



Capitalism Beyond Earth: the Legal and Moral Obstacles of Commercial Space Mining

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Abstract

This article examines whether commercial space mining is permissible under international law, as a growing interest in private investment transforms outer space into a commercial arena. The term 'commercial space mining' refers to the extraction and utilisation of space resources within the private sector. This raises insecurities about the legality and morality of mining activities. While space mining promises to provide benefits for humankind, the legal framework remains ambiguous and the debate is further complicated by ethical considerations. This paper argues that commercial space mining is allowed under the current international legal framework.

Keywords: Commercial Space Mining, Outer Space Treaty, Moon Agreement, Utilitarianism, Contractarianism

Introduction

Are we walking down a lucrative path or are we saving humanity? Due to our extensive utilisation of Earth's resources, we are putting pressure on its ecosystem. But no cause for distress; space has more than enough resources. Space mining can reduce that pressure and make finite resources (almost) infinite. It sounds too good to be true. During the Cold War, a space race began and while the competition at the time was mostly based on geopolitics and prestige, it has now found a commercial dimension.¹ Because of this, the possibility of continuing the development of the space sector relies heavily on private investments. The 'New Space Race' has transformed this honorable form of space mining into a form that is commercial in nature. Capitalism has reached far beyond

¹ Yannick Radi, 'Space Mining in Practice: An International Space Law Perspective on Upcoming Challenges' ESIL Reflections 13:8 (2024)



Earth. Driven by the prospect of ‘out-of-this-world profits, companies are investing heavily towards the private space sector. This has made space an economy on its own. It is because of these capitalistic tendencies that we find ourselves stuck in a legal debate. This article raises the question whether commercial space mining is allowed under current international law.

What Is Space Mining?

Space mining can be best defined as the extraction and ownership of extraterrestrial resources like precious metals and minerals.² These resources tend to be found on celestial bodies like the Moon, Mars and asteroids. The purpose of this extraction is to utilize these resources back on Earth, support human exploration of space, provide economic opportunities and ultimately make life in outer space more feasible. Earth’s resources are finite, while society’s demand is potentially infinite.³ Space mining allows us to expand our resource base, which in turn allows humanity to grow and prosper exponentially.⁴

The Legal Discussion of Space Mining

Currently, there is no coherent and binding legal framework around the question of whether or not commercial space mining is legal under international law. This makes the answer an opinion rather than a legal fact. That being said, there are certain legal instruments that can shine light on the situation.

3.1 The Outer Space Treaty

The Outer Space Treaty (hereafter: OST) was introduced in 1967 and currently counts 116 Member States. This makes it the leading international legal treaty regarding outer space law.⁵ Article 1 of

² André Lippert, ‘Space mining: breach of international law in space?’ (2025) CMS Law-Now ; Tania Gres, ‘Space Mining’ (Space Generation Advisory Council, 22 March 2022) <https://spacegeneration.org/67883-2>

³ Sven Modell, ‘Space mining as an emerging organisational field: An institutional logics perspective’ (2025) 74 Space Policy, Elsevier

⁴ Sven Modell, ‘Space mining as an emerging organisational field: An institutional logics perspective’ (2025) 74 Space Policy, Elsevier

⁵ United Nations Office for Outer Space Affairs, Status of International Agreements relating to Activities in Outer Space – Latest Depository Notifications, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/status/index.html> (last accessed 17 Feb. 2025)



the OST guarantees the freedom of exploration and use of outer space. The commercial use of space resources is covered within this provision, since it does not imply a limitation to the scientific and military use of outer space.⁶ The OST article states that the free access, exploration and use of outer space shall be carried out for the benefit and interest of all countries. This freedom shall be irrespective of the degree of economic or scientific development of the space actor. That signals equality between states to be of big importance. Space activities are allowed, according to Article 1 OST, as long as they are in accordance with international law.

