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Features

## Fly Me To The Moon: The Need For U.S. Lunar Development Legislation That Balances Property Rights, Commercial Incentives, & International Obligations

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## INTRODUCTION

NASA believes that by 2040, Americans will have housing on the moon, with housing on Mars not far behind.<sup>[1]</sup> While some scientists say this timeline is overly ambitious, NASA thinks it is attainable if the agency continues to hit its benchmarks.<sup>[2]</sup> “Scientists at NASA say that it is too early to consider the market value of homes on the moon, or even how an ownership structure for lunar habitats could look.”<sup>[3]</sup> But the future tends to move faster than we think. Even if it does not in this case, the U.S. should take the lead on regulating property rights on the moon now so that when humans are ready to live on the moon we can avoid bitter land disputes, create an equitable—and competitive—system for utilizing the moon’s resources, and ensure compliance with our international space treaty obligations. Specifically, Congress should pass legislation granting commercial entities permission to develop property on the moon.<sup>[4]</sup> Housing on the moon could be necessary for several reasons: to conduct continued exploration of the moon; for astronauts to use as a stopover on the way to Mars or other planets; for tourism; and for resource extraction.<sup>[5]</sup> If the Earth becomes overpopulated or contaminated beyond repair by war or climate change, we may have no choice but to live on the moon.

This paper will unfold as follows: Section I will give background on existing international and domestic laws that impact property rights on the moon and explain why further, U.S.-specific legislation is needed; Section II will propose principles for the needed U.S. legislation; and Section III will discuss other regulations that impact living on the moon and why these regulations and the agencies that enforce them must be streamlined.

### SECTION I: EXISTING SPACE LAW AND THE NEED FOR FURTHER LEGISLATION

#### A. *The Outer Space Treaty*

Drafted in the 1960s,<sup>[6]</sup> the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (also known as the Outer Space Treaty and hereinafter referred to as the OST) has been ratified by more than 100 countries and signed by 23 other states (including the U.S. and the other spacefaring nations except for Iran)<sup>[7]</sup> and is the foundation of all international space law.<sup>[8]</sup> There were only two spacefaring nations when the OST was drafted (the U.S. and the Soviet Union)<sup>[9]</sup> and no one had ever stepped foot on the moon.<sup>[10]</sup> The OST’s drafters were certainly not contemplating real estate development on the moon and private companies like SpaceX were decades away from exploring space.<sup>[11]</sup>

Article II of the OST says, “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.”<sup>[12]</sup> This unambiguously says that the U.S. (or China or Russia for that matter) cannot claim ownership of the moon. However, the OST does not directly address whether a private individual or company can claim ownership of the moon. “In fact, the framers of the Outer Space Treaty were deliberately ambiguous about private property, as opposed to nationally owned property, to allow ratification of the Treaty by both the U.S., which wanted to encourage private enterprise in space, and the U.S.S.R., which did not.”<sup>[13]</sup>

According to legal scholars, “anything that isn’t specifically banned by custom or treaty is generally allowed in international law.”<sup>[14]</sup> Under this theory, private U.S. individuals or companies can appropriate celestial bodies like the moon because the OST and other space treaties to which the U.S. is party have not explicitly prohibited doing so.

Under the common law theory of property, all private property rights derive from the sovereignty.<sup>[15]</sup> If one buys this view, because Article II bans national appropriation, a country cannot confer property rights on the moon to a private corporation because the country has no rights to confer.<sup>[16]</sup> Under the civil law theory of property, rights are established by “use and occupation,” and “[g]overnment merely recognizes those rights.”<sup>[17]</sup> If one believes this theory, private companies *can* own property on the moon.

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One could read the Article VI provision that states are responsible for national space activities regardless of whether they are conducted by governmental or non-governmental entities<sup>[18]</sup> as an implied prohibition on private property rights. However, some experts have rebutted this notion, noting that “the treaty clearly does not contain any language explicitly saying that states may not authorize their citizens to do anything that they themselves cannot do.” These experts note that the U.S. itself cannot get married, but its citizens can, for example.<sup>[19]</sup>

Whether or not the OST bans private individuals or corporations remains up for debate, but several other laws, treaties, and provisions provide some context as to how other countries and Congress have interpreted this, and provide precedent for enacting a new, U.S.-specific law.

