

# THE FINAL FRONTIER: PREVENTING SPACE FROM BECOMING THE WILD WEST THROUGH THE ESTABLISHMENT OF INTERNATIONALLY RECOGNIZED PROPERTY RIGHTS

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## I. INTRODUCTION

Imagine a giant, 120 mile wide, orb of cash floating in outer space. An orb so vast that it contains enough money to give each of the 7 billion people on Earth \$1.4 billion. Now picture millions more of these orbs, all up for grabs. Or imagine a bar of gold, floating in outer space, so large and so close it illuminates the night sky. These images may seem like fanciful dreams, but they are actually rooted in reality. In the asteroid belt.<sup>1</sup> In the Moon.<sup>2</sup> The resources available in outer space on planets, moons, and asteroids are worth near incalculable amounts.<sup>3</sup> As such, a more appropriate, modern adaptation of the famous old saying might be: “There’s gold in them there stars.”<sup>4</sup>

Space may be the final frontier, but it need not become a lawless expanse akin to the Wild West. Over the past quarter century, space travel has become increasingly common and private organizations have begun to overtake public actors.<sup>5</sup> This has led to the commercialization of space.<sup>6</sup> While current commercial activities have been limited to putting satellites in

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<sup>1</sup> See Andrew Wong, *Space Mining Could Become A Real Thing — And It Could Be Worth Trillions*, CNBC (May 15, 2018, 12:39 AM), <https://www.cnbc.com/2018/05/15/mining-asteroids-could-be-worth-trillions-of-dollars.html>; Brid-Aine Parnell, *NASA Will Reach Unique Metal Asteroid Worth \$10,000 Quadrillion Four Years Early*, FORBES (May 26, 2017, 6:12 AM), <https://www.forbes.com/sites/bridaineparnell/2017/05/26/nasa-psyche-mission-fast-tracked/#5ab1274b4ae8>; Asteroids, NASA, <https://solarsystem.nasa.gov/asteroids-comets-and-meteors/asteroids/in-depth>.

<sup>2</sup> See Eames Yates, *How A Self-Made Billionaire Is Trying to Access \$16 Quadrillion Worth of Minerals on the Moon*, BUSINESS INSIDER (Oct. 4, 2016, 9:56 AM), <https://www.businessinsider.com/accessing-16-quadrillion-worth-of-minerals-on-moon-2016-9>.

<sup>3</sup> Robert Walker, *Is There A Fortune To Be Made On Mars?*, FORBES (Sept. 26, 2016, 12:59 PM), <https://www.forbes.com/sites/quora/2016/09/26/is-there-a-fortune-to-be-made-on-mars/#3f8e62ed6e28>; Yates, *supra* note 2; See Parnell, *supra* note 1.

<sup>4</sup> See Edward A. Johnson, “*Thar’s Gold in Them Thar Hills:*” *Georgia Gold History*, DIGITAL LIBRARY OF GEORGIA, <http://dlg.galileo.usg.edu/dahlonoga/history.php>.

<sup>5</sup> See Kristin Houser, *Private Companies, Not Governments, Are Shaping The Future of Space Exploration*, FUTURISM (June 12, 2017), <https://futurism.com/private-companies-not-governments-are-shaping-the-future-of-space-exploration>; Alan Yuhas, *The New Space Race: How Billionaires Launched the Next Era of Exploration*, THE GUARDIAN (Feb. 9, 2018, 11:31 AM), <https://www.theguardian.com/science/2018/feb/09/new-space-race-billionaires-elon-musk-jeff-bezos>.

<sup>6</sup> See Yuhas, *supra* note 5.

orbit or delivering supplies to the International Space Station (ISS)<sup>7</sup>, the next inevitable progression will lead to commercial human space travel to the ISS and beyond.<sup>8</sup> As low-orbit travel becomes increasingly routine, States and companies have set their sights on the next logical steps – traveling further out into space to mine for resources and colonizing the Moon and Mars.<sup>9</sup> Currently, a number of international agreements govern State actions in space, but these treaties are decades old and fail to fully contemplate nongovernmental actors and the commercialization of space.<sup>10</sup> In order to appropriately deal with the rapid progression of technology and the new players in space travel, a new set of guidelines must be established. These guidelines must govern property rights on celestial bodies, preventing wholesale claims to entire planets while maintaining countries' and companies' incentives to be first. This article proposes guidelines that establish temporary, renewable property rights to encourage use and innovation while preventing wasteful monopolies and stagnation.