However, Article 2 of the OST explicitly prohibits any national appropriation of outer space, including celestial bodies. For the sake of the argument, the term ‘appropriation’ shall refer to the taking of property for one’s own or exclusive use with a sense of permanence.⁷ That implies that a temporary occupation of a landing site, for example, would not constitute appropriation. This provision merely prohibits national appropriation, meaning that it does not encompass an explicit prohibition regarding individual appropriation.⁸ The Lotus case established that acts which are not explicitly forbidden, are to be regarded as allowed.⁹ If we were to follow this judgement, an individual acting on their own behalf could lawfully, under international space law, acquire any part of outer space. Nevertheless, if we take the wordings of Article 6 OST into consideration, it seems doubtful that the Treaty intended to target states and exclude individuals of such acts. This article gives Member States the responsibility for their national activities performed in outer space by governmental entities as well as non-governmental actors.

Moreover, if it were to come down to it, a claim of property in outer space by an individual would require the granting of rights through national legislation. ‘National’ should thus be understood in light of the entire OST, including the rulings of Article 6. Given the prohibition for States to be

⁶ André Lippert, ‘Space mining: breach of international law in space?’ (2025) CMS Law-Now

⁷ Stephen Gorove, ‘Interpreting article II of the outer space treaty’ (1969) 37 Fordham L. Rev. 349

⁸ Stephen Gorove, ‘Interpreting article II of the outer space treaty’ (1969) 37 Fordham L. Rev. 349

⁹ Case of the SS Lotus (France v Turkey) (1927) PCIJ Rep Series A No 10



engaged in appropriation, there is an implied duty for them to discourage private appropriation.¹⁰ The prohibition therefore logically extends to the practices of private entities.

3.2 The Moon Agreement

The Moon Agreement was adopted in 1979 by the UN General Assembly with commitment to the ideals of peace and development in mind.¹¹ It is far more direct than the OST regarding resource extraction, as it addresses it explicitly. National appropriation by claim of sovereignty is also prohibited by this Agreement, more specifically by Article 11(2). In addition to that, Article 11(1) jo. 11(4) states that the Moon and its natural resources are “common heritage of mankind” and that they shall not become property of any State (including non-governmental entities). While this poses a prohibition on mining, it only reaches the Moon and its natural resources. Furthermore, only a total of 17 states have ratified this Agreement.¹² So while most would argue that the Moon cannot be subjected to appropriation or resource extraction, the Moon Agreement is not generally viewed as a binding and enforceable instrument.¹³ That leaves us with the provisions of the OST as international guidelines on the matter.

The Moral Discussion of Space Mining

When a legal debate exists with these kinds of ambiguities and uncertainties, it is important to look at it from a philosophical perspective. Since a clear and coherent framework is lacking, the morality of space mining is being questioned. The extraction of resources is done for the greater good: to provide economic opportunities, achieve life in outer space and allow humanity to grow and prosper. With commercial space mining, however, there is an obvious self-interest at heart; the economic prosperity of private space actors. That being said, the intentions of private entities cannot be generalized, which is why the ethical debate within this article will be limited to morality based on consequences. There are two ethical views that are both based on outcomes, yet have

¹⁰ Nicolai Dypvik Myklebust, ‘The Road to Outer Space’ (2024) (584) *Marlus* 1, 2.3 ‘what is the meaning of ‘national appropriation’?’

¹¹ Antonella Bini, ‘The Moon Agreement: Its effectiveness in the 21st century’ (2008) *ESPI Perspectives* No 14

¹² Yannick Radi, ‘Space Mining in Practice: An International Space Law Perspective on Upcoming Challenges’ *ESIL Reflections* 13:8 (2024) ; Ridima Sur, ‘Space Resource Regulation: From National Approaches to the Need for a General Framework’ (2024) *Space Generation Advisory Council* ; Cross Conrad et al., ‘The Future of Mining in Outer Space’ (2024) *The Regulatory Review*

¹³ Cross Conrad et al., ‘The Future of Mining in Outer Space’ (2024) *The Regulatory Review*



very different starting points.

The first would be contractarianism, which takes self-interest as its starting point. Contractarians see morality as a “contract” based on consequences. When asking oneself whether commercial space mining should be allowed under international law, contractarians will ask themselves whether or not they benefit from accepting a “contract” that limits their freedom of space mining. Such a contract would limit the economic interest and social position of space actors. Unlike ethical egoism, however, contractarianism is not self-defeating. It is understood that obeying a “contract” is rational when it serves mutual benefit.¹⁴ Leaving space resources ‘up for grabs’ has the potential of creating a tragedy of commons. In these situations, individuals deplete finite resources and end up harming the collective good out of pure self-interest. Taking this into consideration, contractarianism would endorse restricting rules to secure long-term benefits for each individual. That is not to say this view is against commercial space mining, but rather that it would ensure a “contract” to fight against the tragedy of commons.