### *B. The Moon Agreement*

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (hereinafter referred to as the Moon Agreement),<sup>[20]</sup> originally enacted in 1979 and ultimately signed by 22 countries,<sup>[21]</sup> explicitly prohibits appropriation of the moon by either a nation or an individual: “The 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...”<sup>[22]</sup> It also notes “[t]he moon and its natural resources are the common heritage of mankind”<sup>[23]</sup> and “neither the surface nor the subsurface of the moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental organization, national organization or non-governmental entity or of any natural person.”<sup>[24]</sup> The Agreement does, however, allow for bringing resources back from the moon: “[T]he Moon Agreement does not preclude any modality of exploitation, by public or private entities, or prohibit the commercialization of such resources, provided that such exploitation is compatible with the principle of a common heritage of mankind.”<sup>[25]</sup> Notably, the U.S. and other spacefaring nations did not sign the Moon Agreement, and are not bound by it.<sup>[26]</sup>

Some space pundits have also argued “that the very fact that the framers of the Moon Treaty felt the need to write a new specific ban on private property indicates that they did not feel the earlier Outer Space Treaty had already accomplished such a prohibition.”<sup>[27]</sup>

### *C. The Artemis Accords*

The U.S. established the Artemis Accords in 2020 with a number of other countries (some spacefaring); notably, Russia and China did not sign.<sup>[28]</sup> The Accords are not legally binding, but “[o]ne of the delineated goals of the Accords is to add a permanent human settlement on the Moon.”<sup>[29]</sup> The Accords also propose non-exclusionary “safety zones” to “prevent the activities of one State from interfering with another”<sup>[30]</sup> and protect historically significant sites—like the original moon landing site—from development.<sup>[31]</sup> Importantly, the Accords are silent as to what private corporations can and cannot do.<sup>[32]</sup>

### *D. US. Commercial Space Launch Competitiveness Act*

Enacted in 2015, the U.S. Commercial Space Launch Competitiveness Act was intended to incentivize private space exploration and establishes a property right in that it explicitly allows U.S. citizens who reach a celestial body to extract and bring home natural resources from that body, but it does not create a property right on the body itself.<sup>[33]</sup> While not useful for determining whether a private company can develop housing on the moon, the law serves as an important example of how the U.S. has previously acted to spur space investment by the private sector and how Congress has interpreted the U.S.’s obligations under the OST. Japan, Luxembourg, and the United Arab Emirates have similar laws.<sup>[34]</sup>

### *E. Why U.S. Legislation is Needed*

Given the ambiguity regarding property rights in the OST, amending this treaty or working within the United Nations to create a new treaty that explicitly privates a property right would be the best course of



action. But given the state of diplomatic relations between the U.S. and China and Russia, this is not practical. The countries that signed the Moon Agreement—and supported the common heritage principle—would also be unlikely to agree to a new treaty that allowed for property rights. Furthermore, if former President Trump is reelected, he would be unlikely to participate in drafting a new treaty considering how he handled treaties in his first term as President.<sup>[35]</sup> The U.S. could withdraw from the OST, but given that the treaty is the foundation of all space law and has many valuable provisions (such as the ban on weapons of mass destruction in space),<sup>[36]</sup> this would also be impractical.

“When a treaty is ambiguous, each signatory must interpret for itself what its obligations are.”<sup>[37]</sup> As such, it is up to Congress to decide whether the OST provides private property rights and if so, how to do so in a way that complies with the OST.

## SECTION II: PRINCIPLES FOR FURTHER LEGISLATION

U.S. legislation on property development in on the moon must be unambiguous, compliant with our existing international space treaty obligations, fair, and competitive. It must also be timely and streamlined. I will address each of these principles in turn.

### *A. Unambiguous*

To avoid repeating the pitfalls of the OST, any U.S. legislation must unambiguously provide either a private property right for the moon or clear direction on how private enterprises can develop habitats on the moon without a private property right (more on this later). Private companies will not make the large investments lunar development will require without legal protection and a path to seeing a return on their investments. Congress should unambiguously state how it interprets property rights on the moon and how the law complies with the U.S.’s obligations under the OST. If Congress provides private property rights, it should clearly state how these rights will be enforced and what the U.S. can and will do if another country or private entity violates or refuses to acknowledge these rights. The legislation should also address how the U.S. will recognize land claims from citizens of other countries, how disputes will be litigated, and how the government will oversee the rights granted to private companies and ensure compliance with the rules for receiving and maintaining them.

