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## Property Rights in Space: Asteroid Mining

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# PROPERTY RIGHTS IN SPACE: ASTEROID MINING

By David Sarnacki†

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## I. INTRODUCTION

Imagine a person walking into a lawyer’s office, asking whether he or she can own an asteroid. Space Mining Corporation (“SMC”) is a United States based corporation selling the rights to this asteroid in order to fund research and future missions to mine asteroids. Once the technology matures, the missions will be launched, and the investor who owns the asteroid will receive a percentage of all resources collected. Scientists have scouted this asteroid, and believe it to be full of platinum, gold, and many other valuable resources. The client is concerned that if he or she purchases this asteroid without clear property rights supported by law, the investment will be lost. One practiced in space law may immediately be reminded of *lunar deeds*, pieces of the moon sold without anything to support those claims, but the question the client has asked is still there, “Can I own an asteroid?”

Most of what is commonly thought of as space law began under the Outer Space Treaty and its progeny, which came into force in the late 1960s. This law has not changed since the 1980s, when the last treaty was passed. One of the complications to this Treaty is that it was based on a time when only national governments had the resources and ability to launch a mission to space. The technology and motiva-

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tion for private citizens to be involved in space is becoming a reality. Scholars are calling for the formation of an international governing entity to regulate and enforce these treaties.<sup>1</sup> The technology to extract resources from celestial bodies, and more specifically asteroids, is in its infancy. Applying unnecessary constraints influenced by short-term political currents may stifle innovation and create even more financial disincentives to expand the reaches and resources available.

This Note will discuss why maintaining the status quo, while waiting for the technology to mature, will encourage development and strengthen the industry before being smothered by laws and regulations promulgated by parties who may have conflicts of interest. This Note will first explain why scientists are attempting to mine asteroids. It will then examine the rules that apply, including the two main space treaties (the Outer Space Treaty and the Moon Treaty), the modern view of the court, and the history of deep-sea mining. Finally, this Note will apply the treaties to modern plans being developed to harvest an asteroid.

## II. WHY MINE?

The finite resources on Earth and the belief that asteroids have an abundance of such resources, have lead scientists to hypothesize that many useful minerals such as platinum can be found in abundance in asteroids.<sup>2</sup> The collection of those resources from an asteroid adds to the total amount of resources available for use. Some asteroids are believed to be so rich that one asteroid could have more platinum than the total amount harvested on Earth.<sup>3</sup>

An asteroid is a rock body that is orbiting the sun.<sup>4</sup> Asteroids contain different materials and metals such as nickel and iron.<sup>5</sup> It is hypothesized that some asteroids have high volumes of valuable and rare metals such as platinum and gold.<sup>6</sup> Meteors are asteroids that

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1. Leslie I. Tennen, *Towards A New Regime for Exploitation of Outer Space Mineral Resources*, 88 NEB. L. REV. 794 (2010); see also Sarah Coffey, *Establishing A Legal Framework for Property Rights to Natural Resources in Outer Space*, 41 CASE W. RES. J. INT'L L. 119 (2009).

2. David Cohen, *Earth's Natural Wealth: An Audit*, NEW SCIENTIST, May 23, 2007, at 34–41, available at [http://www.sciencearchive.org.au/nova/newscientist/027ns\\_005.htm](http://www.sciencearchive.org.au/nova/newscientist/027ns_005.htm).

3. William BC Crandall, *To: The Augustine Committee, Enabling Profitable Asteroid Mining*, ABUNDANT PLANET (Aug. 3, 2009), at 9, [http://www.nasa.gov/pdf/383154main\\_53%20-%2020090803.7.toAugustineCommittee-2009-08-03.pdf](http://www.nasa.gov/pdf/383154main_53%20-%2020090803.7.toAugustineCommittee-2009-08-03.pdf); see also Donna Blankinship & Seth Borenstien, *There's Gold In Them Thar Asteroids*, THE-TIMES-TRIBUNE.COM (Apr. 25, 2012), <http://thetimes-tribune.com/news/health-science/there-s-gold-in-them-thar-asteroids-1.1304953>.

4. NASA Jet Propulsion Laboratory, *Frequently Asked Questions*, <http://neo.jpl.nasa.gov/faq> (last visited July 31, 2014).

5. *Id.*

6. Kevin Bonsor, *How Asteroid Mining Will Work*, HOWSTUFFWORKS.COM, Nov. 10, 2000, available at <http://science.howstuffworks.com/asteroid-mining.htm>; see also Donna Blankinship and Seth Borenstien, *There's Gold In Them Thar Asteroids*, THE-

have come into the Earth's atmosphere, unlike comets which are bodies that are mainly composed of ice instead of rock.<sup>7</sup> Most asteroids orbit the sun in the asteroid belt, which is between Mars and Jupiter, but some orbit closer to Earth.<sup>8</sup>

The primary goal of the exploratory missions to asteroids will be to locate water, with the additional possibility to extract and return valuable metals, like platinum.<sup>9</sup> Developing an efficient extraction technique will clear one of the major hurdles to long-term spacefaring and colonization, and a new industry can be created.<sup>10</sup> The mining of these mineral-rich asteroids would yield metals for construction of colonies or resource collection facilities, water for rocket fuel and sustaining life, and a payoff of precious metals to investors.<sup>11</sup>

### III. THE TREATIES, THE CASES, AND THE SEA

The laws that apply to space exploration have been created through treaties under the United Nations ("UN"). In 1958, the UN created the Office for Outer Space Affairs ("UNOOSA") as the body to implement the decisions of both the General Assembly and the smaller committee, the Outer Space Affairs Division.<sup>12</sup> There are five main treaties that govern interactions in space.<sup>13</sup> As of the writing of this Note, three countries have completed manned space missions: the United States, Russia, and China.<sup>14</sup> Nine other countries (and space agencies) have launched satellites: France, Japan, Great Britain, the European Space Agency, India, Israel, Iran, North Korea, and South Korea.<sup>15</sup> The two main treaties examined within this Note are the Outer Space Treaty and the Moon Treaty.

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Times-Tribune.com (Apr. 25, 2012), <http://thetimes-tribune.com/news/health-science/there-s-gold-in-them-thar-asteroids-1.1304953>.

7. NASA Jet Propulsion Laboratory, *Frequently Asked Questions*, <http://neo.jpl.nasa.gov/faq> (last visited July 31, 2014).

8. *Id.*

9. Susan Thomas, *Gold rush in space? Asteroid miners prepare, but eye water first*, REUTERS.COM, Nov. 21 2013, available at <http://uk.reuters.com/article/2013/11/21/us-space-mining-asteroids-idUKBRE9AK0JF20131121>.

10. *Id.*

11. *Id.*

12. UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, <http://www.unoosa.org/oosa/en/OOSA/index.html> (last visited July 31, 2014).

13. UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, *United Nations Treaties and Principles on Space Law*, <http://www.unoosa.org/oosa/en/OOSA/index.html> (last visited July 31, 2014).

14. *Manned Flight*, ENCYCLOPEDIA ASTRONAUTICA, <http://www.astronautix.com/flights/index.htm> (last visited Oct. 2, 2014); see also, *Spacefaring*, WIKIPEDIA, <http://en.wikipedia.org/wiki/Spacefaring> (last visited Oct. 2, 2014).

15. *Q 'n A: Answers To Your Questions*, Spacetoday.org (last visited Feb. 17, 2014), <http://www.spacetoday.org/Questions/FirstSats.html>; see also *Spacefaring*, WIKIPEDIA, <http://en.wikipedia.org/wiki/Spacefaring> (last visited Oct. 2, 2014).