In order to be able to properly craft a workable system to govern property rights on celestial bodies, one must first consider the current international and domestic regulations in place. This article analyzes United Nations (U.N.) Treaties that regulate activities in space, which are outdated and ill-equipped to deal with the current state of technology and space travel. It will also briefly analyze how the Antarctic Treaty System can be used as a reference when formulating new space-related treaties. This article then conducts an analysis of U.S. domestic law, which shows that U.S. lawmakers are beginning to understand the need to have effective regulations and guidelines in place. However, as these U.S. laws are not internationally based, they do little to effectively regulate the global space industry.

Next, this article analyzes current discussions over celestial property rights, highlighting serious gaps in the conversation. While there is near unanimous agreement that increased guidance is needed over celestial property rights, many people believe it is an issue for the future. But in reality, this is a problem that must be addressed today.<sup>11</sup> Further, those

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<sup>7</sup> See *id.*; Houser, *supra* note 5.

<sup>8</sup> Houser, *supra* note 5.

<sup>9</sup> See e.g. LUXEMBOURG SPACE AGENCY, <https://space-agency.public.lu/en/space-resources.html> (last visited Sept. 30, 2019); Vladimir Soldatkin, *Russia Wants to Join Luxembourg in Space Mining*, REUTERS (Mar. 6, 2019, 9:06 AM), <https://www.reuters.com/article/us-luxembourg-russia-space/russia-wants-to-join-luxembourg-in-space-mining-idUSKCN1QN1OQ>; *Making Life Multiplanetary*, SPACEX, <https://www.spacex.com/mars> (last visited Sept. 30, 2019).

<sup>10</sup> See e.g. Outer Space Treaty, *infra* note 24; Andrew Zaleski, *Luxembourg Leads the Trillion-Dollar Race to Become the Silicon Valley of Asteroid Mining*, CNBC (Apr. 16, 2018, 9:01 AM), <https://www.cnbc.com/2018/04/16/luxembourg-vies-to-become-the-silicon-valley-of-asteroid-mining.html>. Not only is international law lacking in this area, but individual States' laws are also sparse. In 2017, Luxembourg became the only country other than the U.S. to adopt laws governing rights over resources from space.

<sup>11</sup> See Zaleski, *supra* note 10; *Making Life Multiplanetary*, *supra* note 9. SpaceX has plans to put humans on Mars by 2024 for long term habitation, demonstrating one of the reasons celestial property rights must be taken under immediate consideration.

discussions that do actually propose a solution fail to properly weigh national and corporate interests in a fair system.

Finally, this article proposes a new solution in order to ensure countries are protected against land grabbing akin to that of the 18<sup>th</sup> century colonial powers and to ensure corporations are provided sufficient guidance to protect against chaotic, unguided power struggles. The proposed solution allows for temporary property rights to be established automatically upon first arrival in a location. Under the proposed guidelines, these property ownership rights are renewable at the end of a set time period, provided the land on the celestial body is being efficiently used and the actor has not violated the rights of others. Further, these property rights are to be overseen by an international tribunal, under the United Nations and the International Court of Justice, with compulsory jurisdiction in all matters.

## II. BACKGROUND

Property rights are not a new issue for States to contemplate. In the Age of Discovery, explorers planted flags and claimed unfamiliar lands for States.<sup>12</sup> Contentious, and often armed, conflicts over property rights have occurred throughout history in attempts to determine which State would control vast expanses of land and resources.<sup>13</sup> The diplomatic tactics used during the ‘Partition of Africa’ and the Berlin Conference of 1884, which established European claims to African lands, show that contemplating land right issues before armed conflicts arise from them is the most prudent approach.<sup>14</sup> In 1961, States around the world effectuated this diplomatic approach through the implementation of a treaty over the largest unclaimed land mass left on Earth – Antarctica.<sup>15</sup> Recognizing the importance of an established framework of laws to prevent armed conflicts, the international community has attempted to put forth a number of treaties and agreements governing activities in space.

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<sup>12</sup> See *Russia Plants Flag Under N Pole*, BBC NEWS (Aug. 2, 2007), <http://news.bbc.co.uk/2/hi/europe/6927395.stm> (quoting a Canadian official in modern times stating that “[t]his isn’t the 15th Century. You can’t go around the world and just plant flags and say ‘We’re claiming this territory’.”)

<sup>13</sup> See *French and Indian War*, HISTORY, <https://www.history.com/topics/native-american-history/french-and-indian-war> (last updated Sept. 6, 2019). The French and Indian War was fought between the French and British over territories in North America, with Britain gaining vast tracts of land after winning the war.

<sup>14</sup> See Maureen Shisia, *What Was the Scramble For Africa?*, WORLDATLAS, <https://www.worldatlas.com/what-was-the-scramble-for-africa.html> (last updated Feb. 27, 2018).

