

# Homesteading the Final Frontier

A Practical Proposal for Securing  
Property Rights in Space

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*By Rand Simberg*

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## A Practical Proposal for Securing Property Rights in Space

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### Executive Summary

While new space transportation companies are driving down the cost of accessing space, development of the space frontier will continue to be held back, as it has for decades, by the lack of clear off-planet property rights. Without them, it is difficult to raise funds for extraterrestrial ventures, despite the abundant resources on the Moon and on asteroids, including metals with high value on Earth.

Many believe that the 1967 Outer Space Treaty implicitly prohibits private property in outer space, but under another conceivable interpretation, it only prohibits declarations of national sovereignty. A proposed law requiring the United States to recognize land claims off planet under specified conditions offers the possibility of legal, tradable land titles, allowing the land to be used as loan collateral or an asset to be sold to raise funds needed to develop it.

Such a law would vitiate the 1979 Moon Treaty, which does outlaw private property claims in space, but to which the U.S. is not a signatory. This should be viewed as a feature, rather than a bug. The law would not impose any new costs on the federal government, and would likely generate significant tax revenue through title transaction fees and economic growth from new space ventures carried out by U.S. individuals and corporations. It would have great potential to kick the development of extraterrestrial resources—and perhaps even the human settlement of space—into high gear.



## Introduction

At the heart of the prosperity of the West lie clear and recognized freely transferrable property rights, protected under the rule of law.<sup>1</sup> Absent legally recognized rights to buy, own, and sell titled property, it is difficult, if not impossible, to get a loan to purchase said property, improve it, mine it, drill for minerals on it, or sell the proceeds from any of those activities. Property rights are a *sine qua non* of wealth creation and a reason why America and other Western nations are rich and others are poor. Moreover, they lie at the heart of liberty. Their current absence off planet partially explains why we have not developed the next and, in a sense, last frontier—space.

The commonly accepted explanation for the lack of off-planet development and settlement is that it is prohibitively expensive to gain access to it and to enable humans to survive in such alien environments. But this overlooks one important consideration. One of the reasons for the high cost of access and survival is because said access and survival currently have little value to most people. Therefore, there is little financial incentive to drive down those costs through traditional market competition and technology development.

With the recent advent of multiple commercial launch providers competing with each other for customers, we are on the verge of solving this problem over the coming years. But even if the technological solution is at hand, the other problem—lack of off-planet property rights—remains, due to the legacies of policy decisions made during the early space age.

Efforts to create an international space treaty began in the 1950s, before the launch of the first satellites. In the political climate of the era, socialism was ascendant, the former great powers of Europe were decolonizing, and the notion of a capitalistic “exploitation” of space was out of fashion in official circles.

The result was 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.<sup>2</sup> It was based on two fundamental principles: “that international law, including the Charter of the United Nations, applies to outer space and celestial bodies, and that 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.”<sup>3</sup>

In the 1960s, outer space was viewed not as a potential frontier for human development and settlement, but rather as a new realm for scientific discovery and a battlefield in the Cold War between the United States and the Soviet Union. The space race to go to the Moon was viewed as ruinously expensive for both the U.S. and the USSR. In fact, as early as 1963, only two

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years after President John F. Kennedy had committed the United States to land a man on the Moon, his administration was having second thoughts about it, and considering a cooperative initiative instead.<sup>4</sup> But Kennedy's assassination in November of that year and Lyndon Johnson's ascension to the presidency put an end to such a policy shift, and the race continued, partly as a memorial to the martyred president.

However, the expense remained, and for many, including Assistant Secretary of State Henry Owen, part of the goal of the Outer Space Treaty was to make space of sufficiently low value—either militarily or economically—as to remove the incentives for racing to get there, and thus shift resources from NASA to the State Department.<sup>5</sup> So far, the treaty has achieved that goal, by reducing the incentive for governments to send humans into space in significant numbers.

### **Space Off-Limits to Commerce**

Some of the problem arises from a false conception of space as scientific preserve, rather than as a new venue for human expansion. Under the former view, the universe is a fragile jewel to be observed and studied, but minimally explored, if at all, by humans. A good example of this is Antarctica, which has some exploitable resources, but the only human activity there consists of international government research bases and low-impact tourism, and the only commerce is that required to support those activities. Contrast this with the development in the sovereign regions of the Arctic. In an environment just as harsh as the Antarctic, a resource boom is under way, led by Canada, Russia, Denmark, and Norway.<sup>6</sup>

This lack of activity is largely due to the Antarctic Treaty, which was negotiated in the late 1950s and was a model for the Outer Space Treaty, at least in its bans on claims of national sovereignty and placement or testing of nuclear weapons (or nuclear waste).<sup>7</sup> Antarctica is thus the model on which the world's governments are currently pursuing space activities. The only off-planet human base is the intergovernmental International Space Station (ISS), occasionally visited by paying customers whom the crews grudgingly tolerate.