### A. *The Outer Space Treaty*

The official name of the Outer Space Treaty (“OST”) is the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.<sup>16</sup> The Treaty was designed to have similar principles as the Antarctic Treaty, which was a successful nonarmament treaty.<sup>17</sup> In 1960, President Dwight Eisenhower addressed the UN General Assembly and pushed for a nonarmament treaty in space modeled on the Antarctic Treaty’s principles.<sup>18</sup> In 1963, the General Assembly of the UN unanimously adopted a resolution calling for all states to refrain from launching weapons of mass destruction into orbit based on statements from the Soviet Union and the United States.<sup>19</sup> This resolution to refrain from launching weapons of mass destruction into space led to the first draft of the OST, submitted in 1966.<sup>20</sup> The final treaty was signed into effect in 1967 and ratified by the United States that same year.<sup>21</sup> More than 100 nations are parties to this Treaty, including every major spacefaring nation.<sup>22</sup> The OST was drafted with an interest in the nonarmament of space and an interest in peaceful exploration of space.<sup>23</sup> The OST does not contain provisions about resource collection, as it was not the focus, but it does prohibit national appropriation of heavenly bodies.<sup>24</sup>

Article II of the OST states “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>25</sup> A government is not permitted to claim ownership of a *celestial body* such as an asteroid. This is why, for example, the United States cannot claim ownership of the moon even though it was the first sovereign nation to plant a flag there. The Treaty uses the

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16. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter *Outer Space Treaty*] available at <http://www.unoosa.org/pdf/publications/STSPACE11E.pdf>, v-vi.

17. U.S. DEPARTMENT OF STATE, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, <http://www.state.gov/t/isn/5181.htm> (last visited July 31, 2014).

18. *Id.*

19. *Id.*

20. *Id.*

21. *Id.*

22. U.S. DEPARTMENT OF STATE, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, <http://www.state.gov/t/isn/5181.htm> (last visited July 31, 2014); see also UNITED NATIONS OFFICE FOR DISARMAMENT AFFAIRS, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, [http://disarmament.un.org/treaties/t/outer\\_space](http://disarmament.un.org/treaties/t/outer_space) (last visited July 31, 2014).

23. Outer Space Treaty, *supra* note 16, at 3.

24. *Id.* at 31.

25. *Id.* at 4 (emphasis added).

term *celestial bodies* throughout, which suggests that those bodies referenced are not just large celestial bodies, such as the moon, but also smaller ones, such as asteroids.<sup>26</sup>

Article II has left what some analysts call a loophole, prohibiting national governments from staking claim but arguably allowing non-government entities to claim ownership in celestial bodies.<sup>27</sup> If a private entity such as SMC were to lay claim to an asteroid or other celestial body, that corporation might not be subject to the same regulations as its home government of the United States. Article VI of the OST tries to resolve this.<sup>28</sup> It states that any “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.”<sup>29</sup> This is clarified in Article VII, which states the jurisdiction that launches the spacecraft is responsible for the actions of that craft.<sup>30</sup>

This Treaty is written with an eye to the future by referring disputes that arise to be resolved through international law.<sup>31</sup> The Treaty neither expressly disallows the extraction of minerals nor does it disallow the use of asteroids and other celestial bodies.<sup>32</sup> The closest prohibition to the use of the materials in an asteroid is in Article IX, which requires that any potentially harmful interference between parties is to be resolved by international consultation before proceeding.<sup>33</sup> This means that if two nations were heading to the same location to acquire the same resources, they are to resolve the dispute through international consultation prior to launch. The Treaty prohibits the armament of space and the governmental acquisition of celestial bodies, but it encourages the cooperation amongst the member states.<sup>34</sup> Further, OST can be amended by a majority of the parties to the agreement, allowing for a more specific resolution to disputes that arise.<sup>35</sup> At first glance, the answer to the hypothetical question is no.

The OST laid the ground for four other space treaties, commonly viewed as the OST’s progeny. The treaties that followed were: the Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space (commonly called “The Rescue Agreement”); the Convention on International

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26. Outer Space Treaty, *supra* note 16.

27. Andres Jauregui, *Legal Loophole May Pave Way For Private Ownership Of Outer Space*, THEHUFFINGTONPOST.COM (Apr. 6, 2012, 5:28 PM), [http://www.huffingtonpost.com/2012/04/06/legal-loophole-may-pave-way-for-private-ownership-of-outer-space\\_n\\_1409035.html](http://www.huffingtonpost.com/2012/04/06/legal-loophole-may-pave-way-for-private-ownership-of-outer-space_n_1409035.html).

28. Outer Space Treaty, *supra* note 16, at 5.

29. *Id.*

30. *Id.*

31. *Id.* at 28.

32. Outer Space Treaty, *supra* note 16.

33. Outer Space Treaty, *supra* note 16, at 6.

34. *Id.*

35. *Id.* at 8.

Liability for Damage Caused by Space Objects (commonly called “The Liability Convention”); the Convention on Registration of Objects Launched into Outer Space (commonly called “The Registration Convention”); and the Agreement governing the Activities of the States on the Moon and other Celestial Bodies (commonly called “The Moon Treaty”).<sup>36</sup> These treaties have varying amounts of acceptance, but none come close to the limited acceptance of The Moon Treaty.<sup>37</sup>

### B. *The Moon Treaty*

The Moon Treaty has not been as successful gaining ratification as the OST, or even the rest of the treaties considered to be the progeny of the OST.<sup>38</sup> The Moon Treaty was first signed in December of 1979, but it only has ten parties and five signatories (countries that signed the Treaty who later decided not to ratify it).<sup>39</sup> None of the parties were a major spacefaring country.<sup>40</sup> France and India are the two signatories that are at least spacefaring.<sup>41</sup> The goal of the Moon Treaty was to solidify cracks in the OST, prohibiting military installations on the moon, and prohibiting any weapons testing.<sup>42</sup> It expressly prohibits any claim above or below the surface of the Moon by a sovereign

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36. *Id.* at v–viii; see also UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, *Status of International Agreements relating to Activities in Outer Space*, <http://www.unoosa.org/oosa/en/SpaceLaw/treatystatus/index.html> (last visited July 23, 2014).

37. COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE, *Status of International Agreements relating to activities in outer space as at 1 January 2014*, Apr. 4, 2014, [http://www.unoosa.org/pdf/limited/c2/AC105\\_C2\\_2014\\_CRP07E.pdf](http://www.unoosa.org/pdf/limited/c2/AC105_C2_2014_CRP07E.pdf) (last visited Oct. 2, 2014); see also, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, *Status of International Agreements relating to Activities in Outer Space*, <http://www.unoosa.org/oosa/en/SpaceLaw/treatystatus/index.html> (last visited July 23, 2014). The total nations who have ratified each treaty are as follows: OST 103; Rescue 94; Liability 91; Registration 60; Moon 15.

38. *Id.*

39. The Parties are: Australia, Austria, Chile, Kazakhstan, Mexico, Morocco, Netherlands, Pakistan, Philippines, and Uruguay. The Signatories are: France, Guatemala, India, Peru, and Romania. NUCLEAR THREAT INITIATIVE, *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement)*, <http://www.nti.org/treaties-and-regimes/agreement-governing-activities-states-moon-and-other-celestial-bodies-moon-agreement/> (last visited July 31, 2014).

40. NUCLEAR THREAT INITIATIVE, *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement)*, <http://www.nti.org/treaties-and-regimes/agreement-governing-activities-states-moon-and-other-celestial-bodies-moon-agreement/> (last visited July 31, 2014); see also, *Manned Flight*, ENCYCLOPEDIA ASTRONAUTICA, <http://www.astronautix.com/flights/index.htm> (last visited Oct. 2, 2014); see also, *Spacefaring*, WIKIPEDIA, <http://en.wikipedia.org/wiki/Spacefaring> (last visited Oct. 2, 2014).

41. NUCLEAR THREAT INITIATIVE, *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement)*, <http://www.nti.org/treaties-and-regimes/agreement-governing-activities-states-moon-and-other-celestial-bodies-moon-agreement/> (last visited July 31, 2014).

