in respect of the latter category of materials. Notably, this distinction is also completely overlooked in the U.S. legislation.

In the formal dimension, there are two basic ways to enact such law: either in the form of a separate, self-standing federal statute or in the form of a statute introducing amendments to the existing pieces of legislation. In this respect, due regard must be made of the principle of normative economy, which has long been recognized in Russian law.[104] Guided by this principle, the latter form appears preferable. Thus, a new section titled "IV.1. Space Mining Activities" might be added to the Space Activities Act.

Another crucial aspect is maintaining the safety and protection of the environment in the course of conducting space mining activities. The deployment of mining infrastructure on celestial bodies will most probably require the creation of certain types of "protection zones" over these facilities, which in turn, no doubt, will require its own legal regulation. Furthermore, the extraction of minerals from the subsoil of celestial bodies potentially constitutes an environmentally hazardous activity; yet, this aspect, as it appears, has not received sufficient coverage in the national legislations of the countries advocating free space mining. Therefore, Russia has an opportunity to assume the role of a pioneer in this regard. The national legislative effort on the part

[104] *See, e.g.*, Resolution of the Arbitrazh (Commercial) Court of the Moscow Circuit of July 12, 2024 No. F05-14365/2024 in case No. A40-57434/2023. (In Russian); Resolution of the Arbitrazh (Commercial) Court of the Moscow Circuit of March 21, 2024 No. F05-4724/2024 in case No. A40-138546/2023. (In Russian); Resolution of the Arbitrazh (Commercial) Court of the North-Caucasian Circuit of July 20, 2023 No. F08-5411/2023 in case No. A32-55571/2021. (In Russian) (upheld by the Ruling of the Supreme Court of the Russian Federation No. 308-ES23-17498 of September 29, 2023).

of the Russian Federation can serve as a model, but it seems inevitable that a global legal instrument addressing these issues will eventually need to be adopted. In this respect, two sets of amendments to the current legislation seem necessary: first of all, amendments to the already existing sections of the Space Activities Act, which deal with the space infrastructure and safety aspects (Secs. IV and V, respectively); and secondly, amendments to the environmental legislation of Russia, which for now deals solely with the protection of the terrestrial environment.

In view of the fact that space activities can only be conducted by entities possessing the requisite qualifications in accordance with the current Russian laws, they are listed among the activities subject to licensing requirements. This is expressly stated in Article 12, paragraph 1, subparagraph 55 of the Federal Law of May 4, 2011 No. 99-FZ "On Licensing of Certain Types of Activities"; however, this federal statute furnishes no details regarding license procedures in the field of space activity. These provisions are provided in a statutory instrument rather than a statute, namely in the Resolution of the Government of the Russian Federation of February 14, 2022 No. 168 "On Approval of the Regulation on Licensing Space Activities and Abrogation of Certain Instruments and Certain Provisions of Certain Instruments of the Government of the Russian Federation." As of now, extraction of minerals from celestial bodies is absent from the list of specific space works subject to licensing requirements given in the Regulation; therefore, this instrument might also be amended to include such activity.

Finally, public interests clearly require that the profit derived from space mining activities benefit the Russian state budget in the form of tax revenues. Yet, again, there exists an obvious lacuna in the current laws of the Russian Federation. As of now, the Russian Tax Code, which imposes a tax on the extraction of commercial minerals, recognizes as the object of taxation only those minerals extracted at sites within the territory of the Russian Federation or at sites located abroad if such sites fall under the jurisdiction of the Russian Federation (Art. 336 of the Russian Tax Code), thus, evidently, leaving outer space mining operations beyond the scope of its authority. This, on the one hand, might call for another legislative amendment. Certain experts, however, advocate for a special, completely novel tax regime for space mining activity, since it is one of the areas of innovation requiring substantial investment with a very long payback period.[105] This might well be a reasonable alternative.

To sum up, complex and multidisciplinary legislative efforts are required for elaborating the statute introducing amendments to the federal laws listed above. Space mining operations, just like any other commercial activity, are fraught with a plethora of risks and difficulties that cannot be dealt with by merely following the steps of the U.S. legislation and similar initiatives.

---

[105] Khavanova, I. A. (2020). Tax aspects of industrialization in the world of breakthrough technologies, new type economies and the "ambitions" of English law. *Financial Law*, *8*, 34–38. (In Russian).