On the other hand, under the view of the universe as a frontier full of potential, the resources that could be developed from it offer great opportunity for human flourishing. Centuries of history demonstrate that the best means of doing that is via the free exchange of goods and services, undergirded by legally enforceable private property rights. From that perspective, the Antarctica and ISS model would be a disaster.

Fortunately, the U.S. government resisted the goals of some other countries, including the Soviet Union, to make space entirely off limits to non-governmental entities. As West Bohemian University international law professor Vladimír Kopal says in a history of the Outer Space Treaty published in the United Nations' Audiovisual Library of International Law:

In connection with the fundamental principles of the Outer Space Treaty, its article VI must also be highlighted: it declared the principle of international responsibility of States for national space activities, 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 of the Outer Space Treaty. This principle, which had already appeared in the 1963 Declaration, was a compromise formula that reconciled the controversial views of those wishing to reserve space activities only for States and intergovernmental organizations, and those advocating access to outer space also for non-governmental entities. By adopting this principle, *the negotiating States paved the way for the private sector to conduct space activities side by side with States and international intergovernmental organizations*. At the same time, however, the respective States assumed responsibility not only for their own space activities, but also for the activities of private legal persons of their nationality. States parties have also become responsible for assuring that all national activities of this nature would be carried out in conformity with the provisions of the Outer Space Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, require authorization and continuing supervision by the respective States parties to the Outer Space Treaty.<sup>8</sup> [Emphasis added]

This provision was crucial in allowing for the creation of the current commercial communications, remote sensing, and launch industries. However, it mandated increased government oversight of space activities above that seen in other industries, such as aviation or land transportation. This served to inhibit—if not short circuit altogether—the development of market-based solutions.<sup>9</sup>

However, Kopal further notes that, “The Outer Space Treaty does not contain any principles that would regulate economic activities for the purpose of exploring and exploiting the natural resources of outer space, the Moon and

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other celestial bodies, or of producing energy from outer space for commercial purposes.”<sup>10</sup>

The 1979 Moon Treaty was an attempt to provide such principles, but it was written in such a way as to effectively preclude resource extraction, since any entity attempting to utilize extraterrestrial resources would have to operate under an undefined “regime” whose primary purpose would have been the “equitable” distribution of the profits—to non-space-faring countries. The key provision, in Article IV, states:

The exploration and use of the [M]oon shall be the province of all mankind and shall be carried out *for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development*. Due regard shall be paid to the interests of present and future generations as well as to the need to promote higher standards of living and conditions of economic and social progress and development in accordance with the Charter of the United Nations.<sup>11</sup> [Emphasis added]

At its heart, the Moon Treaty was redistributionist in nature, taking from those who were willing to take risk and invest capital in developing new resources and giving to those who did not.

There are other onerous provisions, such as a requirement, per Article V, that:

States Parties shall inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of their activities concerned with the exploration and use of the [M]oon. Information on the time, purposes, locations, orbital parameters and duration shall be given in respect of each mission to the [M]oon as soon as possible after launching, while information on the results of each mission, including scientific results, shall be furnished upon completion of the mission.<sup>12</sup>

This sort of oversight overkill makes clear that the treaty is based on the vision of space as a scientific preserve, not on that of space as a new frontier for the development of resources and human settlement. It was explicitly modeled on the United Nations Convention on the Law of the Sea, also known as the Law of the Sea Treaty (LOST), which was in part intended to regulate the mining of the world’s seabeds.<sup>13</sup> At least as of a couple years ago, there has been very little such mining to date.<sup>14</sup>

Given the Moon Treaty's background, the U.S. government should go beyond its current stance of ignoring it—the U.S. has never ratified it—and actively repudiate it.

### **The Technology Is Around the Corner**

Technology is rapidly evolving to make commercial space activities not just technically feasible, but financially practical. For example, consider Moon Express, Inc., a company founded by tech entrepreneur Naveen Jain to start mining the Moon robotically by as early as 2013.<sup>15</sup> Another example is the Texas-based Shackleton Energy Company, which plans to mine ice in Shackleton Crater at the lunar south pole to provide propellant for planetary missions, and is raising funds for the venture now.<sup>16</sup> This is a potentially large market—particularly for missions beyond the Earth-Moon system—that could fuel up with propellants delivered from the lunar surface.