42. *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, Dec. 18, 1979, 1363 U.N.T.S. 3 [hereinafter *Moon Treaty*], <http://www.unoosa.org/pdf/publications/STSPACE11E.pdf>.

nation.<sup>43</sup> The Moon Treaty requires all parties to inform the UN of activities conducted in space, and further include the results of those activities, generally within a month of completion of the activity or experiment.<sup>44</sup> Article 1 of the Treaty expands the definition of the Moon to include any celestial body.<sup>45</sup> It also expressly closes any possibility of a loophole in the OST regarding non-government entities in Article 11, Section 3, stating “natural resources in place, shall [not] become property of any. . . international intergovernmental or non-governmental organization, . . . or non-governmental entity or of any natural person.”<sup>46</sup>

The widespread rejection of the Moon Treaty can be linked to the fact that the Treaty calls for the creation of an enforcement body to control and enforce space law.<sup>47</sup> Article 11 calls for the creation of this international regime.<sup>48</sup> It requires this regime to share all resources, including the granting of mining rights and the resources collected, equitably by weighing both the needs of developing countries and the efforts of the countries that have contributed to the exploration of the Moon.<sup>49</sup> Article 9 requires the UN to have an up-to-date list of all constructed bases, the purpose of the base, and the status of the base.<sup>50</sup> Article 14 requires the parent jurisdiction of a non-governmental entity to ensure compliance with the Treaty.<sup>51</sup> Article 16 permits an international intergovernmental organization, such as the European Space Agency, to ratify the agreement and become a party.<sup>52</sup> The Treaty’s provisions prohibit any government or intergovernmental organization, including corporations, to act outside of the enforcement powers of this regime that would be created. One problem with this prohibition is that all activities, experiments, technology, resources, and bases would be monitored and distributed as this international regime deemed fit.

The Moon Treaty also addresses resource extraction on the moon.<sup>53</sup> Because of Article 1, the definition of the moon is expanded to any celestial body, so the Treaty encompasses *all* celestial bodies.<sup>54</sup> The Moon Treaty’s regime is given the power under Article 6 to permit the

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43. *Id.*

44. *Id.*

45. Articles in the Moon Treaty are numbered in Arabic numerals, not Roman numerals. Moon Treaty, *supra* note 42, at 27.

46. Moon Treaty, *supra* note 42, at 31.

47. Michael Listner, *The Moon Treaty: failed international law or waiting in the shadows?*, THE SPACE REVIEW (Oct. 24, 2011), <http://www.thespacereview.com/article/1954/1>.

48. Moon Treaty, *supra* note 42, at 32.

49. *Id.*

50. *Id.* at 30–31.

51. *Id.* at 33.

52. *Id.* at 34.

53. *Id.* at 27–35.

54. *Id.* at 27.



extraction of resources, but a portion must be given to other parties.<sup>55</sup> This includes materials extracted for the support of the mission (such as water to be used for fuel).<sup>56</sup> However, Article 11 expressly prohibits any governmental or non-governmental entity from creating a right of ownership in any materials on or extracted from the moon (and from Article 1, any celestial body).<sup>57</sup> This prohibits the ownership of any interest in an asteroid, including the resources extracted. The Moon Treaty essentially hinders any for-profit venture from even beginning to stake a claim in the resources to be extracted under Article 11.<sup>58</sup> Under the Moon Treaty, the answer to the hypothetical is a clear and unambiguous no. A person cannot own any right to an asteroid claimed by SMC. This becomes more complicated because the Moon Treaty has such a low number of nations that have ratified it.<sup>59</sup>

It is important to note that the Moon Treaty is still international law, even though there are ten parties (fifteen signatories and ten parties). Many countries have not ratified the Treaty, but ratification could be persuasive to a judge resolving a dispute. The Moon Treaty could also be used to exert political pressure on non-members. This occurred in the Law of the Sea Treaty when one powerful member signed on. As discussed later in this Note, the United States is not a party to the Law of the Sea Treaty, but political pressure has been applied to American companies mining the oceans. The Moon Treaty has little weight in the international community right now because of its low participation, but if a major spacefaring nation did decide to ratify it, the Treaty would become much stronger and would begin to have weight.

In contrast to the Moon Treaty, the OST was successful in obtaining widespread acceptance. This is because the OST resolves conflicts under current international law and does not set up an international court, international arbitration, or international committee to regulate. The OST was written so that many future technologies or ideas would still fall under its regulations without requiring new treaties or enforcement bodies. The OST does not provide for the extraction of resources, but it does not prohibit it either. The Moon Treaty was drafted more than ten years after the OST and attempts to create more regulations and an enforcement body to resolve these issues, but the enforcement body has been a large reason why the Moon Treaty has almost universally been rejected. This body could effectively prohibit the exploitation of resources in space. If the governing body is

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55. *Id.* at 29.

56. *Id.*

57. *Id.* at 31.

58. Moon Treaty, *supra* note 42, at 31.

59. UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, *Status of International Agreements relating to Activities in Outer Space*, <http://www.unoosa.org/oosa/en/SpaceLaw/treatystatus/index.html> (last visited July 23, 2014).

ever formed, it could give authority to parties that do not have the ability to launch a satellite into stable orbit, allowing those countries to restrict or impede the exploration of space and the development of new technologies.

The spacefaring countries have wisely decided not to sign on to the Moon Treaty. Keeping the OST and its provision of using current international law to resolve conflicts will allow the technology to mature and wisdom to be used when regulations are required. The OST was written well after the Soviet Union had launched Sputnik and test-fired an Inter-Continental Ballistic Missile.<sup>60</sup> The result of waiting was universal acceptance of the peaceful exploration of space, based on the wisdom gained during the Cold War and the technologies developed. While not being aggressively proactive may seem like a Wild West approach, the law can resolve most conflicts that would arise. It would be premature to deliver sectors of space to a governing body that could stifle space exploration through heavy-handed regulations, and redistribution of technologies and harvested minerals.

### C. *Claiming Rights in Other Ways*

Property rights can be claimed in many ways under national and international law. The OST calls for disputes to be resolved under current international law. In order to understand how this may be applied, this Section will first look at how the courts of the United States have decided issues related to ownership of space material. This Section will also examine the Law of the Sea Treaty including why some scholars believe this Treaty is what stifled innovation in deep-sea mining. Finally, this Section will examine the liability of corporate, non-government entities being held to treaties.

#### 1. *Nemitz v. US*

The court examined the ownership of an asteroid in *Nemitz v. US*.<sup>61</sup> This short case involves a claim over “Eros,” which is a large asteroid in orbit near Earth.<sup>62</sup> NASA landed on Eros in 2001, and Gregory Nemitz, a private citizen, attempted to assert property rights in Eros by suing NASA for trespass.<sup>63</sup> Nemitz’s claim stated the property rights were granted because Nemitz had registered a claim on Eros

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60. U.S. DEPARTMENT OF STATE, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, <http://www.state.gov/t/isn/5181.htm> (last visited Mar. 23, 2014).

61. *Nemitz v. United States*, CV-N030599-HDM (RAM), 2004 WL 3167042 (D. Nev. Apr. 26, 2004) *aff’d sub nom.* *Nemitz v. N.A.S.A.*, 126 F. App’x 343 (9th Cir. 2005).

62. *Nemitz v. United States*, 2004 WL 3167042, at \*1.