The second view is the utilitarian one. Utilitarianism has everyone’s well-being at heart and believes that everyone must be treated equally. Like contractarianism, it bases its morality on consequences. The main question would then be which action would lead to the best overall outcome. In that light, space resources should benefit all humankind, which we can also see codified in Article 1 of the OST and Article 4 of the Moon Agreement. Since utilitarianism takes the idea of equality as a starting point, the opportunity of space mining should be presented to and achievable for everyone. This includes the less developed states. The OST does apply this principle, but it makes for a difficult enforcement since the opportunity of commercial space mining is mostly based on private investments. For commercial space mining to be morally acceptable, the benefits must outweigh the disadvantages, which depends on the values one assigns to each action and consequence. Some beneficial consequences could be a growing economy, advancing scientific research and a relief on environmental strains.¹⁵ Potential downsides include

¹⁴ Rucha Kulkarni, ‘A Critical Analysis of Moral Contractarianism: Towards a Revised Framework’ (2024) <https://doi.org/10.5817/pf24-1-38249>

¹⁵ Sean R. Crouse et al., ‘An Examination of the Implications of Space Exploration Through the Lens of Five Ethical Philosophies’, (2025) *Collegiate Aviation Review International*, Volume 43 Issue 2



the further pollution of space and safety concerns. As long as we can ensure that the benefits outweigh the harms, overall well-being is maximized and commercial space mining is morally permissible.¹⁶ On the basis of that, the expected value of commercial space mining may be allowed under international law.

Utilitarianism provides a straightforward approach to evaluate the morality of space ventures. It tends to be an appealing ethical view for policymakers and stakeholders as it focuses on tangible outcomes.¹⁷ That being said, predicting the consequences of these types of activities is a very complex and uncertain matter. Mainly because we find ourselves at the infancy of this industry's timeline. Another disadvantage of this approach includes the fact that it might be too permissive as long as the benefits outweigh the harms. Contractarianism, on the other hand, is more cautious. A compromise is necessary in order to make commercial space mining beneficial for all individuals. Rules and regulations are important instruments to achieve fair and beneficial outcomes. Both views, even though they have very different starting points, lead to the conclusion that commercial space mining is morally permissible.

Conclusion

The question hovering over this article is whether or not commercial space mining is allowed under international law. The OST provides a vague framework around this question as it does not address space resources concretely. Especially since the non-appropriation principle does not aim at determining the legal status of exploitation of resources, but rather at prohibiting making a territory one's own.¹⁸ It is for that reason that the legal status of extraterrestrial resource extraction tends to be a controversial topic. The legality of this activity, however, can be deduced from Articles 1, 2 and 6 of the OST. As long as it does not challenge established legal provisions, commercial space mining seems to be in accordance with the OST. On the other hand, the Moon Agreement seems to make no allowance for these types of ventures. The Agreement is not generally accepted as a

¹⁶ Sean R. Crouse et al., 'An Examination of the Implications of Space Exploration Through the Lens of Five Ethical Philosophies', (2025) *Collegiate Aviation Review International*, Volume 43 Issue 2

¹⁷ Sean R. Crouse et al., 'An Examination of the Implications of Space Exploration Through the Lens of Five Ethical Philosophies', (2025) *Collegiate Aviation Review International*, Volume 43 Issue 2

¹⁸ Martin Svec, 'Outer Space, an Area Recognised as Res Communis Omnium: Limits of National Space Mining Law' (2022) *Space Policy*, Volume 60, Elsevier



leading legal instrument, which means that the OST possesses the governing provisions. Since the Agreement does not allow space mining and the OST does (but only implicitly), the debate continues to live on. After all, legality does not necessarily imply legitimacy.

The moral inquiry through contractarianism and utilitarianism reveals that, even though it is morally permissible, commercial space mining needs a coherent set of rules governing its legitimacy. We might not be walking down a lucrative path right now, but the question remains whether or not we are saving humanity. Regardless, it seems safe to assume commercial space mining is indeed allowed under international law.

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