There may even be earthly markets for some of these products. Asteroids are relatively rich in rare earth minerals such as neodymium, scandium, and yttrium, as some of the most productive sites for mining them are ancient impact craters.<sup>17</sup> China currently is the source of a majority of rare earths, which are of high value due to their critically important uses in modern electronics and other technologies. Other possibilities are mining asteroids for platinum-group metals such as platinum itself and palladium, which can have very high values per pound, an important attribute given the high per-pound cost of transportation.<sup>18</sup>

The technology to allow this is coming along rapidly. Space Exploration Technologies' (SpaceX) Falcon Heavy launcher is scheduled for its first flight within two years. It will deliver about 50 tons of payload to low-Earth orbit (LEO) at a price of \$120 million, breaking through the previous cost floor of several thousand dollars per pound to approximately just \$1,000/lb.<sup>19</sup> If SpaceX can achieve its goal of partial or full reusability, its launcher's prices will likely drop further, especially as other competitors come along later in the decade. Over the next 10 to 15 years, we can expect launch systems to evolve to full reusability, either by a performance expansion from current reusable suborbital providers, such as XCOR Aerospace, Virgin Galactic, or Armadillo Aerospace into orbit, or by an evolution from expendability to reusability for the SpaceX Falcon family. In fact, SpaceX recently announced the goal of making its vehicle not only fully reusable, but capable of landing vertically on a pad, rather than splashing down in an ocean. For the capsule, it recently completed testing of thrusters that would both power it to a safe landing and provide an abort system in an emergency, thus making the vehicle more affordable and safer and more comfortable for human space flight.<sup>20</sup>

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*Another key technology that is coming along rapidly and promises to revolutionize the use of extraterrestrial materials is three-dimensional printing, a process that “prints” solid objects by stacking layers of assorted materials and building them up from computer-designed specifications.*

This will drive launch prices down much closer to the marginal cost of propellant, which means potential prices of less than \$100/lb. of payload to LEO. For instance, SpaceX founder Elon Musk has noted that the propellant cost of a Falcon 9 flight is only a couple hundred thousand dollars.<sup>21</sup> Fuel costs for air transports are typically about a third of the total, and with high flight rates, there is no reason that fully reusable space transports cannot achieve comparable ratios, rendering the \$100/lb. number conservative. Combined with orbital propellant depots initially supplied from Earth, this will enable relatively low-cost lunar missions.

Another key technology that is coming along rapidly and promises to revolutionize the use of extraterrestrial materials is three-dimensional printing, a process that “prints” solid objects by stacking layers of assorted materials and building them up from computer-designed specifications. This could allow for the manufacture of complex structures using an input of raw lunar or asteroidal materials, such as iron removed from regolith with magnets, or aluminum and silicon smelted from the silicates of the lunar plains.<sup>22</sup>

While the technology is a challenge, one of the biggest business uncertainties these new companies face is the legal status of any output from their off-world mining operations, and the corresponding ability to raise the funds needed to make them successful.

### **What Is the Solution?**

The 1967 Outer Space Treaty precludes claims of national sovereignty off planet. Absent such claims, the critical question is: Can a signatory still recognize off-planet property rights, including the rights to improve the property and extract resources? While there is no international consensus on this question, many argue that it cannot. Those who do, such as Thomas Gangale,<sup>23</sup> executive director of the space enterprise consultancy, OPS Alaska, generally argue on the basis of Article II, which states:

Outer space, including the [M]oon 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>24</sup>

Skeptics of granting property claims within the Outer Space Treaty’s framework claim that this ban on national appropriation “by any other means” precludes the recognition of property rights of extraterrestrial land. The absence of a state actor in the commercial exploitation of the Moon does not change the fact

that such exploitation still must be conducted under the “authorization and continuing supervision” of state parties, as per Article VI:

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the [M]oon 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 [M]oon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the [M]oon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.<sup>25</sup>

They argue that, since the state is authorizing and supervising the activity, as well as recognizing the permanent and continuous occupation of a portion of the Moon and defending recognized extraterrestrial properties by imposing appropriate sanctions against aggressors, that amounts to national appropriation and is therefore a violation of Article II and associated international law. A declaration that the U.S. is “not making any claim of national appropriation” does not, in and of itself, alter these facts.

If they are right, then it will not be possible for the United States—or any signatory—to recognize and record land claims without either renegotiating or withdrawing from the treaty. Withdrawal is certainly a legal option—Article XVI makes a provision for it a year after notification of intent to do so—but it would not be politically practicable. The valid reasons for the treaty do not go away just because it does not seem to allow private property claims. It is the basis for most current international space law, including follow-on treaties, such as those relating to astronaut rescue and return<sup>26</sup> and the 1972 Liability Convention,<sup>27</sup> which establishes how to adjudicate claims for incidents that result in harm to third parties in the conduct of space activities.