63. Key Davidson, *Final Frontier for Lawyers—property rights in space/Land claims, commercial schemes and dreams have legal eagles hovering*, SFGATE.COM (Oct. 16, 2005, 4:00 AM), <http://www.sfgate.com/news/article/Final-frontier-for-lawyers-property-rights-in-2564610.php>.

with the Archimedes Institute.<sup>64</sup> The Archimedes Institute was a non-governmental organization run by a group of private citizens that ran a website which allowed anyone to claim a celestial body for free.<sup>65</sup> Nemitz claimed property rights based on his registration with the Archimedes Institute website, but had not asserted any control over Eros beyond his free application with a now-defunct, non-government website.<sup>66</sup> One of Nemitz's claims was that he used the Archimedes Institute because of the loophole created in Article II of the Outer Space Treaty.<sup>67</sup> The court dismissed this case for failure to state a claim, finding that Nemitz failed to assert a property right.<sup>68</sup> The court also determined that the ratification of the Outer Space Treaty and the rejection of the Moon Treaty were not enough for Nemitz to claim a private property right.<sup>69</sup> This dismissal was affirmed by the ninth circuit court.<sup>70</sup>

The creation of property rights under common law is generally cemented in one of three avenues: discovery, creation, and capture.<sup>71</sup> Here, Eros had been discovered by German Astronomer Gustav Witt.<sup>72</sup> Nemitz could not claim discovery, so he tried to claim the creation by registration with the Archimedes Institute, however Nemitz did not create Eros.<sup>73</sup> The law typically used for mineral and resource rights is based on capture.<sup>74</sup> A law-school staple, *Pierson v. Post*, illustrates how capture works.<sup>75</sup> Pierson and Post were both hunters chasing the same fox.<sup>76</sup> While Post and his dogs were pursuing the fox, Pierson shot the fox and took it.<sup>77</sup> The court held that property rights are created once the resource has been occupied, or in this instance, captured by being mortally wounded.<sup>78</sup> The case would be analogous to the capture of an asteroid. Here, Nemitz did nothing to bring Eros

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64. *Nemitz v. United States*, 2004 WL 3167042, at \*1.

65. The Archimedes institute was space-related website that offered to register private property rights for free, and was hosted on permanent.com during the lawsuit. <http://www.permanent.com/archimedes-institute.html>.

66. *Nemitz v. United States*, 2004 WL 3167042, at \*1.

67. *Id.*

68. *Id.*

69. *Nemitz v. United States*, 2004 WL 3167042, at \*2.

70. *Nemitz v. NASA* 126 Fed. Appx. 343 at \*1 (9th Cir. 2005) (Mem. op.).

71. Peter T. Wendel, *Casebook Review: The Perfect Blend of Methodology, Doctrine & Theory: Property*, 22 SEATTLE UNIV. L. R. 1031, 1036 (1999) (reviewing JESSE DUKEMINIER & JAMES E. KRIER, *PROPERTY* 4TH EDITION (1998)).

72. Edward F. Tedesco, *Eros*, ENCYCLOPEDIA BRITANNICA, <http://www.britannica.com/EBchecked/topic/191801/Eros> (last updated Jan. 13, 2014).

73. *Nemitz v United States*, CV-N030599-HDM (RAM), 2004 WL 3167042, at \*1 (D. Nev. Apr. 26, 2004) *aff'd sub nom. Nemitz v. N.A.S.A.*, 126 F. Appx. 343 (9th Cir. 2005).

74. 38 Am. Jur. 2d Gas and Oil § 8 (2012).

75. *Pierson v. Post*, 3 Cai. R. 175, 1805 WL 781, 1805 N.Y. Lexis 311 (N.Y. Sup. Ct. 1805).

76. *Pierson*, 1805 WL 781, at 177.

77. *Id.*

78. *Id.* at 177–78.

under his control. Nemitz would have a much stronger argument if he had landed a spacecraft on the asteroid and modified the asteroid's orbit.

Nemitz was acting like a patent troll. A patent troll will register and purchase patents without any interest in using the patent beyond excluding others. Here, just like a patent troll, Nemitz registered property rights in space without any ability or intent to act on those rights except to exclude others. Nemitz failed here because he did not establish any real property rights. Nemitz established no control over what he claimed was his and had no way to act on any of the property rights he claimed.

The reason Nemitz's case is important is that the federal court has not closed the door to the creation of property rights in celestial bodies. The United States' view on granting property rights to extraterrestrial objects can be expanded by examining the eleventh circuit court case of *United States v. Roberts*, where the court recognized property rights in objects returned from space.<sup>79</sup> The Apollo missions brought back lunar samples that were held by NASA.<sup>80</sup> A NASA intern, Thad Roberts, was convicted for the theft of those rocks, as well as several other samples gathered from space.<sup>81</sup> By capturing the lunar rocks, the court recognized that NASA created a property right in the rocks when the court convicted Roberts. This means that the courts have recognized, contrary to the treaties in place, that NASA occupied the rocks, creating a right by capture, and that the United States government will support those property rights created.<sup>82</sup>

The American courts, through cases like *Nemitz* and *Roberts*, have not expressly found that property rights can be created in space, but they have hinted that there are property rights to be acquired in materials harvested from space. One can only speculate how those rights would be created, but it is likely that the property would need to be captured in order to create those rights. Loose asteroids orbiting in the asteroid belt cannot just be claimed.

## 2. Deep-Sea Minerals

The OST resolves conflicts with international law, and there are two major examples of how this conflict has been resolved. One drastic example of international law is the treaties governing Antarctica. Many governments were attempting to mine the continent while expressing superior rights to do so.<sup>83</sup> The nations were unable to resolve

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79. *United States v. Roberts*, 155 Fed. Appx. 501, 502 (11th Cir. 2005).

80. *Id.*

81. *Id.*

82. Listner, *supra* note 47, comments.

83. *Mining in Antarctica*, BRITISH ANTARCTIC SURVEY, [http://www.antarctica.ac.uk/about\\_antarctica/geopolitical/environmental\\_issues/mining.php](http://www.antarctica.ac.uk/about_antarctica/geopolitical/environmental_issues/mining.php) (last visited July 31, 2014).

this conflict without establishing an entity to control the claiming of mining sites.<sup>84</sup> The eventual result of this was a moratorium set on any commercial mining in Antarctica until 2040, but scientific processes are still conducted without interference.<sup>85</sup> The Law of the Sea Treaty takes the opposite approach. The Law of the Sea Treaty governs the extraction of deep-sea minerals from international waters, which sets up a regulatory body similar to what may happen if the Moon Treaty is signed.

*a. Law of the Sea Treaty*

The United Nations Convention on the Law of the Sea is commonly referred to as the Law of the Sea Treaty (“LOST”). It is hypothesized that if the enforcement body from the Moon Treaty were to be formed, it would mirror LOST Part XI, which formed “The Enterprise.”<sup>86</sup> “The Enterprise” is the commercial arm of the International Seabed Authority (“ISA”).<sup>87</sup> “The Enterprise” was established to collect technologies used to mine deep-sea resources, and in turn give those technologies to non-developed countries.<sup>88</sup> This act is one of the reasons listed by President Ronald Reagan for not signing LOST.<sup>89</sup> The ISA has the authority to set prices for the sale of minerals, as well as setting the tax rate on the resources collected.<sup>90</sup> This money is then used to fund the ISA, “The Enterprise,” and can be redistributed to non-developed countries.<sup>91</sup> In contrast, the United States follows its own statutory language, the Deep Seabed Hard Mineral Resources Act, which is similar to LOST with the exception of Part XI.<sup>92</sup>

LOST was not recognized by the United States until President Bill Clinton signed it in 1994.<sup>93</sup> However, the Treaty is not binding on the United States because the Senate has still not ratified LOST, with the most recent failure to ratify occurring in 2012.<sup>94</sup> Analysts and scholars, due to the United States not being a party to LOST, debate the

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84. *Id.*

85. *Id.*

86. *Id.*

87. *Frequently Asked Questions*, International Seabed Authority, <http://www.isa.org.jm/en/about/faqs> (last visited July 31, 2014).

88. Listner, *supra* note 47.

89. Ian Bezpalko, Note, *The Deep Seabed: Customary Law Codified*, 44 Nat. Resources J. 867, 872–74 (2004).

90. *Rejecting the Law of the Sea Treaty (LOST)*, National Space Society, 2 (Mar. 13, 2009), <http://www.nss.org/legislative/NSS-LoST-WhitePaper.pdf>.