<sup>15</sup> The Antarctic Treaty (Dec. 1, 1959), 12 U.S.T. 794, 402 U.N.T.S. 71. See also *The Antarctic Treaty*, SECRETARIAT OF THE ANTARCTIC TREATY, <https://www.ats.aq/e/antarctic treaty.html> (last visited Oct. 18, 2019); *Antarctic Treaty*, U.S. STATE DEP’T, <https://www.state.gov/t/avc/trty/193967.htm> (last updated Jan. 20, 2017).

A. *The United Nations and U.N. Space Agreements*

In the mid-twentieth century, in the midst of the Space Race, the international community realized that there was a need for a governing body to oversee space-based activities. As a result, in 1958, the United Nations Office for Outer Space Affairs (UNOOSA) was founded.<sup>16</sup> UNOOSA is in charge of promoting international peaceful uses of outer space, maintaining the United Nations Register of Objects Launched into Outer Space, and overseeing the implementation of a number of international treaties concerning space-based activities.<sup>17</sup> UNOOSA also operates as the secretariat of a number of U.N. committees, including the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS).<sup>18</sup> COPUOS is tasked with ensuring international cooperation and peaceful use of outer space, as well as assessing legal problems that arise from space exploration.<sup>19</sup> By ensuring international cooperation in outer space and assessing potential legal problems, COPOUS has been instrumental in creating space treaties and defining legal principles in outer space.<sup>20</sup>

Through a number of declarations and the five major space treaties, detailed below, UNOOSA and COPOUS have helped outline the international legal principles governing outer space since the start of the Space Race.<sup>21</sup> This article will review the various U.N. agreements governing activities in outer space and on celestial bodies. It will be apparent that the established outer space agreements are outdated and more recent ones have failed to garner the support needed from the international community to make them effectual.

i. *The Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space*

The first major space-focused international agreement created was the Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space (1963 Declaration).<sup>22</sup> Through a U.N. General Assembly Resolution, this declaration established general principles of peaceful international cooperation in outer space and space-based

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<sup>16</sup> *History*, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, <http://www.unoosa.org/oosa/en/aboutus/history/index.html> (last visited Oct. 18, 2019).

<sup>17</sup> *Roles and Responsibilities*, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, <http://www.unoosa.org/oosa/en/aboutus/roles-responsibilities.html> (last visited Oct. 18, 2019).

<sup>18</sup> *Id.*

<sup>19</sup> *Committee on the Peaceful Uses of Outer Space*, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, <http://www.unoosa.org/oosa/en/ourwork/copuos/index.html> (last visited Oct. 18, 2019).

<sup>20</sup> *See id.*

<sup>21</sup> *Id.*

<sup>22</sup> G.A. Res. 1962 (XVIII), Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space (Dec. 13, 1963).

activities.<sup>23</sup> However, as a mere resolution, this declaration has little binding power.

## ii. The Outer Space Treaty

Ten years after the first-ever satellite, Sputnik 1, was launched into space, and at the height of the Space Race, the international community came together to create the first treaty governing activities in outer space.<sup>24</sup> In 1967, 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, finally codified legal guidelines to govern international activities in space.<sup>25</sup> The Outer Space Treaty was the first of the five major U.N. agreements regarding space-based activities, and it put many of the principles from the 1963 Declaration into a treaty.<sup>26</sup> The Outer Space Treaty included provisions stating: outer space is not subject to claims of sovereignty, by any means; outer space is free for exploration by all; States are responsible for the national space activities of both governmental and nongovernmental actors; and States must avoid harmfully contaminating celestial bodies.<sup>27</sup> The Outer Space Treaty has been widely recognized in the international community, with 107 parties and 23 non-party signatories.<sup>28</sup>

## iii. The Rescue Agreement

In 1968, the second of the major U.N. space treaties was created: the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space.<sup>29</sup> Also known as the Rescue Agreement, this treaty is focused on astronaut rescues and international

<sup>23</sup> *Id.*

<sup>24</sup> Steve Garber, *Sputnik and the Dawn of the Space Age*, NASA (Oct. 10, 2007), <https://history.nasa.gov/sputnik/>; 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 UST 2410, 610 UNTS 205 [hereinafter Outer Space Treaty].

<sup>25</sup> Outer Space Treaty, *supra* note 24.

<sup>26</sup> *Id.*

<sup>27</sup> *Id.*

<sup>28</sup> U.N. Committee on the Peaceful Uses of Outer Space, *Status of International Agreements relating to activities in outer space as at 1 January 2018*, U.N. Doc A/AC.105/C.2/2018/CRP.3 (Apr. 11, 2018), available at [http://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105\\_C2\\_2018\\_CRP03E.pdf](http://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105_C2_2018_CRP03E.pdf). International agreements are only binding on those States that choose to partake. For international agreements, there are parties and non-party signatories. A party is a State that has signed onto the agreement and ratified it, making it legally binding. A non-party signatory is a State that has signed onto the agreement, indicating that it intends to ratify it, but has not yet officially ratified it. Therefore, non-party signatories are not legally bound by the agreement.