Interestingly, Robert Bigelow, billionaire hotelier and founder of Bigelow Aerospace, a company that plans to develop real estate in orbit, believes that the Chinese government plans to do exactly that. He has given at least two

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speeches, the most recent in Las Cruces, New Mexico, in October 2011, in which he laid out his thesis of China’s plans to claim the entire Moon. “China already has a grand national vision,” he said. “Their vision is that China wants to be indisputably number one in the world, measured any way you want to measure.” He also suggested that China could try to amend the treaty—with support of countries where it is making major investments, especially in Africa and Latin America—or simply withdraw from the treaty altogether. “There isn’t going to be World War III over this.”<sup>28</sup>

However, as Dean Cheng of the Heritage Foundation has noted,<sup>29</sup> this is extremely speculative, and the Chinese have no stated plans other than building a space station in a decade or so, and robotic missions to the moon after that,<sup>30</sup> though in a recent white paper they indicate plans to start planning in the next five years for an eventual lunar base.<sup>31</sup>

From the standpoint of the State Department, renegotiating the treaty would reopen a can of worms thought sealed decades ago, and most diplomats would be loath to do so on something viewed as so speculative as Moon mining. But the lack of defined rights and uncertainty of the prospect for profits will inhibit private entities from pursuing any such exploration and eventual exploitation, thus creating a chicken-and-egg situation.

But is it true that any recognition of off-planet property claims is *de facto* a violation of the Outer Space Treaty? Not necessarily. For instance, one could argue that the existence of the Moon Treaty is in and of itself a refutation of the notion that the Outer Space Treaty outlaws private property in space, or else there would be no need for another treaty that essentially explicitly does so. And there is at least one potential loophole that could be exploited by appropriately worded legislation.

There are two key assumptions in the legal argument used by opponents of off-planet property claims: 1) that the recognition by a government would only recognize claims by its own citizens; and 2) that it would defend them by force. That need not necessarily be so. Under the treaty, it would in fact be possible for a government, or group of governments, to recognize the property claims of *anyone* who met specified conditions, regardless of their citizenship or nationality. Such cooperation would obviate the need for physical force to defend claims.

The argument that the treaty permits individual property rights was actually made from the very beginning. In 1969, two years after the treaty went into force, the late distinguished space-law professor, Stephen Gorove, noted that under it, “[A]n individual acting on his own behalf or on behalf of another individual or a private association or an international organization could

lawfully appropriate any part of outer space, including the [M]oon and other celestial bodies.”<sup>32</sup> This clearly provides support for the concept of individual claims off planet under Article II.

### **A Solution Worth Exploring**

The Space Settlement Institute, a non-profit organization founded to help promote the human settlement of outer space, has taken just such an approach in proposed legislation it calls the Space Settlement Prize Act.<sup>33</sup> If passed, it would require, under certain conditions, that:

All U.S. courts and agencies shall immediately give recognition, certification, and full legal support to land ownership claims based on use and occupation, of up to the size specified in Sections 6.1, 6.2, and 6.3 below, for any private entity which has, in fact, established a permanently inhabited settlement on the Moon, Mars, or an asteroid,<sup>34</sup> with regular transportation between the settlement and the Earth open to any paying passenger.

The Act defines a “private entity” as “[a]n individual, corporation, or consortium of companies and individuals or a consortium of individuals that is *not controlled by any sovereign state or government.*” [Emphasis added] Presumably, “controlled by” in this phrase is in the corporate governance sense—the government does not have a majority vote or the ability to remove its board, because every citizen and corporation is “controlled” in the sense that they have to operate under the laws of the government in which they are domiciled.

In other words, the law would require that the U.S. court system recognize the claim of, say, a corporation chartered on the Isle of Man<sup>35</sup> with investors from Dubai. To say that such a recognition amounts to a “national appropriation” by the U.S. of the legal real estate established with such a claim is plainly absurd.

There is an interesting consequence to this. The government of the “company town” that comprised the claim would be intrinsically sovereign, and not subject to the laws of any earthly one (though citizens of terrestrial nations living in it would still be within the reach of their governments). Local laws would be defined by the corporate board of the claim owner. (In theory, such an entity would be able to apply for U.N. recognition, and if granted, locals could renounce their previous citizenship and adopt their new lunar one.)