2.2.3. BRICS Outer Space Cooperation: Perspectives for a Common Legal Approach

Although no arrangements with regard to the exploitation of outer space resources have been adopted under the auspices of BRICS as of yet, the potential of this organization in the field of space cooperation can hardly be overestimated. Notably, in a very recent statement made at the International Astronautical Congress, the representative of Brazil, who is also one of the founding members of the BRICS organization, called for closer cooperation within the BRICS group as far as space matters are concerned.[106]

However, a necessary prerequisite for building cooperation in the realm of outer space within BRICS is to find common ground between the legal positions of its members. Certain divergences do exist for the time being – for instance, the UAE has expressly authorized acquisition of ownership rights in relation to extracted space minerals; similar provisions (although not of a binding nature) can also be found in Indian program documents;[107] while Russia, as of now, opposes such an approach, as noted previously. So far, the following points upon which there is agreement among the BRICS members can be identified:

1. First of all, there appears to be a commitment towards forming a universal approach: the BRICS countries seemingly share the understanding that neither inter-state arrangements nor national legislative acts can serve as a substitute or a parallel system to a universal international legal framework; on the contrary, they are complementary to it and can only operate within the limits established by that framework. As a vivid example, China, in its position paper submitted to the Working Group on Legal Aspects of Space Resource Activities, emphasized repeatedly that any discussions and developments concerning exploration, exploitation, and utilization of space resources must be strictly guided by the principles and norms enshrined in the Outer Space Treaty.[108]

2. Secondly, there seems to be common ground among the BRICS members that space mining activities and the utilization of space minerals as such, though not expressly authorized by any universal international law instrument, are permissible.

---

[106] CGTN. (2024, October 19). *International Astronautical Congress: Brazil calls for closer collaboration in space development among BRICS countries*. https://news.cgtn.com/news/2024-10-19/VHJhbnNjcm-lwdDgxMzk1/index.html

[107] *See* para. 4.13 of the Indian Space Policy 2023: "NGEs would be encouraged to … engage in the commercial recovery of an asteroid resource or a space resource. Any NGE engaged in such a process shall be entitled to possess, own, transport, use, and sell any such asteroid resource or space resource obtained in accordance with applicable law, including the international obligations of India." Indian Space Policy – 2023. Indian Space Research Organisation. https://www.isro.gov.in/media_isro/pdf/IndianSpacePolicy2023.pdf

[108] Committee on the Peaceful Uses of Outer Space. (2024, April 15). *China – Input to the Working Group on Legal Aspects of Space Resource Activities*. United Nations Office for Outer Space Affairs. https://www.unoosa.org/res/oosadoc/data/documents/2024/aac_105c_22024crp/aac_105c_22024crp_5_0_html/AC105_C2_2024_CRP05CE.pdf

3. Finally, scientific investigation of natural resource potential in outer space ought to be encouraged, not just as an initiative catering to the interests of individual states but also as a tool for future benefit-sharing.

It is advisable that these understandings be more clearly enunciated in a non-binding instrument adopted within BRICS, which could serve as a point of reference for further cooperation, particularly in the area of harmonization of national legislation. The most contested area that remains to be settled is the possibility of acquiring private-law rights in respect of extracted space minerals, without which entering into transactions that are equally enforceable in all the BRICS member states in respect of space-originating materials would be unavailable to private actors.

The role that BRICS could assume in the issue at hand is thus two-fold: apart from fostering the development of space sectors of its member states, it could serve as a viable proponent for creating the universal legal regime. In this respect, one cannot fail to reiterate that the overlapping subjects between BRICS and the Artemis Accords might potentially serve as an important factor in reconciling the competing approaches. The most likely avenue of prospective discussions seems to be the scientific aspect: even though perhaps less capable of constituting a "*pomme de discorde*," it can serve as a starting point for seeking consensus within COPUOS.

Conclusion

To summarize, at present there is no clear legal framework that specifically addresses space mining and space resource utilization at the universal level. There are competing approaches both in the legal teachings and in the practices of states. While some countries, including certain members of the BRICS group, do agree with the appropriation of outer space minerals, a number of other countries, including Russia, oppose such initiatives.

The challenges of the modern-day space race and the positions of other leading spacefaring nations underscore the need for Russia to develop a clear-cut approach with regard to the status of space minerals, including within the realm of its national legislation. These goals can only be more effectively achieved after the necessary clarifications have been made in the universal regime. One of the key potential contributors to finding the international consensus on this contentious matter could be the BRICS alliance, in view of its strong commitment to creating a stable and equitable international legal order. Still, for now, there are a number of significant steps that must be taken in order to harmonize the positions between the BRICS member states themselves; resolving these divergences would enable BRICS to become a more powerful international joint force in creating an improved, up-to-date legal regime for natural resource activities on celestial bodies on the basis of the existing international law principles and norms, to which all the BRICS countries give due deference.