<sup>29</sup> See Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Apr. 22, 1968), 19 UST 7570, 672 UNTS 119 [hereinafter Rescue Agreement].

cooperation in such activities.<sup>30</sup> Though not on the same level as the Outer Space Treaty, the Rescue Agreement has garnered widespread international acclaim with 92 parties and 24 non-party signatories.<sup>31</sup>

#### iv. The Liability Convention

In 1972, the international community established the third major treaty governing space-based activities in the Convention on International Liability for Damage Caused by Space Objects.<sup>32</sup> Also called the Liability Convention, this agreement focused on liability for space launches and items in orbit (or falling out of orbit).<sup>33</sup> With 89 parties and 22 non-party signatories, the Liability Convention has received wide international recognition, but illustrates the continued decline in international agreement on how activities in space should be governed since the Outer Space Treaty.<sup>34</sup>

#### v. The Registration Convention

As the Space Race came to an end, the fourth major U.N. agreement over space-based activities was created. The Convention on Registration of Objects Launched into Outer Space, also called the Registration Convention, required the registration of space launches and the orbit of all space objects.<sup>35</sup> The Registration Convention, like the Rescue Agreement and the Liability Convention, does not include any provisions relating to property rights on celestial bodies or the right to appropriate resources from planets and asteroids.<sup>36</sup> These rights, which had been discussed in the Outer Space Treaty, were not redefined by any of the three subsequent international agreements on space-based activities.<sup>37</sup> With only 67 parties and 3 non-party signatories, the Registration Convention shows the continued decline in participation from prior agreements. This decline is starkly indicative of States' unwillingness to join international agreements regulating activities in outer space in recent years.<sup>38</sup>

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<sup>30</sup> *Id.* at art. 2. This agreement did not include any provisions relating to property rights or the rights to appropriating resources on planets, asteroids, and other celestial bodies.

<sup>31</sup> U.N. Committee on the Peaceful Uses of Outer Space, *supra* note 28.

<sup>32</sup> Convention on International Liability for Damage Caused by Space Objects (Mar. 29, 1972), 24 UST 2389, 961 UNTS 187 [hereinafter Liability Convention].

<sup>33</sup> *Id.* at art. 2. This agreement did not include any provision relating to property rights or the rights to appropriating resources on celestial bodies.

<sup>34</sup> See U.N. Committee on the Peaceful Uses of Outer Space, *supra* note 28.

<sup>35</sup> Convention on Registration of Objects Launched into Outer Space (Jan. 14, 1975), 28 UST 695, 1023 UNTS 15 [hereinafter Registration Convention].

<sup>36</sup> See *id.*; Liability Convention, *supra* note 32; Rescue Agreement, *supra* note 29.

<sup>37</sup> Registration Convention, *supra* note 35; Liability Convention, *supra* note 32; Rescue Agreement, *supra* note 29; Outer Space Treaty, *supra* note 24.

<sup>38</sup> See U.N. Committee on the Peaceful Uses of Outer Space, *supra* note 28.

## vi. The Moon Treaty

The fifth and final major U.N. agreement regarding space-based activities is the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, also known as the Moon Treaty.<sup>39</sup> Twelve years after the Outer Space Treaty first codified international regulations for activities in space, the Moon Treaty attempted to update these guidelines.<sup>40</sup> Updating these guidelines was essential, as, in those twelve years, the U.S. had landed men on the moon and the number of countries with the capability to launch items into space had more than doubled.<sup>41</sup>

The Moon Treaty expanded upon the 1967 Outer Space Treaty, including provisions such as: banning military bases from being established on celestial bodies; banning the claiming of sovereignty by a State over any portion of a celestial body; banning the ownership of celestial bodies by any organization or person; allowing international governmental organizations to own property on celestial bodies; requiring approval from other States prior to the exploration or use of a celestial body; and establishing an international regime to oversee space exploration and ensure proper management of celestial resources.<sup>42</sup> The Moon Treaty also sought to establish jurisdiction for space-based activities, with international law as the governing body of law over all celestial bodies and activities in space.<sup>43</sup> This would have been in direct contrast to current international practice, which gives a country responsibility for and jurisdiction over anything it sends into space.<sup>44</sup>

The Moon Treaty has received virtually no support in the international community.<sup>45</sup> The treaty has only 18 parties and 4 non-party signatories, and no country that currently engages in manned space exploration has become a party.<sup>46</sup> The Moon Treaty is indicative of the culmination of the sharp decline in countries' willingness to agree to international agreements governing their activities in space,<sup>47</sup> as those activities grow in size and frequency.

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<sup>39</sup> G.A. Res. 34/68, Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Dec. 5, 1979) [hereinafter Moon Treaty].