What are the conditions under which the claim would be recognized? The land claimed must be “permanently and continuously inhabited.” It can be

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temporarily evacuated in the case of emergencies or belligerence, but it cannot be abandoned. There are other obligations as well:

- (1) The claimant must commit to consistently make good-faith efforts to promptly offer, or arrange for, safe and reliable transportation to and from the settlement to all, regardless of nationality, who are willing to pay a fare sufficient to cover expenses and a reasonable profit.
- (2) The claimant may not unreasonably deny landing rights, and the right to transport passengers and cargo, to any other safe and peaceful vehicle willing to pay a reasonable fee for such landing rights.
- (3) The claimant may set appropriate standards of behavior and safety, etc., for passengers and cargo and the use of its facilities, but it may not act in an anti-competitive manner.
- (4) If demand for transport exceeds supply, and the claimant is making a good-faith effort to increase the availability of transport, it may give preference to passengers and cargo offering the largest financial inducement.<sup>36</sup>

In other words, the claimant must not only offer land for sale, but provide the means for the purchaser to utilize it, by establishing—or enabling the establishment of—and maintaining one or more commercial space lines. (The specific provisions of any actual legislation likely would vary.)

How much land can be claimed? As currently drafted, the Act permits a first claim of 600,000 square miles on the moon (384 million acres, approximately 4 percent of the total lunar surface), and 3.6 million square miles on Mars (approximately 6.5 percent of the total Martian surface). Each subsequent claim is reduced by 15 percent off the previous one. In addition, to prevent initial monopolies and thereby preempt the need for antitrust regulations in the future, the Act bars any single entity from making multiple concurrent claims on the same body. For asteroids or other bodies, 600,000 square miles would be allowed unless the body had a total surface area of less than 1 million square miles, in which case the entire body could be claimed.<sup>37</sup>

Where do the numbers come from? While traditional land claims in the U.S. under the Homestead Act were 160 acres, this was based on what was considered sufficient size for a farm. Under the 1872 Mining Act, lode claims of 1,500 by 600 feet are allowed, and “placer” claims—along a stream or river—of only 20 acres are allowed.<sup>38</sup> So why would off-planet claims be so large,

often measuring hundreds of thousands of square miles? The goal of the proposed legislation is to allow the holder of a sufficiently large claim to use it as collateral to raise the funds to develop it. In the scenario envisioned here, the government will recognize claims, and in theory the deeds will then become tradable in the market.

For example, were this law in place today, the Shackleton Energy Company mentioned above would raise the funds to set up a transportation system to the Moon's south pole by selling company stock, the value of which would be based on the promise of future revenues. Once it had sent the initial settlers to Shackleton Crater, it would apply for the land patent, after which it could start selling plots.

Many of the purchasers may have no intention of ever going to the Moon, but rather see their purchase as an investment. In a sense, the sale of the land would function like an initial public offering. Once the company had raised sufficient funds from the land sales, it could invest in the facilities to start to harvest lunar resources. Similarly, asteroids or comets with favorable orbital and compositional characteristics would be the first targets of other space-resource companies, leaving the less desirable real estate for the stragglers.

### **How Much Might the First Claim be Worth?**

There are currently three companies selling lunar “deeds.” The pioneer in the field, Lunar Embassy, founded in 1980; Lunar International, founded in 1996; and Lunar Republic (now called the Luna Society), founded in 1999. The titles are essentially novelty items—like the 1970s “Pet Rock” fad—with little value and no legal validity. Even so, they sell for anywhere from \$20 to \$40. Lunar Embassy has a fixed price of \$22.49 per acre,<sup>39</sup> while Lunar International has prices ranging between roughly \$20 (for the Mare Fridoris, the northernmost “sea”) and \$38 per acre for the Sea of Tranquility (the site of the first Apollo landing).<sup>40</sup> It is unclear whether they have any market or trading value; a search of eBay for “lunar deeds” and “lunar titles” came up empty.

But presumably, if they were legally valid—that is, if they actually represented true land ownership on the lunar surface and were transferable with low transaction costs—the price would be higher and the market for them larger. If the real thing sold for the same prices as the most expensive offering of the novelty—about \$40—that would make a typical 600,000-square-mile claim worth more than \$15 billion. At \$100, it would be worth over \$38 billion (though it could be much higher or lower, given that lunar titles have little relevance to land claims against which they could be compared).

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Even if much of the land goes unsold initially, even raising a few billion dollars would probably be sufficient for a private venture. Boeing has done some recent analyses using Shackleton as an example, showing that a large lunar base could be supported for on the order of a thousand tons per year of mass launched into low Earth orbit (of which most initially would be propellant).<sup>41</sup> In terms of launch costs, that would be fewer than 20 flights of a SpaceX Falcon Heavy, which comes to about \$2 billion.<sup>42</sup> Development and manufacturing costs for the hardware would presumably add a few billion more at most.

This would constitute several billion dollars of new money available to space activities from the investment markets, not coming from the taxpayer, creating jobs for not just the space companies, but for everybody from whom they purchase goods and services—all of which would generate tax revenue.