91. *Id.*

92. Deep Seabed Hard Mineral Resources Act, 30 U.S.C. §§ 1401–1473 (2002).

93. Bezpalko, *supra* note 89, at 873–74.

94. *Id.* at 874; see also Tom Murse, *Law of the Sea Treaty Timeline Important Dates in the Debate*, <http://uspolitics.about.com/od/Obama-Administration/a/Law-Of-The-Sea-Treaty-Timeline.htm> (last visited July 31, 2014).

effect of the Treaty.<sup>95</sup> The ISA is only now seeing a surge of interest from mining companies.<sup>96</sup>

The international governing body created in LOST Part XI is commonly seen as the major point of contention between those for the ratification and those against its ratification.<sup>97</sup> The Moon Treaty, in Article 11, prohibits a nation, non-governmental entity, or natural person, from staking a claim or establishing property rights. Part XI of LOST has similar language, stating in Article 137, “No State or natural or juridical person shall claim, acquire or exercise rights with respect to the minerals recovered from the Area except in accordance with this Part.”<sup>98</sup> This Article also states that the resources belong to “mankind as a whole” and denies the recognition of property rights in any minerals claimed or harvested in conflict with the Treaty.<sup>99</sup> The ISA is granted complete immunity from legal process and any form of search or seizure.<sup>100</sup> This immunity grants the ISA the same rights as a national sovereignty.<sup>101</sup> The ISA’s home territory would be international waters within the UN’s jurisdiction.<sup>102</sup>

Subsection E of Part XI establishes the Enterprise as an arm of the ISA.<sup>103</sup> Article 144 requires all parties to cooperate in the transfer of technology and scientific knowledge, including “facilitating access of the Enterprise and of developing states to the relevant technology, under fair and reasonable terms and conditions.”<sup>104</sup> The transfer of ownership and control of technologies used is mandated, so the Enterprise has a major interest in obtaining the technology which could be used as leverage when bargaining for a mineral lease.<sup>105</sup> In Article 268, member states are required to acquire and disseminate marine technology.<sup>106</sup> If one party has developed a usable process, the host country of that party is required to give the technology to the Enter-

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95. Andrew Langer, *The Case for Ratification of the Law of the Sea Treaty*, REAL-CLEARPOLITICS.COM (Nov. 28, 2012), [http://www.realclearpolitics.com/articles/2012/11/28/the\\_case\\_for\\_ratification\\_of\\_the\\_law\\_of\\_the\\_sea\\_treaty\\_116272.html](http://www.realclearpolitics.com/articles/2012/11/28/the_case_for_ratification_of_the_law_of_the_sea_treaty_116272.html); see also Brooke Jarvis, *Deep-Sea Mining—Bonanza or Boondoggle?* NOVA NEXT (June 25, 2013), <http://www.pbs.org/wgbh/nova/next/earth/deep-sea-mining/>; *Rejecting the Law of the Sea Treaty (LOST)*, National Space Society, 2 (2009), <http://www.nss.org/legislative/NSS-LoST-WhitePaper.pdf>.

96. Brooke Jarvis, *Deep-Sea Mining—Bonanza or Boondoggle?* NOVA NEXT (Jun. 25, 2013) available at <http://www.pbs.org/wgbh/nova/next/earth/deep-sea-mining/>.

97. *Rejecting the Law of the Sea Treaty (LOST)*, National Space Society, 2 (Mar. 13, 2009), <http://www.nss.org/legislative/NSS-LoST-WhitePaper.pdf>.

98. United Nations Convention on the Law of the Sea, art. 137, Dec. 10, 1982, 1833 U.N.T.S. 397.

99. *Id.*

100. *Id.* at 473.

101. *Id.*

102. *Id.*

103. United Nations Convention on the Law of the Sea, art. 137, Dec. 10, 1982, 1833 U.N.T.S. 458, 471.

104. *Id.* at 449.

105. *Id.*

106. *Id.* at 504.

prise.<sup>107</sup> The Enterprise will then make that technology available to every nation who is party to the Treaty.<sup>108</sup> The transfer of technology can be conducted through licenses, but the requirement to transfer the technology leaves little room for negotiation.<sup>109</sup> The ISA is also able to set the price of minerals that go to market.<sup>110</sup>

LOST has the goal of fair remuneration and cooperation in the extraction of resources that belong to mankind.<sup>111</sup> While this goal is noble, the science and the markets were not mature enough to support the end goals. One of the problems that LOST creates is that it removes incentive for companies to develop the processes and procedures to profitably extract minerals from deep-sea beds. The United States' reaction to the Treaty is likely based on these fears. In 1974, the United States disagreed with the arrangement set forth under the initial LOST, and with seven other member states, created a different treaty.<sup>112</sup> Under this different treaty, the United States began to mine an area outside of Hawaii considered international waters under UN control.<sup>113</sup> This project was ended due to the political pressures applied by the UN.<sup>114</sup> Eventually, these conflicts were resolved when the United States companies stopped mining.<sup>115</sup> The United States has a few areas under its exclusive jurisdiction (such as just off the coast of Florida) but, the costs to mine the sea and develop the technology to do so efficiently has not been able to compete with inland mines.<sup>116</sup> As long as the ISA has the authority to keep and distribute technologies and set the prices for commodities mined at levels on par with surface mines, it is not likely that many advancements will occur in the near future. This is just one danger that following a treaty such as LOST could create—stifled innovation.

LOST has many parallels with the Moon Treaty. LOST follows suit with the Antarctic Treaty of 1959 and the OST by stating that the minerals belong to mankind.<sup>117</sup> The provision that grants this authority in LOST was kept because the ISA believes the resources belong to mankind, and large quantities of minerals were not being recovered.<sup>118</sup> Keeping with the treatment of LOST, the minerals found in space are considered to belong to mankind. It is also of note that the

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107. *Id.*

108. United Nations Convention on the Law of the Sea, art. 137, Dec. 10, 1982, 1833 U.N.T.S. 504.

109. *Id.* at 530.

110. *Id.* at 451.

111. *Id.* at 398.

112. Bezpalko, *supra* note 89, at 871.

113. *Id.* at 880.

114. *Id.*

115. *Id.*

116. *Id.*

117. *Id.* at 882.

118. United Nations Convention on the Law of the Sea, art. 137, Dec. 10, 1982, 1833 U.N.T.S. 504.

Moon Treaty was established in 1979 and LOST was established in 1982, resulting in similar language and provisions.<sup>119</sup> Following LOST, rights are granted in the minerals harvested, but only after a license is granted to mine a site. The actions taken under LOST show that all minerals extracted create property rights within the party harvesting those minerals, even to non-signatory states. Property rights would be created in the minerals actually harvested, but not in the site itself.

The development and acquisition of the technology to send a man into space is so difficult that only three countries have conducted manned space flights: The United States, Russia, and China.<sup>120</sup> By acceding to a Treaty similar to the Moon Treaty, and allowing a central world governing body to control the technologies and minerals derived from harvesting minerals in space, the only countries with a heavy investment in this industry could lose their investments and technology. This brings up a glaring problem with the Moon Treaty: it is valid international law. While the United States, Russia, and China have not ratified it, because several countries have ratified the Treaty, it is still international law that can be brought up in international disputes. This is pressing because even though the United States is not a signatory on LOST, the United States is classified as an observer state and must pay dues to the ISA.<sup>121</sup> One concern with the Moon Treaty is that Russia and/or China can still sign on, giving significant weight to the Treaty.<sup>122</sup>

#### *b. Non-governmental Entities*

Another major issue at play is the loophole left in the OST. This loophole could hypothetically allow a corporation or other non-governmental entity to claim a property right in a celestial body. This is because the OST plainly states in Article II, “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>123</sup> So it appears that a non-governmental entity could claim property rights in a celestial body, as long as the Treaty is not interpreted to apply to that entity.

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119. *Rejecting the Law of the Sea Treaty (LOST)*, National Space Society (Mar. 13, 2009), <http://www.nss.org/legislative/NSS-LoST-WhitePaper.pdf> at 1, 3.

120. Listner, *supra* note 47.

121. Marjorie Ann Browne, *United Nations System Funding: Congressional Issues*, CONGRESSIONAL RESEARCH SERVICE, Jan. 14, 2013, <https://www.fas.org/sgp/crs/row/RL33611.pdf> at 5; *see also Observer States To The Authority*, INTERNATIONAL SEABED Authority, <http://www.isa.org.jm/en/about/members/states/observers> (last visited July 31, 2014).