<sup>40</sup> *See id.*

<sup>41</sup> *Timeline: 50 Years of Spaceflight*, SPACE.COM (Sept. 28, 2012), <https://www.space.com/4422-timeline-50-years-spaceflight.html>.

<sup>42</sup> Moon Treaty, *supra* note 39.

<sup>43</sup> *Id.*

<sup>44</sup> *International Space Station Legal Framework*, EUROPEAN SPACE AGENCY, [https://m.esa.int/Science\\_Exploration/Human\\_and\\_Robotic\\_Exploration/International\\_Space\\_Station/International\\_Space\\_Station\\_legal\\_framework](https://m.esa.int/Science_Exploration/Human_and_Robotic_Exploration/International_Space_Station/International_Space_Station_legal_framework) (last visited Oct. 18, 2019).

<sup>45</sup> Louis de Gouyon Maitgnon, *The 1979 Moon Agreement*, SPACE LEGAL ISSUES (July 17, 2019), <https://www.spacelegalissues.com/the-1979-moon-agreement/>.

<sup>46</sup> U.N. Committee on the Peaceful Uses of Outer Space, *supra* note 28.

<sup>47</sup> When analyzing the number of parties and signatories to the Outer Space Treaty (1967) as compared to the number of parties and signatories to the Moon Treaty (1979). *See id.*; Outer Space Treaty, *supra* note 24.

While there have been other U.N. General Assembly Resolutions regulating activities in outer space,<sup>48</sup> no major international treaty governing activities in outer space and on celestial bodies has been created since 1979.<sup>49</sup> It has been forty years since the last international treaty on space-based activities was created and even longer since an agreement has received widespread international recognition.<sup>50</sup>

### B. *An Analogous Agreement – The Antarctic Treaty System*

The international treaty governing Antarctica is analogous to the U.N. treaties that govern activities in outer space. Antarctica is remote, cold, and barren – just like the celestial bodies in our solar system. Further, like the planets and asteroids in question, Antarctica has no indigenous population.<sup>51</sup> Yet, Antarctica has been the site of research and exploration by a number of nations, all done peacefully and in accordance with international agreements.<sup>52</sup> Therefore, internationally recognized regulations and treaties governing activities in the Antarctic can be used as a helpful guideline when looking to establish a successful, enduring system of regulating property rights on celestial bodies.

In 1959, the Antarctic Treaty System (ATS) was established to govern the use of land in Antarctica.<sup>53</sup> The treaty came about as the result of competing claims over Antarctic territories by seven different nations, with another five nations having outposts established on the continent at that time.<sup>54</sup> It sought to regulate activities in order to prevent open hostilities from developing from the competing claims.<sup>55</sup>

The ATS was essential in ensuring disputes over the veracity of claims to land on the continent did not escalate to armed conflicts. The ATS did not rebuke any State's territorial sovereignty claims that had already been established when the ATS was made; however, it prevents States from claiming new land.<sup>56</sup> The ATS also states that disputes on the frozen

<sup>48</sup> See e.g. G.A. Res. 51/122, Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries (Feb. 4, 1996). This declaration stated that space would be used for the common good and current States with developed space-based capabilities would help facilitate the development of such capabilities by other States. It did not include any provision relating to property rights or the rights to appropriating resources on celestial bodies, and as a mere resolution it lacks the binding power of a treaty.

<sup>49</sup> See Moon Treaty, *supra* note 39.

<sup>50</sup> See *id.*; Registration Convention, *supra* note 35.

<sup>51</sup> Dep't of the Env't and Energy, *How Many People Live in Antarctica*, AUSTRALIAN ANTARCTIC DIVISION, <http://www.antarctica.gov.au/about-antarctica/people-in-antarctica/how-many> (last updated Mar. 11, 2003).

<sup>52</sup> Arthur B. Ford, *Antarctica*, ENCYCLOPEDIA BRITANNICA, <https://www.britannica.com/place/Antarctica> (last visited Oct. 18, 2019).

<sup>53</sup> See The Antarctic Treaty, *supra* note 15.