Better yet, this is not a race with a single prize—there are second and third and fourth and dozens of other awards, just on the Moon alone. Shackleton may hold the best land, but that cannot be known until the Moon is extensively explored, as the American West was. The discoverer of gold in California did not expect to find it—he ran a saw mill and just happened to see some glitter in the race of the waterwheel.

Multiply the Shackleton scenario by some factor for other ventures and would-be claimants, potentially producing billions of dollars in new capital and economic growth. Also bear in mind that those who grew richest in California were not the miners, but those who supplied them with picks, shovels, and blue jeans. And Americans working and producing on the Moon will be feeding the federal coffers as well, at least under current tax laws.

### **Legality and Politics**

It is likely that a large number of countries would decide that it is in their interest to support, and join in, reciprocal land claims recognition, thereby creating huge economic opportunities for their own aerospace industries and investors. The proposed legislation contains a number of efforts to encourage that. However, the U.S. State Department might object because it might upset some other nation, particularly for something that seemed so “pie in the sky”—and some signatories to the Moon Treaty may well be upset, because the legislation completely preempts it. On the other hand, there are only 14 signatories to the treaty, including U.S. allies Austria, Australia, the Netherlands, and Belgium (Turkey acceded to it recently, the first country to do so in many years).<sup>43</sup>

Some critics of the legislation likely will point to a 2010 article in the *Nebraska Law Review* by Leslie Tennen, in which he writes:

The inherent value of recognition of a claim is that it provides a legal basis for enforcement by the rejection of competing or conflicting claims and the exclusion of others from the territory or area claimed. The mere recognition of claims by a state would constitute a *de facto* exclusion of other states and their nationals, and thereby constitute a form of national appropriation. State recognition of claims to the Moon and other celestial bodies by its nationals is national appropriation “by any other means,” and is prohibited by [A]rticle II. The Board of Directors of the International Institute of Space Law unanimously confirmed that state action cannot provide any legal basis for the assertion or recognition of such claims. No euphemistic label can provide a sufficient mechanism to transform appropriation into non-appropriation.<sup>44</sup>

But, as noted previously, the proposed legislation does not exclude other states or their nationals from participating in a given recognized claim, *de facto* or otherwise; either can do so by simply purchasing land on the claim.

In the final sentence, Tennen presumably refers to a statement issued in 2004 by the International Institute of Space Law (IISL):

According to international law, States party to a treaty are under a duty to implement the terms of that treaty within their national legal systems. Therefore, to comply with their obligations under Articles II and VI of the Outer Space Treaty, *States Parties are under a duty to ensure that, in their legal systems, transactions regarding claims to property rights to the Moon and other celestial bodies or parts thereof, have no legal significance or recognised legal effect.*<sup>45</sup> [Emphasis added]

This would seem to explicitly state that a law like that proposed by the Space Settlement Institute would be a violation of the Outer Space Treaty, but that would be an erroneous reading.

The statement must be understood in the full context of both the document and the circumstances under which it was issued. Specifically, it was a response to numerous spurious claims—including that of Dennis Hope and the Lunar Embassy and other novelty lunar deed mills, as well as an attempt by a company called Orbital Development to claim the asteroid *Eros*.<sup>46</sup> As the IISL statement makes clear in its opening paragraph:



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with Persian  
Gulf investors  
recognized by the  
U.S. government  
would be legal  
under terrestrial  
international  
law and the  
jurisdiction of  
those involved,  
so there is no  
justification for  
proscribing such  
an arrangement.*

Claims to own the Moon or parts thereof by private parties have been made for many years, but so far such claims have not been taken very seriously. However, this could change, as “deeds to lunar property” have started to appear, raising the opportunity for individuals to be misled. In addition, the scope of such claims has been extended recently to other celestial bodies. Thus, the Board of Directors of the International Institute of Space Law (IISL) has concluded that there is a need for a statement regarding the current legal situation concerning claims to private property rights to the Moon and other celestial bodies or parts thereof.<sup>47</sup>

Moreover, it goes on to explicitly address specific concerns regarding lunar claims:

[A]ccording to international law, and pursuant to Article VI, the activities of non-governmental entities (private parties) are national activities. The prohibition of national appropriation by Article II thus includes appropriation by non-governmental entities (i.e. private entities whether individuals or corporations) since that would be a national activity. The prohibition of national appropriation also precludes the application of any national legislation on a territorial basis to validate a “private claim”. Hence, it is not sufficient for sellers of lunar deeds to point to national law, or the silence of national authorities, to justify their ostensible claims. The sellers of such deeds are unable to acquire legal title to their claims. Accordingly, the deeds they sell have no legal value or significance, and convey no recognized rights whatsoever.<sup>48</sup>

But as discussed earlier, there is a fault in this argument, in its implicit assumption that any private activity is intrinsically a “national activity.” That fails to address the possibility such as that in the example provided earlier of a Manx company with Persian Gulf investors, recognized by the U.S. government. Such a corporate structure would be legal under terrestrial international law and the laws of the jurisdiction involved, so there is no justification for proscribing such an arrangement.