### *B. Compliant*

Even if Congress interprets Article II of the OST as allowing for private property rights, several other OST provisions make regulating land development more complicated than simply saying, “go forth and build!” Article I states that “The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries...”<sup>[38]</sup> This implies that a lunar settlement should be open to all. Article XII says that “All stations, installations, equipment and space vehicles on the moon and other celestial bodies shall be open to representatives of other States Parties to the Treaty on a basis of reciprocity,” but that these representatives should give advance notice of their visit and avoid interfering with the facility’s normal operations.<sup>[39]</sup> This should not impact the development of lunar habitats: “[E]ven on Earth, most private property is subject to such visits by officials of local, regional, and national governments, especially if they obtain the appropriate court orders.”<sup>[40]</sup>

The law must also address how lunar inhabitants will warn other parties to the treaty of any dangers they discover that could pose a threat to other inhabitants to comply with Article V; create liability regimes to comply with Articles VI and VII; maintain a registry of spacecraft used to travel to and from the moon, as well as around the moon itself, to comply with Article VIII; include environmental regulations to comply with Article IX; and create an information-sharing framework in the event that private citizens make scientific discoveries to comply with Article XI.<sup>[41]</sup>

If Congress interprets the OST as prohibiting private property rights, it can create a licensing regime that allows for development and leasing activity and property rights within a specific facility, or perhaps within



a specific Artemis Accords safety zone.

### *C. Fair*

The legislation should be cognizant of concerns about colonialism and ensure that the U.S. does not repeat past atrocities like the stealing of land from Native Americans. In the event that people do need to live on the moon to ensure the future of civilization, the legislation should make certain that private landowners do not engage in price gauging. This could potentially be accomplished through rent control or limits on the amount of land any one entity can own. Perhaps only public companies should be allowed to own or develop land on the moon, with limits on the percentage of the company that any individual or holding company can own. This would allow more people (and people all over the world) to share in the profits. Additionally, a public, multinational structure could potentially stave off national appropriation claims under the common law theory of property rights. An initial public offering would also help a private company to raise money to get to and develop housing on the moon.

The law should also require productive use of the land or “mixing labor with the soil” to establish a property right. This would help prevent massive land grabs and excessive speculation and would maintain the spirit of OST Article I’s “province of all mankind” principles.<sup>[42]</sup>

The legislation should protect the original moon landing site, as in the Artemis Accords, but otherwise ensure that historic preservation does not impede progress and development, which often happens in cities throughout the U.S.<sup>[43]</sup>

### *D. Competitive*

In addition to striving for equitable access to the moon and its resources, the U.S. legislation should ensure any company that wishes to own or develop land on the moon complies with U.S. antitrust regulations. Additionally, given that the U.S. may *need* to send citizens to live on the moon in the future, it is imperative that the country not become too reliant on any one company or individual to create and operate housing. For example, “SpaceX is currently the sole means by which NASA transports crew from U.S. soil into space.”<sup>[44]</sup> Congress should ensure that the future of society does not rest in the hands of any one individual or company.

### *E. Temporal*

Just as the drafters of the OST were not contemplating property development on the moon in the 1960s, there are inevitably things that Congress will not contemplate when drafting this legislation, especially as technology and our diplomatic relations with other countries continue to evolve. To avoid another 50 years of ambiguity, the law should include a provision that calls for it to be assessed and amended as necessary every 10 years. A temporal provision will ensure the law does not quickly become dated, while balancing existing property rights and investments.

### *F. Streamlined*

The law should delineate which agency will regulate property development and operations. Commercial space activities currently require licenses from the Federal Aviation Administration (FAA), the Department of Commerce’s (DOC) National Oceanic and Atmospheric Administration (NOAA), and the Federal Communications Commission (FCC)<sup>[45]</sup> and “U.S. agency regulations [concerning space] easily exceed tens of thousands of pages.”<sup>[46]</sup> To incentivize, rather than disincentivize, investment, one agency should oversee property rights and development on the moon and any regulations that come on top of the main moon property law should be housed in one easy-to-find-and-use web portal.