<sup>54</sup> *Id.*

<sup>55</sup> *Id.*

<sup>56</sup> *Id.*

continent between States should be resolved through peaceful discussion or, with the voluntary consent of all parties, through the International Court of Justice.<sup>57</sup> For years, the ATS has successfully prevented the international community from coming to blows over disputes in Antarctica. However, nearly fifty years after its establishment, ATS faces new, unforeseen challenges.<sup>58</sup> Changes in the global environment and technological advancements have led to new developments in Antarctica, such as increased fishing and tourism, presenting new challenges to the treaty and testing ATS's mettle.<sup>59</sup>

### C. *Domestic Space Law in the United States*

The United States has always been a pioneer in space-related activities. A number of domestic councils and organizations have been created to get the U.S. into outer space and to deal with the various aspects of space travel.<sup>60</sup> In recent years, the U.S. has also begun to demonstrate that it understands private actors' desires to become involved in space travel; U.S. lawmakers have begun to loosen legal restrictions and pass laws to help private actors and to facilitate the commercialization of space.<sup>61</sup>

In 1958, the United States passed the National Aeronautics and Space Act (1958 Space Act), establishing the National Aeronautics and Space Administration (NASA)<sup>62</sup> and the National Aeronautics and Space Council (NASC).<sup>63</sup> The NASC, now known as the National Space Council (NSC), has been in effect intermittently since its establishment.<sup>64</sup> The NSC, when operative, serves to facilitate the sharing of technological information and promote increased space technology and travel.<sup>65</sup> This includes sharing technology and information between public and private actors, as can be seen by the various corporate and public service members of the National Space

<sup>57</sup> *Id.*

<sup>58</sup> See Klaus Dodds, *Governing Antarctica: Contemporary Challenges and the Enduring Legacy of the 1959 Antarctic Treaty*, 1 *Glob. Policy* 1 (2010).

<sup>59</sup> *Id.*

<sup>60</sup> See e.g. *NASA History Overview*, NASA, <https://www.nasa.gov/content/nasa-history-overview> (last visited Oct. 24, 2019); *Mission*, OFFICE OF SPACE COMMERCE, <https://www.space.commerce.gov/about/mission/> (last visited Oct. 24, 2019).

<sup>61</sup> See *US Commercial Space Launch Competitiveness Act*, Pub L. No. 114-90 (2015).

<sup>62</sup> *NASA History Overview*, *supra* note 60; *Mission*, *supra* note 60.

<sup>63</sup> National Aeronautics and Space Act, 42 U.S.C. § 2451 et seq., Pub. L. No. 85-568 (1958), *repealed* by National Aeronautics and Space Program, 41 U.S.C. § 20101 et seq., 124 Stat. 3328 (2010); National Aeronautics and Space Administration Authorization Act, Fiscal Year 1989, Pub. L. No. 100-685, 102 Stat. 4083 (codified as amended at 42 U.S.C. § 2471 (2010)).

<sup>64</sup> *NASA Statement on National Space Council*, NASA, <https://www.nasa.gov/press-release/nasa-statement-on-national-space-council> (last updated Jun. 18, 2018).

<sup>65</sup> NASA, CHARTER OF THE NATIONAL SPACE COUNCIL USERS' ADVISORY GROUP (2017), available at , <https://www.nasa.gov/content/national-space-council-users-advisory-group>.

Council Users' Advisory Group.<sup>66</sup> At the time, however, the 1958 Space Act made space travel wholly owned by the U.S. government, preventing space technology from being used by private actors or for commercial purposes.<sup>67</sup>

After space travel significantly developed, the Commercial Space Launch Act of 1984 (1984 Space Act) was passed.<sup>68</sup> The Act was intended to facilitate the commercialization of space.<sup>69</sup> It overturned the wholesale governmental ownership of space travel and restrictions on private space travel from the 1958 Act, paving the way for private actors to begin space travel and for the commercialization of space.<sup>70</sup> However, the 1984 Act did not address potential property rights over celestial bodies or resources found in space.<sup>71</sup>

U.S. domestic law addressed space-related property rights after the Moon landings.<sup>72</sup> Federal law and NASA policy states that any lunar samples collected are permanent property of the U.S. government.<sup>73</sup> However, this contradicts both the Outer Space Treaty, to which the U.S. is a party, and the Moon Treaty, to which the U.S. is not even a signatory.<sup>74</sup> Both treaties establish that States cannot claim ownership over any items on or from celestial bodies.<sup>75</sup>

In 2015, the U.S. continued its deviation from international agreements with regards to ownership over items in space on celestial bodies. The U.S. Commercial Space Launch Competitiveness Act, also known as the SPACE Act of 2015, was implemented to help encourage development and innovation in space-based corporate endeavors.<sup>76</sup> The SPACE Act of 2015 establishes that the United States recognizes private rights to resources found in space.<sup>77</sup> However, the property or resource must be actually obtained before rights can be claimed.<sup>78</sup> Recognition of individual property rights to

<sup>66</sup> *Id.* The National Space Council Users' Advisory Group consists of members such as: Marillyn Hewson, CEO of Lockheed Martin; Gwynne Shotwell, President and COO of SpaceX; Dennis Muilenburg, CEO of the Boeing Company; and Buzz Aldrin, former Gemini 12 and Apollo 11 astronaut.

<sup>67</sup> *National Aeronautics and Space Act*, *supra* note 63.

