PROPERTY RIGHTS IN OUTER SPACE: THE ISSUE OF NATURAL RESOURCES (AND THEIR SIGNIFICANCE FOR THE EUROPEAN UNION AND MOLDOVA)

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Summary: *Space mining will become a reality in the not-so-distant future, unlocking the virtually limitless natural resources available in outer space. These resources will be crucial not only for sustaining activities in space but also for supporting industries on Earth, offering unprecedented political, economic, social, scientific and technological benefits to the polities that will harness them. However, may space resources be subject to national appropriation? Is their extraction permissible? And is ownership over such resources allowed? After examining a doctrinal perspective, international normative developments and the positions of States on the manner, it is reasonable to conclude that the extraction of space resources is allowed and that their ownership is permissible under international space law. Nevertheless, what implication does all this have for the EU and Moldova? Outer space represents the future – and only those actors that act with foresight will remain politically relevant. Therefore, Moldova, specifically, should actively pursue outer space-related policies and legal initiatives aimed at developing its national space sector. Likewise, European nations, the EU and the ESA ought to devote greater political attention and allocate more resources to outer space affairs if they wish to capitalize on the unparalleled advantages that the forthcoming golden age (space age) will usher.*
Keywords: *outer space, space mining, Outer Space Treaty, Artemis Accords, United States, China*

DREPTUL DE PROPRIETATE ÎN SPAȚIUL COSMIC: PROBLEMA RESURSELOR NATURALE (ȘI IMPORTANȚA ACESTORA PENTRU UNIUNEA EUROPEANĂ ȘI REPUBLICA MOLDOVA)

Rezumat: *Mineritul spațial va deveni o realitate în viitorul nu prea îndepărtat, deblocând resursele naturale practic nelimitate disponibile în spațiul cosmic. Aceste resurse vor fi esențiale nu doar pentru activitățile din spațiu, ci și pentru industriile de pe Pământ, oferind beneficii politice, economice, sociale, științifice și tehnologice fără precedent pentru entitățile politice care le vor valorifica. Cu toate acestea, este permisă aproprierea națională a resurselor spațiale? Dar extragerea acestora? Și este admisă, din punct de vedere juridic, dobândirea dreptului de proprietate asupra acestor resurse? După examinarea unei perspective doctrinare, a evoluțiilor normative internaționale și a pozițiilor statelor pe acest subiect, este rezonabil să concluzionăm că extragerea resurselor spațiale este permisă și că dobândirea dreptului de proprietate asupra acestora este admisă conform dreptului internațional spațial. Totuși, ce implicații au toate acestea pentru UE și R. Moldova? Spațiul cosmic reprezintă viitorul – și doar acei actori care acționează anticipativ vor rămâne relevanți din punct de vedere politic. Prin urmare, R. Moldova, în mod specific, ar trebui să urmărească în mod activ politici și inițiative legislative legate de spațiul cosmic, menite să-și dezvolte propriul sector spațial. De asemenea, națiunile europene, UE și Agenția Spațială Europeană ar trebui să acorde o atenție politică sporită și să aloce mai multe resurse domeniului spațial dacă doresc să valorifice avantajele inegalabile pe care le va aduce viitoarea epocă de aur (epoca spațială).*
Cuvinte-cheie: *spațiul cosmic, mineritul spațial, Tratatul privind spațiul cosmic, Acordurile Artemis, Statele Unite, China*

Introduction.

Throughout history and continuing to the present day, human civilization has been confined to Earth (with the exception of a limited number of space endeavors in the 20th and 21st centuries), despite our planet being only a minuscule part of the Solar System – which itself is a tiny fraction of our Interstellar Neighborhood, which is a minuscule part of the Milky Way Galaxy, which is a tiny fraction of the Local Galactic Group, which is a minuscule part of the Virgo Supercluster, which is a

tiny fraction of the Local Superclusters, which in turn constitute an infinitesimal part of the observable Universe. [6] However, this is about to change.

Arguably, we are already in the midst of a new space race and an era of astropolitics, [12, pp. xi, xiv] with developments such as space mining likely to become a reality in the decades to come.

In this context, it is relevant to note that while Earth's natural resources are finite, those available in outer space are, for all practical purposes, virtually limitless. For instance, the asteroid Davida, located in the asteroid belt between the orbits of Mars and Jupiter, has an estimated resource value of approximately 27 quintillion USD. [11] By comparison, the global GDP in 2022 amounted to slightly over 100 trillion USD [10] – circa 270,000 times less than the estimated resource value of Davida.