122. Listner, *supra* note 47.

123. Outer Space Treaty, *supra* note 16, at 4 (emphasis added).



There is a split in the courts and scholarly debate on this issue.<sup>124</sup> The main argument for non-government entities is that they have not signed the Treaty and are not held to it.<sup>125</sup> The counter argument is that these corporations are still subject to sovereign power, with that sovereign required to take responsibility for the actions of that corporation.<sup>126</sup> Traditionally, international law is binding only on the sovereign nations, because those laws govern only how the nations interact with each other.<sup>127</sup> The second circuit has held that corporations are not subject to the same level of scrutiny as a sovereign nation under customary international law.<sup>128</sup> Rulings like this make enforcing international laws such as the OST difficult against a non-governmental entity.

The American courts have held that the government will recognize private property rights for extraterrestrial property. As explained earlier in this Note, the theft of NASA's lunar rocks shows that the government will grant property rights to materials harvested off Earth. In *Nemitz*, the courts declined the opportunity to examine the interaction between the OST and the Moon Treaty.<sup>129</sup> The Law Of the Sea Treaty is similar to the Moon Treaty, and neither has been ratified by the United States. The United States has mostly ignored LOST and the Moon Treaty. The loophole in the OST is also still open because non-governmental entities are traditionally only subject to the sovereign they are under.

#### IV. RIGHTS THAT CAN BE CREATED

The Outer Space Treaty is the main law governing interactions in space. The main reason to establish property rights in an asteroid would be to exclude others from that same asteroid. The right to exclude others from property is the main right one would seek when purchasing mining rights from an international body. However, a corporation may attempt to use the loophole to claim an asteroid, as it is not making a national claim on it.

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124. Joel Slawotsky, *The Global Corporation as International Law Actor*, VA. J. OF INT'L L. DIGEST 79, 79–80 (2012).

125. *Id.* at 82.

126. *Id.* at 86.

127. Joel Slawotsky, *Corporate liability for violating international law under The Alien Tort Statute: The corporation through the lens of globalization and privatization*, INT'L REV. OF L. 1 (2013), <http://www.qscience.com/doi/pdf/10.5339/irl.2013.6>.

128. Mara Theophila, "Moral Monsters" Under the Bed: Holding Corporations Accountable for Violations of the Alien Tort Statute After *Kiobel v. Royal Dutch Petroleum Co.*, 79 FORDHAM L. REV. 2859, 2861 (2011); *Kiobel v. Royal Dutch Petroleum Co.*, 621 F.3d 111, 145 (2d Cir. 2010).

129. *Nemitz v. United States*, CV-N030599-HDM (RAM), 2004 WL 3167042 (D. Nev. Apr. 26, 2004) *aff'd sub nom.* *Nemitz v. N.A.S.A.*, 126 F. App'x 343 (9th Cir. 2005).

### A. *Ownership of Space Property*

The OST contains a few ambiguities to explore. One ambiguity is what exactly a celestial body is. Another ambiguity is whether national appropriation has anything to do with the creation of property rights.

The OST and its progeny, including the Moon Treaty, all use the term “celestial bodies.”<sup>130</sup> Webster’s dictionary defines celestial body as “an aggregation of matter in the universe that constitutes a unit (as a planet, nebula) for astronomical study.”<sup>131</sup> Dictionary.com defines a celestial body as “Pertaining to the sky or visible heaven, or to the universe beyond the earth’s atmosphere, as in celestial body.”<sup>132</sup> The Oxford Dictionary defines celestial as: “positioned in or relating to the sky, or outer space as observed in astronomy ‘a celestial body.’”<sup>133</sup> The Macmillan Dictionary simply states a celestial body is, “something in space, such as a star or planet.”<sup>134</sup> While the term celestial body leaves some ambiguity, common interpretation would include any non-manmade objects ranging from a large nebula to a small asteroid. This common usage, based on ambiguity, would not leave very strong ground to support an argument that the OST does not apply to an asteroid.

At first glance, the loophole in the OST would seem to work.<sup>135</sup> A corporation is not a government entity. Corporations can be multinational, and are commonly established to extract resources. Multi-national corporations have traditionally not been subject to international law.<sup>136</sup> The Moon Treaty expressly closes this loophole in Article 11 by prohibiting a non-governmental organization from establishing property rights.<sup>137</sup> By expressly closing the loophole, the authors of the Moon Treaty have attempted to correct the ambiguity left in the OST. Using the loophole, an argument could be made that a corporation could begin to harvest minerals from a sector of space filled with asteroids. The corporation would own those minerals, possibly the asteroids, but may have difficulty establishing ownership of the sector of

130. Outer Space Treaty, *supra* note 16.

131. *Celestial Body Definition*, MERRIAM-WEBSTER ONLINE DICTIONARY, available at <http://www.merriam-webster.com/dictionary/celestial%20body> (last visited Mar. 23, 2014).

132. *Celestial Body Definition*, DICTIONARY.COM, <http://dictionary.reference.com/browse/celestialbody> (last visited Mar. 23, 2014).

133. *Celestial Definition*, OXFORD DICTIONARY, available at [http://www.oxforddictionaries.com/us/definition/american\\_english/celestial](http://www.oxforddictionaries.com/us/definition/american_english/celestial) (last visited Mar. 23, 2014).

134. *Celestial Object Definition*, MACMILLAN DICTIONARY, <http://www.macmillan.com/dictionary/american/celestial-object> (last visited Mar. 23, 2014).

135. See *supra* Section IIIC2b, Earlier in this Note, the OST loophole was about the possibility of corporations getting around international treaty because corporations are not subject to international treaties.

136. Slawotsky, *supra* note 124, at 1.

137. Moon Treaty, *supra* note 42, at 31.

space itself. That corporation would be free to sell the resources extracted to any entity, not just their home country.

The counter to this argument is that the OST itself provides for the closing of the loophole. The OST closes the loophole in Article VI and Article VII.<sup>138</sup> Article VI provides that the jurisdiction that launches the vehicle is responsible to enforce the Treaty.<sup>139</sup> Article VII provides that that vehicle launched is subject to the jurisdiction it was launched under.<sup>140</sup> This means that if a company such as SMC launches a spacecraft in Arizona, the United States is responsible for ensuring SMC abides by the Treaty, and that vehicle is considered an American flagged vessel. This argument is buttressed by the fact that the UN's Office for Outer Space Affairs website expressly denies that a non-governmental entity can claim a celestial body because the Treaty requires continuing supervision by the appropriate State Party.<sup>141</sup> The United States agreed to this when it created the Registration of Objects Launched into Outer Space Treaty, which was ratified by the Senate, signed by the President, and entered into force in 1976.<sup>142</sup> The Treaty, in Article I, section (a)(ii), defines that a launching state means "a state from whose territory or facility a space object is launched."<sup>143</sup> This means that anything launched from American soil is deemed to be flagged as an American vessel, subject to American jurisdiction, and any international treaties that the courts will enforce.

Hypothetically, what happens if Space Mining Corp. ("SMC") then forms a subsidiary in Belize (a non-signatory, non-participating country)<sup>144</sup> and launches a vessel to harvest an asteroid claiming that asteroid? It would be up to international law and agreements to pressure Belize and hold the nation responsible even though Belize did not sign the charter. The pressure could include trade embargos, or refusal to purchase the mined materials. Because SMC is an American corporation, international law would hold the United States responsible as well. As a result, international pressure could cause the government of the United States to restrict SMC. This is because the government refused to enforce the Treaty. The government of the United States

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138. Outer Space Treaty, *supra* note 16, at 5.

139. *Id.*

140. *Id.*

141. *Frequently Asked Questions*, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, <http://www.oosa.unvienna.org/oosa/FAQ/splawfaq.html> (last visited July 31, 2014).

142. Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15 [hereinafter *Registration Convention*].

143. *Id.* at 5.