<sup>68</sup> *Commercial Space Launch Act of 1984*, 51 U.S.C. § 50901 et seq., Pub. L. No. 98-575 (1984).

<sup>69</sup> *Id.*

<sup>70</sup> *Id.*

<sup>71</sup> *Id.*

<sup>72</sup> See NASA, IG-12-007, NASA'S MANAGEMENT OF MOON ROCKS AND OTHER ASTROMATERIALS LOANED FOR RESEARCH, EDUCATION, AND PUBLIC DISPLAY 12 (2011), available at <https://oig.nasa.gov/audits/reports/FY12/IG-12-007.pdf>.

<sup>73</sup> *Id.*

<sup>74</sup> See Outer Space Treaty, *supra* note 24; Moon Treaty, *supra* note 39.

<sup>75</sup> Outer Space Treaty, *supra* note 24; Moon Treaty, *supra* note 39.

<sup>76</sup> *US Commercial Space Launch Competitiveness Act*, Pub L. 114-90 (2015) [hereinafter *SPACE Act*].

<sup>77</sup> See *id.*; Outer Space Treaty, *supra* note 24; Moon Treaty, *supra* note 39.

<sup>78</sup> *SPACE Act*, *supra* note 76. The law states that actions taken to "obtain" a resource include "to possess, own, transport, use, and sell it."

space resources is in direct contradiction with international treaties.<sup>79</sup> However, the SPACE Act of 2015 asserts that there is no claim of sovereignty or ownership over a celestial body being made by the United States, in line with previous international treaties.<sup>80</sup>

The U.S. Department of Commerce has recognized the impending commercialization of space for many years. In 1988, the Office of Space Commerce within the U.S. Department of Commerce was created to facilitate the development of a United States based commercial industry in space.<sup>81</sup> In 2018, the U.S. Secretary of Commerce announced plans to create a new organization, the Space Policy Advancing Commerce Enterprise (SPACE) Administration, which would encompass the Office of Space Commerce.<sup>82</sup> These recent developments within the U.S. Department of Commerce, along with the SPACE Act of 2015, show that U.S. lawmakers understand the growing importance of creating regulations to properly govern space-based commercial activities as technology rapidly progresses.<sup>83</sup>

#### D. *Space-Based Case Law*

For centuries, people have attempted to claim ownership over the Moon, planets, and stars,<sup>84</sup> from claims made by Prussian King Frederick the Great in the 1700s to those made by ordinary people in the early 21st century.<sup>85</sup> These claims ranged from ownership over the Moon to ownership over all of outer space itself.<sup>86</sup> Many of the claims are so outlandish that they are met by the courts with incredulosity and promptly dismissed.<sup>87</sup> However, as these claims grow in number and humankind travels further out into the stars, court rulings and reasoning behind such cases grows in importance.

Unsurprisingly, international and U.S. case law on space-based activities is significantly limited. One U.S. case, directly relating to property rights in space, is that of *Nemitz v. NASA*.<sup>88</sup> *Nemitz* was a case concerning

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<sup>79</sup> Compare Outer Space Treaty, *supra* note 24, with *id.*

<sup>80</sup> Compare SPACE Act, *supra* note 76, with Outer Space Treaty, *supra* note 24, and Moon Treaty, *supra* note 39.

<sup>81</sup> See *Legal and Departmental Authorities of the Office of Space Commerce*, OFFICE OF SPACE COMMERCE, <https://www.space.commerce.gov/law/office-of-space-commercialization/> (last visited Sept. 30, 2019).

<sup>82</sup> See Sean Higgins, *Trump Makes Commerce Department the New Space Agency*, WASHINGTON EXAMINER (June 26, 2018), <https://www.washingtonexaminer.com/policy/economy/trump-makes-commerce-department-the-new-space-agency>.

<sup>83</sup> See OFFICE OF SPACE COMMERCE, *supra* note 81; SPACE Act, *supra* note 76.

<sup>84</sup> Adam Mann, *Space Cases: The Weirdest Legal Claims in Outer Space*, WIRED (June 1, 2012, 6:30 AM), <https://www.wired.com/2012/06/space-cases/>.