These substantial extraterrestrial resource reserves will be crucial both for direct activities in outer space and for industries on Earth, potentially solving the issue of Earth's resource scarcity, as well as supporting its environmental sustainability, which is currently impacted by human resource extraction.

Among these resources are minerals, gases, water, [3] as well as rare metals, [12, p. xii] which are indispensable for modern technologies and have already become sources of geopolitical tensions.

However, from a legal standpoint, three interrelated questions arise: May space resources be subject to national appropriation?? Is their extraction (i.e., space mining) permissible? And is ownership over such resources allowed? This Article seeks to address these questions from a doctrinal perspective, as well as through an examination of international normative developments and the positions of States on the matter.

Results and Discussion

Before proceeding, it is relevant to mention that this Article does not consider the Moon Agreement due to its minimal relevance to international space law, stemming from its limited number of Parties and the absence of the three major spacefaring nations – the U.S., China and Russia. [5] [12, pp. xiv-xv]

In accordance with Article II of the Outer Space Treaty, the national appropriation of outer space, including the Moon and other celestial bodies, is prohibited [16] – a provision that has also evolved into customary international law. [13, p. 230] Nonetheless, it is important to note that Article II does not provide detailed specifications regarding what cannot be appropriated. In particular, with respect to celestial bodies, it remains unclear whether the prohibition extends solely to their national appropriation in total or also encompasses their natural resources. [13, p. 234]

Article I, which establishes the object and purpose of the Outer Space Treaty, provides the rationale for the designation of celestial bodies as res communis in accordance with Article II. The primary aim of the Outer Space Treaty is to enshrine that the exploration and use of outer space is the province of all humankind and a right afforded equally to all nations. As such, any claim of sovereignty over celestial bodies would violate this core objective. [13, pp. 235-236]

Returning to the question of whether the natural resources of celestial bodies may be appropriated, it is notable that during debate on the final wording of what became the Outer Space Treaty, the French representative recommended that the legal subcommittee define the term "use". However, this clarification was ultimately not adopted, leaving the interpretation of "use" to be determined by subsequent State practice. A purposive reading suggests that the national appropriation of natural resources found on celestial bodies is not prohibited, provided that no claim or conferment of territorial sovereignty is made over the areas where such use occurs. [13, pp. 236-237]

But can property rights exist in the absence of territorial sovereignty? In this context, the concept of jurisdictional sovereignty becomes particularly relevant signifying that in areas where territorial sovereignty is absent or cannot exist such as outer space, States may still execute particular sovereign functions and exercise specific sovereign rights. This concept incorporates extraterritorial competence over persons and things. Accordingly, Article VIII of the Outer Space Treaty stipulates that States are competent to exercise jurisdiction over persons and objects in outer space. Furthermore, in accordance with Article VI, States are under a positive obligation to ensure that entities subject to their jurisdiction comply with the provisions of the Outer Space Treaty. [13, pp. 238-240]

It is also important to note that this doctrinal perspective engages with the Artemis Accords, [13, pp. 242-243] which, however, will be addressed shortly in this Article.

Therefore, this doctrinal perspective presents a favorable view toward the permissibility of the national appropriation of space resources, [13, pp. 234, 237] their extraction and their ownership, [13, pp. 238-240, 244] with the author concluding that the establishment of a legal framework for the exploitation of natural resources found in space has essentially been left to State practice. [13, p. 244]

Turning to the Artemis Accords, these were established in 2020 by the U.S. together with 7 other States. As of 20 May 2025, this soft-law (i.e., non-legally binding) instrument had 55 Signatories, primarily consisting of Western democracies and Western-aligned nations, including most EU Members. [8]

The ninth preambular paragraph affirms the importance of compliance with the Outer Space Treaty, while the tenth underscores the intention to implement its provisions. Additionally, in accordance with Section 1, paragraph 1, the Artemis Accords represent a political commitment to the principles outlined in the soft-law instrument, many of which provide for the operational implementation of important obligations contained in the Outer Space Treaty. [15]