## **SECTION III: OTHER LEGAL CONSIDERATIONS REGARDING LUNAR HABITATS**



As noted in the above section, there are tens of thousands of pages of U.S. space regulations and numerous agencies involved. Congress will ideally streamline some of these regulations to help make continued space exploration more feasible for private entities. Operating lunar habitats will require more than just a property rights regime—inhabitants will need to get to the moon (regulated by the FAA, Transportation Security Administration, National Transportation Safety Board, and Department of Transportation), internet (overseen by the FCC) and weather reports (overseen by NOAA).[47] Assuming they conduct scientific research they will need to interact with the DOC, National Institute of Standards and Technology, National Space Council, and other agencies.[48] They will need protection, which is tricky given OST Article IV’s prohibition on military bases,[49] but the Department of Defense will have to find a way to keep inhabitants safe. Private developers will have to comply with U.S. labor and employment laws, civil rights, and environmental legislation and will need insurance. Even if Congress passes legislation allowing private lunar habitat development, the legal environment will be very complex, but passing this legislation will be “one small step for man, one giant leap for mankind.”[50]

## CONCLUSION

U.S. legislation regarding private land rights is imperative for spurring private investment in space exploration, ensuring that Americans and allies can utilize the moon and its resources if needed, preventing China or Russia from colonizing the moon, and maintaining a competitive environment so that the U.S. does not become any more reliant than it already is on SpaceX or another entity. If the U.S. leads in this next frontier, it is likely that other countries will follow with similar legislation like they did with the 2015 Competitiveness Act, which will further support an international private property rights regime and perhaps even lead to a new treaty.

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[2] *Id.*

[3] *Id.*

[4] This paper will focus on regulating property rights and development on the moon, but the same principles could apply to Mars and other celestial bodies.

[5] See Kamin, *supra* note 1. See also Steve Mirmina & Caryn Schenewerk, *International Space Law and Space Laws of the United States* 44 (2022) (“Some contend that the Moon and neighboring asteroids contain enough natural resources to satiate Earth’s needs for energy and wealth for decades to come.”) (internal citation omitted).

[6] Steve Mirmina & Caryn Schenewerk, *International Space Law and Space Laws of the United States* 39 (2022).

[7] *Id.*; see also Jackson Landers, *Can There Be Real Estate on the Moon?*, *Smithsonian Mag.* (July 13, 2016), <https://www.smithsonianmag.com/smithsonian-institution/want-buy-mountain-moon-180959692/>.

[8] Mirmina & Schenewerk, *supra* note 6, at 38 (internal citations omitted).

[9] Mirmina & Schenewerk, *supra* note 6, at 13-15 (internal citations omitted).

[10] *Id.* at 16.



[11] The first privately developed commercial rocket launched in 1982. See Mirmina & Schenewerk, *supra* note 6, at 139 (internal citations omitted). Elon Musk founded SpaceX in 2002. See Emra Kelly, *How Elon Musk took SpaceX from an idea to the cusp of making history*, USA Today, (May 26, 2020), <https://www.usatoday.com/story/news/nation/2020/05/26/spacex-how-elon-musk-took-idea-cusp-history/5257977002/>.

[12] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, art. II, Jan. 27, 1967, 610 U.N.T.S. 205., T.I.A.S. No. 6347 [hereinafter OST].

[13] Alan Wasser & Douglas Jobes, *Space Settlements, Property Rights, and International Law: Could A Lunar Settlement Claim the Lunar Real Estate It Needs to Survive?*, 73 J. Air L. & Com. 37, 59 (2008).

[14] Landers, *supra* note 7. See also Wasser & Jobes, *supra* note 13 at 47 (“The long-accepted legal doctrine *expressio unius est exclusio alterius* says that, when interpreting statutes, we should presume things not mentioned were excluded by deliberate choice, not inadvertence.”).

[15] Wayne N. White Jr., *Real Property in Outer Space*, Space Settlement Inst. 6 (1997), [http://www.space-settlement-institute.org/Articles/research\\_library/WayneWhite98-2.pdf](http://www.space-settlement-institute.org/Articles/research_library/WayneWhite98-2.pdf).

[16] *Id.*

[17] Wasser & Jobes, *supra* note 13, at 49.

[18] OST, *supra* note 12, art. VI (“States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty.”).

[19] Wasser & Jobes, *supra* note 13, at 56.