144. UNITED NATIONS OFFICE FOR DISARMAMENT AFFAIRS, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, [http://disarmament.un.org/treaties/t/outer\\_space](http://disarmament.un.org/treaties/t/outer_space) (last visited July 31, 2014).

might then be expected to take actions that go against SMC's property rights in the asteroid.

The OST does account for the loophole further into its text. A corporation exists due to government recognition by grants of rights and privileges.<sup>145</sup> While national appropriation yields images of a person planting a flag, that nation is responsible for the actions of the corporation. Even multinational corporations are recognized as belonging to a parent state, as well as the nations they operate in. It is because of this that if SMC plants its flag on an asteroid, the home country still has jurisdiction, and the property rights still have not been created.

### B. *Space Mining Methods and the OST*

Article II of the OST prohibits the appropriation of a celestial body, it does not speak of exploiting the resources of that body. The three main methods of mining asteroids are: bring the asteroid to earth, process the asteroid on site, and bring the asteroid into stable orbit and process it there. If an asteroid is mined, this process is likely to create property rights in those minerals due to the capture of those resources.

The most dangerous way to harvest an asteroid would be to attach some sort of engine to the asteroid or capture it in some large device and redirect it back into the Earth's orbit.<sup>146</sup> While this conjures up images of disaster movies, it has been hypothesized by scientists that slowing the speed of the asteroid, having it land in the ocean, would eliminate the catastrophic nature of the collision from an asteroid (becoming a meteorite) falling to Earth.<sup>147</sup> Article IX of the OST prohibits this type of dangerous activity by prohibiting "adverse changes in the environment of the Earth resulting from the introduction of extra-terrestrial matter. . . ."<sup>148</sup> This means that bringing asteroids back to earth would likely be a violation of the Treaty. In a later agreement called the Convention on International Liability for Damages Caused

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145. *Corporation Definition*, BLACK'S LAW DICTIONARY (9th ed. 2009), available at WestlawNext. A corporation is defined in Black's law dictionary as an entity having authority under law to act as a single person. This right is gained by filing incorporation documents, and being recognized by the government as an entity from that point on.

146. *Asteroid Retrieval Feasibility Study*, KECK INSTITUTE FOR SPACE STUDIES (Apr. 2, 2012), [http://www.kiss.caltech.edu/study/asteroid/asteroid\\_final\\_report.pdf](http://www.kiss.caltech.edu/study/asteroid/asteroid_final_report.pdf); see also Steven J. Ostro and Carl Sagan, *Cosmic Collisions and the Longevity of Non-Spacefaring Galactic Civilizations*, JET PROPULSION LABORATORY, <http://trs-new.jpl.nasa.gov/dspace/bitstream/2014/19498/1/98-0908.pdf> (last visited July 31, 2014).

147. See generally, William BC Crandall, *To: The Augustine Committee, Enabling Profitable Asteroid Mining*, ABUNDANT PLANET 7 (Aug. 3, 2009), [http://www.nasa.gov/pdf/383154main\\_53%20-%2020090803.7.toAugustineCommittee-2009-08-03.pdf](http://www.nasa.gov/pdf/383154main_53%20-%2020090803.7.toAugustineCommittee-2009-08-03.pdf) at 7; see also Stephen Harris, *Your Questions Answered: Asteroid Mining*, THEENGINEER.CO.UK (Apr. 8, 2013) <http://www.theengineer.co.uk/aerospace/in-depth/your-questions-answered-asteroid-mining/1015966.article>.

148. Outer Space Treaty, *supra* note 16, at 6.

by Space Objects, or the Liability Treaty, damages caused to any party as a result of an object crashing to Earth are the responsibility of the nation that flagged the ship.<sup>149</sup> Thus, it is not likely any country would approve this method for harvesting an asteroid.

The next way to capture an asteroid would be to land a vehicle on it that could adjust the trajectory of the asteroid into a stable orbit near a processing facility.<sup>150</sup> This method still has the risk of collision with other objects, but is much safer than crashing the asteroid into the Earth. Using this method could create property rights because of the capture or occupation of the asteroid.

If NASA brings the asteroid into stable orbit, according to Article II of the OST, no property rights could be enforced.<sup>151</sup> This is because the party claiming the asteroid would be NASA, not a corporation. NASA's claim would be a national claim of sovereignty, or the same exclusive use of the asteroid expressly prohibited in Article II. Extracting and claiming the resources is plausible, but not while the asteroid is a celestial body. If SMC brought the asteroid into stable orbit, the OST still applies. SMC would not have property rights in the asteroid until processing. The OST mission for the peaceful exploration of space and the generation of property rights through capture will likely get heavy weight, as taking a captured asteroid from another party does not lead to peace. The method of stable orbit leaves potential problems that are solvable by treating only captured asteroids as claimed. If technology makes this method feasible, the OST may need amending to reduce potential conflict if two parties are attempting to capture the same asteroid.

The last method commonly discussed is the on-site harvesting of the minerals in the asteroid.<sup>152</sup> The idea is to land some form of solar-powered unit to harvest the resources, and then return these resources back to a station or Earth.<sup>153</sup> This method would be clear as to who should own the property rights, as the minerals would have been fully captured. As far as the OST is concerned, this is merely harvesting resources, and not staking a claim on a celestial body. Where this becomes troublesome is if two competing factions are attempting to get the same resources from the same asteroid. Currently, the resources would likely go to whoever extracts them.

The OST and its progeny consistently talk about the spirit of cooperation. Grounds against cooperation start to arise if multiple parties

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149. Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter *Liability Convention*].

150. Harris, *supra* note 147(b); See also *Asteroid Retrieval Feasibility Study*, KECK INSTITUTE FOR SPACE STUDIES (Apr. 2, 2012), [http://www.kiss.caltech.edu/study/asteroid/asteroid\\_final\\_report.pdf](http://www.kiss.caltech.edu/study/asteroid/asteroid_final_report.pdf).

151. Outer Space Treaty, *supra* note 16, at 5.

152. *US Company Aims to 'Harvest' Asteroids*, PHYS.ORG (Jan. 22, 2013), <http://phys.org/news/2013-01-company-aims-harvest-asteroids.html>.

153. *Id.*

are attempting to collect the same asteroid, commonly known as the free rider problem.<sup>154</sup> While the costs would be astronomical, it is likely that agreements and contracts will be created to reduce the risk. As asteroid mining becomes cheaper and more efficient, registering a launch to a specific asteroid with the UN (because a nation cannot have sovereignty) may be a simple enough solution to claim those rights. Then again, this may not be necessary. In *Pierson v. Post*, Post was still pursuing the fox when Pierson ended the chase.<sup>155</sup> Pierson gained his rights by mortally wounding the fox—Post did not first register that he would be hunting the fox. This method of establishing property rights by mortally wounding the wild animal still serves hunters.

United States law gives the basis for the process of harvesting the minerals, and will establish property rights in those minerals. The Apollo missions set the precedent when the United States collected and brought back lunar samples to Earth. Where this gets complicated is that the OST was in effect as the missions in the Apollo program were ending.<sup>156</sup> There is an argument to be made that there is a property right created in the harvested material because the OST allows for the collection and use of materials in Article VIII.<sup>157</sup> Article VIII provides that “Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to earth.”<sup>158</sup> This article appears to govern the creation of facilities when using launched components combined with harvested components. It could be argued to include harvesting and using of metals to build facilities or the acquisition and use of hydrogen to refuel rockets, allowing the nation to flag the use of the minerals as the nation’s own property; comingling the new materials with those launched from Earth. This would raise the question of what percentage of terrestrial matter is required for ownership. A low percentage would probably be valid; this is because the materials would have to be processed and incorporated, modifying the minerals into pieces of the facility, still being flagged by the government building the structure.

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154. Bezpalko, *supra* note 89, at 883.

155. *Pierson v. Post*, 3 Cai. R. 175, 1805 WL 781, 1805 N.Y. Lexis 311 (N.Y. Sup. Ct. 1805).