Nonetheless, most relevant for our three interrelated questions is Section 10, paragraph 2, pursuant to which the Signatories emphasize that the extraction and utilization of space resources, including any recovery from the surface or subsurface of the Moon, Mars, comets or asteroids, should be carried out in a manner that conforms to the Outer Space Treaty. The paragraph further provides that the Signatories affirm that such extraction does not, per se, constitute national appropriation under Article II of the Outer Space Treaty and that contracts and other legal instruments concerning space resources should be consistent with the Outer Space Treaty. [15]

As such, the Artemis Accords do not seek to challenge the norms of the Outer Space Treaty, but rather aim to facilitate their implementation. Thus, this soft-law instrument does not contradict the principle of non-appropriation of outer space, including the Moon and other celestial bodies. Regarding the national appropriation of space resources themselves, the instrument does not clarify whether their national appropriation is permissible or prohibited. However, it establishes that the extraction of space resources does not, per se, constitute national appropriation under Article II of the Outer Space Treaty (Section 10, paragraph 2). Furthermore, the extraction of space resources (i.e., space mining) is permissible (Section 10, paragraph 2). Based on the foregoing, it is reasonable to conclude that the Artemis Accords support the view that ownership over such resources may be acquired. [15]

Although the Artemis Accords are not legally binding and cannot be regarded as State practice stricto sensu, this soft-law instrument could influence the future behavior of States, which, in turn, could constitute State practice and potentially contribute to the development of customary international law if the opinio juris element emerges.

In this context, it is worth noting that four Signatories of the Artemis Accords – specifically the U.S., Luxembourg, Japan and the UAE, have enacted domestic legislation governing the commercial exploitation of space resources, with the legislation of the U.S., Luxemburg and the UAE predating the adoption of the soft-law instrument. [7]

Since the Artemis Accords reflect the position of the U.S. (it is relevant to note that the permissive stance of the U.S. toward the extraction of space resources is further supported by the fact that the U.S. has previously brought lunar samples to Earth) [1, p. 43] and its allies (some nuances might exist with Australia and Mexico, which are both Signatories to the Artemis Accords and Parties to the Moon Agreement; [7] however, this is beyond the scope of this Article) it is also relevant to examine the positions of Russia and China (the other two major spacefaring nations besides the U.S.) [12, pp. xiv-xv] on the issue of property rights over space resources.

In response to the Artemis Accords, Dmitry Rogozin, the then-General Director of Roscosmos, stated in 2020 that Russia would not accept attempts to privatize the Moon, claiming that such actions are illegal and contrary to international law, in an interview with the Komsomolskaya Pravda radio station. [2] However, this statement may suggest Russia's negative stance toward the potential astropolitical capabilities of the U.S. and its allies, given the strained relations between Russia and the West even in 2020 (and considering that, in fact, the Artemis Accords reject the national appropriation of outer space, including the Moon and other celestial bodies [15] which contradicts Russia's allegations), [2] rather than representing a definitive position rejecting the permissibility of national appropriation of space resources, their extraction and their ownership.

While Russia's response probably reflects broad astropolitical concerns, in the case of China, there is a more complex scenario. [2] On one hand, the Artemis Accords received a decisively negative response in Chinese state media, likely motivated by political considerations. On the other hand, Chinese legal experts generally expressed a more positive perspective. [4] Nonetheless, China's position vis-à-vis the issue of property rights over space resources is best reflected in the 2024 submission by the Delegation of China to the Working Group on Legal Aspect of Space Resource Activities of the Legal Subcommittee of the COPUOS. [14]

China suggests that outer space, including the Moon and other celestial bodies, cannot be subject to national appropriation in conformity with Article II of the Outer Space Treaty, given its positive attitude toward international space law, including the Outer Space Treaty, as expressed throughout its submission. For instance, in accordance with Section III, subsection (a), paragraph 9, the Chinese delegation holds that the exploration, exploitation and utilization of outer space resources must comply with the principle of non-appropriation set forth in the Outer Space Treaty. [14]

However, with regard to whether space resources may be subject to national appropriation, whether the extraction of such resources is permissible and whether their ownership is allowed, China does not employ direct language. Nonetheless, China's submission references the collection, detection, utilization and use of space resources on multiple occasions – for instance, in the context of the Chang'e-6, Chang'e-7 and Chang'e-8 lunar probes, as well as the planned International Lunar Research Station (Section I, paragraph 2); when referring to resource activities in outer space as a new form of human use of space (Section II, paragraph 3); and when affirming that the utilization of outer space resources must be in compliance with the principle of non-appropriation (Section III, subsection (a), paragraph 9). Thus, it is reasonable to conclude that China holds a favorable view regarding the permissibility of extracting space resources [14] (especially considering that the Chang'e-6 lunar probe successfully brought samples from the far side of the Moon to Earth in 2024) [9] and the acquisition of ownership over such resources. [14]