In fact, when asked directly by the author of the proposed legislation if the statement was intended to apply to such legislation, the then-head of the IISL, Dr. Nandasiri Jasentuliyana, replied that it was not, as reported in the *Journal of Air Law and Commerce*:

When the IISL recently issued a statement aimed at discrediting claims like Dennis Hope’s claims to the Moon (i.e., claims with no legal basis such as use and occupation), some of those who confuse [t]he Space Settlement Initiative with Hope’s “Lunar Embassy” claims, tried to pretend that the IISL statement applied to both. One of the authors of this paper, Alan Wasser, contacted the Board of the IISL to ask if the statement did, in fact, apply to both.

Dr. Nandasiri Jasentuliyana replied personally to say that it certainly did not. He wrote “[...]the Statement was without prejudice to any future regime which might or should be developed. The statement indeed implies that there is a need for further work to be done to cover the future developments relating to activities on the Moon and other celestial bodies.”<sup>49</sup>

But even if the intent *had been* to preempt such legislation, it does not necessarily follow that the U.S. Congress would be bound by a statement of the IISL (which as the Board of Directors themselves note, was a statement of their own personal legal opinion, not an official statement of the organization itself, and one with which some notable space law experts, including the late Stephen Gorove, disagree.) It is not settled law, as the issue has not been litigated, let alone adjudicated.

Interestingly, in countering Orbital Development’s claim to *Eros*, the U.S. government did not even bother to invoke the Outer Space Treaty, nor did the court address it. As Robert Kelly, then at the University of Mississippi law school, wrote about the case in the *Journal of Space Law* in 2004: “[S]ince there is a complete absence of any showing of a property interest in *Eros*, the District Court did not have to construe the Outer Space Treaty nor answer the question of whether or not the treaty prohibited private ownership of lunar or celestial property.”<sup>50</sup>

A similar argument would apply to the claims by the Lunar Embassy and other existing sales outlets for lunar property. Their claims are invalid not because the Outer Space Treaty prohibits them *per se*, but because they have no historically legitimate basis—especially given that they do not involve such traditional homesteading recognition practices as occupation and improvement.

Thus, this is as much a political matter as a legal one, if not more so. Any space property rights legislation would result from debate and negotiation between Congress and the White House—with federal agencies, lobbyists, and foreign governments all weighing in.

*It is past time to resolve what the Outer Space Treaty really means, and, if necessary, amend it to make it clearly congruent with space as a frontier rather than as scientific preserve.*

Moreover, just as strict constitutionalists frown on the notion that foreign law should inform U.S. jurisprudence, many in Congress would be indifferent to international opinion on the interpretation of federal legislative compliance with the treaty.

Once the law is in place, issues regarding its compliance with international treaty obligations would be resolved—as they should be—in U.S. courts, as was the Orbital Development case.

If ultimately the U.S. Supreme Court determines that such a law is indeed in violation of the Outer Space Treaty, then we will arrive at a point at which we would need to reconsider the treaty itself, if we are to secure property rights in space.

When we do get to that point, unless Bigelow’s suspicions are correct, China—as well as Russia, India, Japan, and others—may actually be willing to either initiate a new treaty or amend the Outer Space Treaty, given the increasing openness of their economies. Moreover, it is not 1967, or even 1979 (the year of the Moon Treaty), and the Cold War has been over for more than two decades now. In fact, the legislation explicitly calls on the U.S. government to initiate such discussions and encourage other nations to follow suit. Thus, by forcing the issue, it could in fact provide the basis for Dr. Jasentuliyana’s desire for “further work...to cover the future developments,” as an alternative to the failed Moon Treaty—which has not gotten the support of a single space-faring nation.

Some critics will object to the proposed legislation as a “bridge too far,” arguing that a continuation of the more gradual, incrementalist approach that over the decades has established treaty-compliant property rights in the areas of satellites and sample returns would be more productive and less politically disruptive, and avoid issues of functional sovereignty of a private off-planet entity. For instance, space lawyer Wayne White has proposed that property rights be extended beyond private extraterrestrial residential or research facilities to a “safety zone” some small distance, probably several hundred meters, around it, which he maintains would comply with the Outer Space Treaty.<sup>51</sup>

However, such a modest approach does not provide either the certainty or financial incentives necessary to allow the raising of capital to launch large scale space enterprises in the first place. As with the fundamental changes in the London bourse 25 years ago, a “big bang” approach may be needed to unleash the innovation and enterprise necessary to truly open a new frontier.<sup>52</sup> Forty-five years after its creation, it is past time to resolve what the Outer Space Treaty really means, and, if necessary, amend it to make it clearly congruent with space as a frontier rather than as scientific preserve.