[20] The Moon Agreement is also sometimes known as the Moon Treaty.

[21] Morgan M. DePagter, “Who Dares, Wins:” *How Property Rights in Space Could be Dictated by the Countries Willing to Make the First Move*, Chi. J. Int’l. L. (2022), <https://cjl.uchicago.edu/online-archive/who-dares-wins-how-property-rights-space-could-be-dictated-countries-willing-make>.

[22] The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, art. 4(1) (1979), 1636 U.N.T.S. 3, 18 I.L.M. 1434 [hereinafter Moon Agreement].

[23] Moon Agreement, *supra* note 22, art. 11(1).

[24] Moon Agreement, *supra* note 22, art. 11(3).

[25] DePagter, *supra* note 21.

[26] *Id.*

[27] Wasser & Jobes, *supra* note 13, at 42.

[28] DePagter, *supra* note 21; see also Matthew Gross, *The Artemis Accords: International Cooperation in the Era of Space Exploration*, Harv. Int’l. Rev. (Jan. 27, 2023), <https://hir.harvard.edu/the-artemis-accords/>.



[29] DePagter, *supra* note 21.

[30] Mirmina & Schenewerk, *supra* note 6, at 48.

[31] The Artemis Accords: Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids, Section 9, NASA (Oct. 13, 2020).

[32] Gross, *supra* note 28.

[33] See DePagter, *supra* note 21 (“U.S. citizens ‘engaged in commercial recovery of an asteroid resource or a space resource under this chapter shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell the asteroid resource or space resource obtained in accordance with applicable law, including the international obligations of the United States.’”) (citing 51 U.S.C. § 51303).

[34] DePagter, *supra* note 21.

[35] See, e.g., Matt McGrath, *Climate change: US formally withdraws from Paris agreement*, BBC (Nov. 4, 2020), <https://www.bbc.com/news/science-environment-54797743>.

[36] OST, *supra* note 12, art. IV. It is worth noting that just because Russia and China are parties to the OST, there is no guarantee that they will abide by art. IV. See, e.g., David E. Sanger, *Henry Kissinger, Who Shaped U.S. Cold War History, Dies at 100*, N.Y. Times (Nov. 29, 2023), <https://www.nytimes.com/2023/11/29/us/henry-kissinger-dead.html> (“While Mr. Putin and Mr. Biden renewed New START in 2021, once the war in Ukraine started the Russian leader suspended compliance with many parts of the treaty.”) and *U.S. report finds Beijing ‘unlawfully claims sovereignty’ in South China Sea*, AFP (Jan. 13, 2022), <https://hongkongfp.com/2022/01/13/us-report-finds-beijing-unlawfully-claims-sovereignty-in-south-china-sea/> (“These claims gravely undermine the rule of law in the oceans and numerous universally recognized provisions of international law reflected in the [1982 UN treaty on the law of the sea].”).

[37] Wasser & Jobes, *supra* note 13, at 60 (internal citation omitted).

[38] OST, *supra* note 12, art. I.

[39] OST, *supra* note 12, art. XII.

[40] Wasser & Jobes, *supra* note 13, at 67.

[41] OST, *supra* note 12, art. V, VI, VII, VIII, IX, XI.

[42] OST, *supra* note 12, art. I.

[43] See Jacob Anbinder, *What Historic Preservation Is Doing to American Cities*, The Atlantic (May 2, 2022), <https://www.theatlantic.com/ideas/archive/2022/05/historic-preservation-has-tenuous-relationship-history/629731/> (noting that in Manhattan, “an astonishing 27 percent of the borough’s lots now fall under the purview of the landmarks commission.”).

[44] Ronan Farrow, *Elon Musk’s Shadow Rule*, The New Yorker (Aug. 21, 2023), <https://www.newyorker.com/magazine/2023/08/28/elon-musks-shadow-rule>.

[45] Mirmina & Schenewerk, *supra* note 6, at 22.

[46] *Id.*





[47] Mirmina & Schenewerk, *supra* note 6, at 91.

[48] Mirmina & Schenewerk, *supra* note 6, at 92.

[49] OST, *supra* note 12, art. IV.

[50] Neil Armstrong's Famous Line, ABC Television Stations, <https://www.youtube.com/watch?v=J6jplPkbe8g>.

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