156. The last Apollo mission to reach the moon was launched Dec. 7, 1972, and the OST came into effect in 1967. *Apollo 17*, NASA.gov (April 7, 2011), [http://www.nasa.gov/mission\\_pages/apollo/missions/apollo17.html#UwFpNfldVzU](http://www.nasa.gov/mission_pages/apollo/missions/apollo17.html#UwFpNfldVzU); U.S. DEPARTMENT OF STATE, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, <http://www.state.gov/t/isn/5181.htm> (last visited July 31, 2014).

157. Outer Space Treaty, *supra* note 16, at 5.

158. *Id.*

The OST was written with the intent to keep a nation from planting a flag on the moon and claiming it. Maintaining the provisions in the OST is still possible, even when parties begin to harvest resources from those celestial bodies. The only adjustment that may be needed is over who would “own” the asteroid if multiple parties were competing for ownership. The process of capture is a likely source to grant property rights in the resources collected, just not to a private company claiming a sector of the asteroid belt.

### C. *Private Ventures and Speculation*

The only country pushing for privatization of the space industry is the United States. The OST applied in its current form would hold the United States responsible for the actions undertaken by the privatized space companies because of Article VI and VII of the OST. Many Americans have purchased a “Lunar Deed” from a person who claimed the moon, (and several other planets and their moons), citing Article II as the authority to take ownership.

If a person were to claim an asteroid merely by registering it with an agency (such as the Archimedes institute), the courts would likely agree with the ruling in *Nemitz* and hold that no rights were created.<sup>159</sup> Another example would be Dennis Hope who sells “Lunar Deeds.”<sup>160</sup> Mr. Hope stated that he claimed ownership of the moon by sending a letter to the UN stating his claim and demanding a response to state if that claim was invalid.<sup>161</sup> He stated that he did this because he saw the loophole in the OST and decided that if a government could not own the moon, then he should be able to.<sup>162</sup> He has been selling plots of land on the moon since 1995, and believes that most of his customers believe these are actual rights because 42% of his sales are to trusts.<sup>163</sup> While no one has legally challenged these deeds, because of the time and notoriety involved, it could be argued that the UN acquiesced to Mr. Hope. On the other hand, Mr. Hope knows that his claim has severe legitimacy issues because he recently established the “Galactic Government” (ratified by over 100,000 of the moon’s “landowners”) and is seeking for it to be recognized as a nation.<sup>164</sup> Ironically, by creating a government, the “Galactic Government” now conflicts with the OST, prohibiting a national government’s claim to appropriation.

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159. *Nemitz v. United States*, CV-N030599-HDM (RAM), 2004 WL 3167042 (D. Nev. Apr. 26, 2004) *aff’d sub nom.* *Nemitz v. N.A.S.A.*, 126 Fed. App’x 343 (9th Cir. 2005).

160. Rachel Hardwick, *Denis M. Hope has Owned the Moon Since 1980 Because He Says So*, Vice.com (Apr. 11, 2013), <http://www.vice.com/read/ive-owned-the-moon-since-1980>.

161. *Id.*

162. *Id.*

163. *Id.*

164. *Id.*

Investors, who would fund the private venture into space mining, would likely want some form of return in the minerals harvested. These initial space mining ventures do not need to claim the asteroids they are attempting to harvest because of the very large barriers to entry. As the technology becomes more readily available, these pioneering companies may have established regions where they exclusively mine asteroids. This is where the major challenge to the OST and property rights would come into play. The Liability Convention Article III provides that the party that damages another is responsible.<sup>165</sup> So if SMC claimed a sector of asteroids, the OST would not protect it. If SMC attempted to police this area itself, it would be liable for any damage done. The home nation would also be responsible because of articles VI and VII of the OST, which requires the government to flag the vessels and requires enforcement of the OST.<sup>166</sup>

The privatization of space as an industry, for now, seems to be happening only in the United States.<sup>167</sup> Russia revitalized its bankrupt space program by pioneering space tourism. Dennis Tito was Russia's first commercial space tourist, purchasing a flight to the international space station for \$20 million on April 28, 2001.<sup>168</sup> Russia is also ferrying American astronauts to and from the International Space Station since the end of NASA's shuttle program in 2011.<sup>169</sup> Russia would have started a market for private space ventures if the loophole was considered a realistic possibility. After the fall of the Soviet Union, the Russian Space Agency went bankrupt. One could speculate that if the Russian government believed this loophole was a possibility, it would have sold their usable Soyuz capsules to a nongovernment entity. China has recently landed an unmanned drone on the moon.<sup>170</sup> China is likely using that drone to scout for good resource collection sites that are also near the lunar poles, where water has been discovered.<sup>171</sup> If China were to grant its space technologies and resources to a fledgling company (such as SpaceX, which was given a multimillion-

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165. Liability Convention, *supra* note 149, at 5.

166. Outer Space Treaty, *supra* note 16, at 5.

167. Dominic Basulto, *Funding Manned Space Exploration is Not Rocket Science*, BIGTHINK.COM (Apr. 25, 2011, 9:27 PM), <http://bigthink.com/endsless-innovation/funding-manned-space-exploration-is-not-rocket-science>.

168. Mike Wall, *First Space Tourist: How a U.S. Millionaire Bought a Ticket to Orbit*, SPACE.COM (Apr. 27, 2011, 6:00 AM), <http://www.space.com/11492-space-tourism-pioneer-dennis-tito.html>.

169. Irene Klotz, *NASA Wants "Space Taxis" To Bring Astronauts To The International Space Station*, BUSINESSINSIDER.COM (Nov. 19, 2013, 9:52 PM), <http://www.businessinsider.com/nasa-iss-space-taxis-2013-11>.

170. Glenn Harlan Reynolds, *Will China Restart the Space Race?*, USATODAY.COM (Dec. 16, 2013, 4:20 PM), <http://www.usatoday.com/story/opinion/2013/12/16/china-moon-astronaut-nasa-column/4031105/>.

171. Jennifer Ouellette, *This Moon was Made for Farming (Helium-3)*, DISCOVER-YNNEWS.COM (Feb. 21, 2011, 10:47 PM), <http://news.discovery.com/space/this-moon-was-made-for-mining.htm>.



dollar startup grant by the United States government),<sup>172</sup> it could begin to test the loophole by claiming that site. At this point, it would be unnecessary for China to create such a nongovernmental entity. The OST allows for countries to build structures. Conflict will only begin once one party attempts to exclude another by claiming property rights. Should this conflict happen, parties to the Treaty would have to pressure the country not following the Treaty into compliance.

As the OST is applied to hypothetical and real situations, it still holds up and allows for the construction of colonies and the extraction of resources. The loophole itself is, at a minimum governed under Sections VI and VII of the OST, holding the launching nation responsible. Another extreme possibility to avoid the OST could be renouncing citizenship of the Earth. Renouncing citizenship would then make any treaty inapplicable to that person, resulting in no governing authority over that person. This is a flawed position because the enforcement of the OST could be based on trade embargos against that non-Earth entity.

## V. CONCLUSION

The answer to the question of, “Can I own an asteroid?” is no. Creation of an international regime to govern the property rights of objects in space would make ownership possible, but most nations are not ready to give the UN control. It is possible to gain property rights in the resources harvested from that asteroid. The OST has reached wide acceptance, and most nations are a part of it. This Treaty can still govern any interaction in space. Any change in the status quo would stifle the development of the industry. This would lead to a situation like in LOST, where the result was slowing the creation of an infant industry. The ISA stalled the development of sea floor mining once it came into effect. Most countries in the world have not signed the Moon Treaty. A party owns resources collected from space and returned to Earth, with property rights in those resources. As space exploration matures, so will new technologies and new ways to generate revenue. Space mining is still in its infancy, and property rights will emerge once theoretical problems become real problems.

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172. Loren Thompson, *What NASA Risks By Betting On Elon Musk's SpaceX*, FORBES.COM (May 23, 2011, 11:40 AM), <http://www.forbes.com/sites/beltway/2011/05/23/what-nasa-risks-by-betting-on-elon-musks-spacex/>.