Finally, some environmentalists may oppose any effort to settle and develop space. Therefore, we will need to have an open discussion of environmental issues surrounding space exploration and development. These will include issues related to preservation of historical sites, such as those of the Apollo landings. Barring the occasional impact from a meteoroid or larger objects, the lunar environment is very stable, and tracks and footprints there can be expected to last for thousands of years due to the lack of atmosphere or weather. Some space archaeologists and historians are already concerned about the fate of these and other sites, and the issue has become embroiled with concerns by NASA and the State Department that attempts to declare them off-limits will be viewed as a claim of sovereignty.<sup>53</sup> The language of the legislation may have to be modified to ease concern over such issues, perhaps by putting in an additional requirement that such sites be protected in perpetuity if included within a claim, with appropriate penalties for failure to do so.

### **Fiscal Impact of the Legislation**

If the United States were to pledge to not only recognize, but defend such claims, it can do so under a clause in the proposed legislation:

The U.S. pledges to defend recognized extraterrestrial properties by imposing appropriate sanctions against aggressors, whether public or private. It pledges never to allow the sale to U.S. citizens of any extraterrestrial land which was seized by aggression.

*But it makes no pledge of military defense of recognized extraterrestrial properties.*<sup>54</sup> [Emphasis added]

In other words, the defense of the claims may result in costs to our international relations, in terms of diplomatic fallout or trade sanctions. But none of this will result in dollar costs to the U.S. government.

The claimant could perform the survey, which would be verified by an independent entity to prevent land fraud. The claimant could pay for the verification as well, so there would be no survey cost to the government. Such a survey is well within the capability of current technology and private players. For example, NASA has just released the first high-resolution topographical map of the entire lunar surface, with a resolution to 100 meters, generated by the Lunar Reconnaissance Orbiter launched in 2009.<sup>55</sup>

There will be technological challenges to all this, but the legislation, as currently written, does not require the government to develop any such technologies. This is to the good, as NASA has traditionally not made a high

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priority of developing cutting-edge technologies. If there are significant costs of this legislation to the taxpayer, opponents will have to identify them—this analyst could not.

### **Conclusion**

The U.S. government may have access to legally viable means for establishing recognized property rights beyond Earth that would not necessarily require renegotiating or withdrawing from the 1967 Outer Space Treaty. However, such an action by the U.S. would vitiate the 1979 Moon Treaty, which outlaws private property in space—to which the United States (or any space-faring nation) is not a signatory, anyway. This should be viewed as a feature, rather than a bug.

The proposal would generate new economic activity not only in the U.S., but also around the world, while establishing a solid basis for the expansion of liberty into the solar system, at no net cost to taxpayers. It would be a major step forward in changing our view of space from that established in the middle of the Cold War as a sterile realm for scientists and competitions for diplomatic prestige to a new unlimited venue for human activity and commerce.

## NOTES

- 1 In *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else* (New York: Basic Books, 2003), Peruvian economist Hernando De Soto outlines the essential (if not sufficient) role that the official recording of property ownership plays in allowing individuals and corporations to borrow capital and grow wealth, and its foundations in centuries-old English common law. Space and technology entrepreneur James C. Bennett has noted this as well in his seminal book *The Anglosphere Challenge* (Lanham, Maryland: Rowman & Littlefield Publishers, 2007).
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- 30 Ibid.
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- 39 Lunar Embassy website, <http://www.lunarembassy.com/>.
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- 55 “LRO camera team releases high resolution global topographic map of moon,” Physorg.com, November 17, 2011 <http://www.physorg.com/news/2011-11-lro-camera-team-high-resolution.html>. A next-generation version will almost certainly beat that resolution by a couple of orders of magnitude, perhaps down to a foot or so, which is adequate for surveying plots on the order of an acre. The total mission cost for the Lunar Reconnaissance Orbiter was about \$500 million, but probably more than half of that was the launch cost of an Atlas V. On a Falcon 9, the launch cost would be \$60 million, and an updated version of the Orbiter could probably be procured for much less than the original, particularly if done privately.

## About the Author

Rand Simberg is an expert on space technology and policy, particularly with regard to NASA and commercial human space flight. He has published lengthy essays on these topics at *The New Atlantis*, as well as many columns for Fox News, *Popular Mechanics*, AOL News, and PJMedia. With over three decades of experience, including many years in aerospace engineering and project management at the Aerospace Corporation and Rockwell International Corporation in Los Angeles, he has been recognized as an expert in space transportation by the Office of Technology Assessment.

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