Nevertheless, there is no definitive answer to the three interrelated questions outlined in this Article. Rather, multiple perspectives and interpretations exist, as the Outer Space Treaty is ambiguous with respect to the exploitation of outer space. [13, p. 231]

We conclude that the national appropriation of outer space areas is prohibited by the Outer Space Treaty (Article II). [16] Furthermore, since the concept of national appropriation generally refers to territory, it is not typically applicable to natural resources per se. However, if one were to interpret national appropriation as applicable to natural resources per se, then, under a permissive interpretation, one could argue that the national appropriation of space resources is allowed and consequently, the extraction of such resources and their ownership would also be permissible. Nonetheless, even if one considers that the concept of national appropriation does not refer to natural resources per se, a permissive interpretation could suggest that the extraction of space resources is allowed and their ownership is permissible (for instance, through the concept of jurisdictional sovereignty), [13, pp. 238-239] as the Outer Space Treaty does not explicitly prohibit the extraction of space resources (i.e., space mining) [16] – which may fall under the term "use". [13, pp. 236-237]

An informed assessment suggests that permissive interpretations regarding the exploitation of space resources are likely to prevail, as both logic and human nature indicate that States are unlikely to voluntarily forgo the substantial economic opportunities that the emerging space age promises.

Nevertheless, what implications does all this have for the EU and Moldova? Moldova, specifically, should actively pursue outer space-related policies and legal initiatives aimed at developing its national space sector. Likewise, European nations, the EU and the ESA ought to devote greater political attention and allocate more resources to outer space affairs if they wish to harness the unprecedented political, economic, social, scientific and technological benefits that space resources will bring. Outer space represents the future – and only those polities that act with foresight will remain politically relevant.

Bibliography:

1. Azelton, K., Christensen, I. A., Croy, L. G., Johnson, C. D., Martinez, P., Pemberton, R., Samson, V., Tanso, T. (Editors), Handbook for new actors in space, 2nd ed.: Secure World Foundation, 2024.
2. https://nasawatch.com/commercialization/russia-says-nyet-to-artemis-accords/, accessed on 20 May 2025.
3. https://space-agency.public.lu/en/space-resources/ressources-in-space.html, accessed on 19 May 2025.
4. https://thediplomat.com/2020/09/what-does-china-think-about-nasas-artemis-accords/, accessed on 20 May 2025.
5. https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXIV-2&chapter=24&clang=_en#EndDec, accessed on 20 May 2025.
6. https://upload.wikimedia.org/wikipedia/commons/0/0f/Earth%27s_Location_in_the_Universe_SMALLER_%28JPEG%29.jpg, accessed on 19 May 2025.
7. https://www.ibanet.org/disputes-over-space-mining-on-the-horizon, accessed on 20 May 2025.
8. https://www.nasa.gov/artemis-accords/, accessed on 20 May 2025.
9. https://www.scientificamerican.com/article/china-returns-first-ever-samples-from-the-moons-far-side/, accessed on 20 May 2025.
10. https://www.statista.com/statistics/268750/global-gross-domestic-product-gdp/, accessed on 19 May 2025.
11. https://www.statista.com/topics/3279/space-mining/#topicOverview, accessed on 19 May 2025.
12. Marshall, T., The Future of Geography: How Power and Politics in Space will Change our World: Elliott & Thompson, 2023.
13. Oliver, N. Past as prologue: Roman law and the interpretation of international space law governing the use of the Moon and other celestial bodies. In: The Oxford University Undergraduate Law Journal, No. XII/2023, pp. 226-257.
14. Submission by the Delegation of China to the Working Group on Legal Aspects of Space Resource Activities of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space. 2024.
15. The Artemis Accords: Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes. Adopted on 13 October 2020.
16. Treaty on principles governing the activities of States in the exploration and use of outer space, including the moon and other celestial bodies. Opened for signature at Moscow, London and Washington, on 27 January 1967. Came into force on 10 October 1967.