Acknowledgement

This research was supported by the Russian Science Foundation grant number 23-18-00977, https://rscf.ru/project/23-18-00977/.

References

Achilleas, P., & Sourbès-Verger, I. (2022). L'exploitation des ressources de la Lune au coeur de la nouvelle diplomatie américaine. In *Annuaire français de relations internationales 2022* (pp. 739–754). Panthéon-Assas.

Anderson, S., Christensen, K., & LaManna, J. (2019). The development of natural resources in outer space. *Journal of Energy & Natural Resources Law*, *37*(2), 227–258. https://doi.org/10.1080/02646811.2018.1507343

Berkman, P. A., Vylegzhanin, A. N., Yuzbashyan, M. R., & Mauduit, J.-C. (2018). Outer space law: Russia–United States common challenges and perspectives. *Moscow Journal of International Law*, *50*(1), 16–34. https://doi.org/10.24833/0869-0049-2018-1-16-34. (In Russian).

Cheng, B. (1968). Le Traité de 1967 sur l'espace. *Journal du Droit International*, *3*, 533–645.

Criddle, E. J., & Fox-Decent, E. (2019). Mandatory multilateralism. *American Journal of International Law*, *113*(2), 272–325.

Crotts, A. (2014). *The new moon: Water, exploration, and future habitation*. Cambridge University Press.

Dallas, J. A., Raval, S., Alvarez Gaitan, J. P., Saydam, S., & Dempster, A. G. (2020). Mining beyond earth for sustainable development: Will humanity benefit from resource extraction in outer space? *Acta Astronautica*, *167*, 181–188. https://doi.org/10.1016/j.actaastro.2019.11.006

Freeland, S. (2016). Subsequent state practice. In S. Hobe (Ed.), *Does international space law either permit or prohibit the taking of resources in outer space and on celestial bodies and how is this relevant for national actors?: What is the context, and what are the contours and limits of this permission or prohibition?* (pp. 35–42). International Institute of Space Law, Directorate of Studies.

Heiken, D. T., Vaniman, D., & French, B. (Eds.). (1991). *Lunar sourcebook: A user's guide to the Moon*. Cambridge University Press.

Hobe, S. (2005). Current and future development of international space law. In United Nations Office for Outer Space Affairs, *Disseminating and developing international and national space law: The Latin America and Caribbean perspective: Proceedings* (pp. 2–24). http://www.unoosa.org/pdf/publications/st_space_28E.pdf

Hobe, S. (2016). V. Results. In S. Hobe (Ed.), *Does international space law either permit or prohibit the taking of resources in outer space and on celestial bodies and how is this relevant for national actors?: What is the context, and what are the contours and limits of*

this permission or prohibition? (p. 41). International Institute of Space Law, Directorate of Studies.

Jankowitsch, P. (2015). The background and history of international space law. In F. G. von der Dunk & F. Tronchetti (Eds.), *Handbook of space law* (pp. 1–28). Edward Elgar Publishing.

Khavanova, I. A. (2020). Tax aspects of industrialization in the world of breakthrough technologies, new type economies and the "ambitions" of English law. *Financial Law*, *8*, 34–38. https://doi.org/10.18572/1813-1220-2020-8-34-38. (In Russian).

Kolosov, Y. M. (1979). Introductory article. In F. Nozari, *The law of outer space* (pp. 7–39). Yuridicheskaya literatura. (In Russian).

Kolosov, Y. M. (1984). On the problem of private commercial space activities in outer space. In *Proceedings of the twenty-seventh colloquium on the law of outer space* (pp. 66–70). AIAA.

Kolosov, Y. M. (2007). Legal regime of the natural resources of the Moon and other celestial bodies. In A. N. Vylegzhanin (Ed.), *International legal basics of using subsoil* (pp. 237–242). Norma. (In Russian).

Kolosov, Y. M. (2014). *Striving for peaceful outer space* (2nd ed.). Statut. (In Russian).

Kolosov, Y. M., & Yuzbashyan, M. R. (2015). Contribution of the Russian (Soviet) jurisprudence to the formation and development of the international space law. *Moscow Journal of International Law*, *98*(2), 12–34. https://doi.org/10.24833/0869-0049-2015-2-12-34. (In Russian).

Kopal, V. (2005). Comments and remarks. In United Nations Office for Outer Space Affairs, *Disseminating and developing international and national space law: The Latin America and Caribbean perspective: Proceedings* (pp. 25–30). http://www.unoosa.org/pdf/publications/st_space_28E.pdf

Kopal, V. (2006). International legal regime on outer space: Outer Space Treaty, Rescue Agreement and the Moon Agreement. In United Nations Office for Outer Space Affairs, *Meeting international responsibilities and addressing domestic needs: Proceedings* (pp. 8–17). http://www.unoosa.org/pdf/publications/st_space_32E.pdf

Kopal, V. (2008). *Treaty on principles governing the activities of states in the exploration and use of outer space, including the Moon and other celestial bodies*. United Nations. http://legal.un.org/avl/pdf/ha/tos/tos_e.pdf

Tronchetti, F. (2015). Legal aspects of space resource utilization. In F. G. von der Dunk & F. Tronchetti (Eds.), *Handbook of space law* (pp. 769–813). Edward Elgar Publishing.

Vereshchetin, V. S., & Danilenko, G. M. (1985). Custom as a source of international law of outer space. *Journal of Space Law*, *13*(1), 22–35.

Vitzthum, W. G., & Proelß, A. (Eds.). (2013). *Völkerrecht* (6th ed.). De Gruyter. https://doi.org/10.1515/9783110633269

Von der Dunk, F. G. (2018). Asteroid mining: International and national legal aspects. *Michigan State International Law Review*, *26*(1), 83–101.

Vylegzhanin, A. N., & Krokhina, P. A. (2024). Legislation of Luxemburg on natural resources of celestial bodies and international law. *Moscow Journal of International Law*, *3*, 17–35. https://doi.org/10.24833/0869-0049-2024-3-17-35. (In Russian).

Vylegzhanin, A. N., & Yuzbashyan, M. R. (2024). The status of natural resources of celestial bodies: novelties indicated by the practice of states. *State and Law*, *1*, 147–158. https://doi.org/10.31857/S1026945224010143. (In Russian).

Vylegzhanin, A. N., Yuzbashyan, M. R., & Alekseev, M. A. (2021). International legal prospects for the use of natural resources of the Moon and other celestial bodies. *Mining Informational and Analytical Bulletin*, *3*(1), 155–172. https://doi.org/10.25018/0236_1493_2021_31_0_155. (In Russian).

Vylegzhanin, A. N., Yuzbashyan, M. R., & Alekseev, M. A. (2023). International legal outer space policy of the United States of America. *International Trends*, *21*(3), 6–30. https://doi.org/10.17994/IT.2023.21.3.74. (In Russian).

Wu, X. (2023). The International Lunar Research Station: China's new era of space cooperation and its new role in the space legal order. *Space Policy*, *65*, Article 101537. https://doi.org/10.1016/j.spacepol.2022.101537

Yuzbashyan, M. R. (2017). The US Space Resource Exploration and Utilization Act of 2015 and international space law. *Moscow Journal of International Law*, *106*(2), 71–86. https://doi.org/10.24833/0869-0049-2017-106-2-71-86. (In Russian).

Yuzbashyan, M. R. (2024). Topical trends in outer space cooperation/competition and perspectives on space law. *Journal of Law and Administration*, *20*(1), 103–119. https://doi.org/10.24833/2073-8420-2024-1-70-103-119. (In Russian).

Zhukov, G. P. (1966). *The Law of Outer Space*. Mezhdunarodnye otnosheniya. (In Russian).

Zhukov, G., & Kolosov, Y. (2014). *International space law* (2nd ed.). Statut.

Information about the authors

Alexander Vylegzhanin (Moscow, Russian Federation) – Professor, Department of International Law, Head, Laboratory of International Legal Research, MGIMO University (76 Vernadskogo Ave., Moscow, 119454, Russian Federation; e-mail: sopspravo@mail.ru).

Mariam Yuzbashyan (Moscow, Russian Federation) – Participant, Russian Science Foundation Project No. 23-18-00977, MGIMO University (76 Vernadskogo Ave., Moscow, 119454, Russian Federation; e-mail: m_you@mail.ru) – **corresponding author**.

Georgiy Suvorov (Moscow, Russian Federation) – Associate, ELWI (6 Gasheka St., Moscow, 125047, Russian Federation; e-mail: severegs@mail.ru).