<sup>85</sup> *Id.*

<sup>86</sup> *Id.*

<sup>87</sup> *Id.*

<sup>88</sup> *Nemitz v. U.S.*, 2004 WL 3167042, \*1 (D. Nev. 2004), *aff'd sub nom*, *Nemitz v. NASA*, 126 Fed. App'x 343 (9th Cir. 2005).

whether or not a private citizen could own an asteroid.<sup>89</sup> Nemitz had filed an ownership claim for the asteroid Eros in an online registry for celestial land claims.<sup>90</sup> Nemitz claimed he wanted to mine the asteroid for its platinum, but NASA stated that Nemitz had no legal standing to claim ownership and his claim violated the 1967 Outer Space Treaty.<sup>91</sup> In 2015, the Ninth Circuit affirmed the district court's ruling that Nemitz was unable to prove actual ownership and did not have legal standing to claim ownership over the asteroid.<sup>92</sup> Despite his claim of ownership, Nemitz purchased the asteroid from a party that had no real legal claim to the property rights of the asteroid.<sup>93</sup> Furthermore, the distinction was made that Nemitz's claim came from Earth.<sup>94</sup> Nemitz had never been to the asteroid or even sent any form of probe to the asteroid.<sup>95</sup> Had Nemitz made physical contact with the asteroid, his property ownership claim would potentially have been seen as more legitimate by the court, under the SPACE Act of 2015.<sup>96</sup> However, as it stands, *Nemitz* is a clear instance of a U.S. court upholding the validity of provisions from within the Outer Space Treaty as binding on the United States and on a private U.S. citizen.<sup>97</sup>

The preceding review of international space agreements, analogous international agreements, and U.S. domestic space laws shows the need for an updated system of international laws that govern activities in space. While some nations have developed domestic laws to govern activities and property rights in space, there is no up-to-date international legal consensus on the issue. As activities in space become more commonplace, legal issues will inevitably arise.<sup>98</sup> This article will next discuss the problem at hand, analyze some of the various proposed solutions to establish an international legal framework that governs space, and propose a new solution that would

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<sup>89</sup> *Id.*

<sup>90</sup> *Id.*; Keay Davidson, *Final Frontier For Lawyers -- Property Rights In Space / Land Claims, Commercial Schemes and Dreams Have Legal Eagles Hovering*, SF GATE (Oct. 16, 2005, 4:00 AM), <https://www.sfgate.com/news/article/Final-frontier-for-lawyers-property-rights-in-2564610.php>. Ironically, Nemitz's claim was filed in an unofficial online registry for celestial lands that had been created solely by a law professor in an attempt to stir up discussion on this very topic – legal issues in space.

<sup>91</sup> See also Davidson, *supra* note 90.

<sup>92</sup> *Id.*

<sup>93</sup> *Id.*; *Nemitz*, 2004 WL 3167042, at \*1.

<sup>94</sup> See Blake Gilson, *Defending Your Client's Property Rights in Space: A Practical Guide for the Lunar Litigator*, 80 FORDHAM L. REV. 1367, 1391 (2011).

<sup>95</sup> *Id.*

<sup>96</sup> *Id.*; K.G. Orphanides, *American Companies Could Soon Mine Asteroids for Profit*, WIRE2, (Nov. 12, 2015), <https://www.wired.co.uk/article/how-to-mine-asteroids-for-fun-and-profit>.

<sup>97</sup> See *Nemitz*, 2004 WL 3167042, at \*1; see generally Outer Space Treaty, *supra* note 24.

<sup>98</sup> See *Timeline: 50 Years of Spaceflight*, *supra* note 41. See generally Mike Baker, *NASA Astronaut Anne McClain Accused by Spouse of Crime in Space*, N.Y. TIMES (Aug. 23, 2019), <https://www.nytimes.com/2019/08/23/us/nasa-astronaut-anne-mcclain.html> (discussing the first known crime committed in space).

establish temporary, renewable property rights overseen by an international tribunal.

### III. ANALYSIS

#### A. *The Cosmic Void of Adequate Regulation*

Despite a lack of recent, widely accepted international agreements on space-based activities, many people recognize the need for a better set of regulations, more honed to the circumstances of today's technological and economic environment. The most recent and widely recognized international agreement governing property rights in space is over fifty years old.<sup>99</sup> In those fifty years, the number of countries with the capability to send rockets into space has significantly grown and private actors have become involved.<sup>100</sup> The antiquated regulations that are intended to guide and restrict these modern day State and non-State actors are from a time long ago, when there were no private corporations sending rockets into outer space and the U.S. and the USSR were the only countries with space-based capabilities.<sup>101</sup>

One need not pick up a law school property book to know how important property rights are and how much people want to feel secure in what they own. Without property rights, there is little incentive to be first to a location. Furthermore, a lack of property rights will likely lead to high tensions between corporations, all vying for the same mineral rich deposits on celestial bodies.<sup>102</sup> While property rights are essential, and need to be further developed for space and celestial bodies, the laws and regulations over property rights in space must be designed in a way to prevent any discouragement of innovation and exploration.<sup>103</sup>

It is essential to address property rights on celestial bodies as the commercialization of space grows exponentially.<sup>104</sup> Furthermore, many State and non-State actors have indicated desires to colonize the Moon and Mars in the near future.<sup>105</sup> Currently, the only international regulations in

<sup>99</sup> See Outer Space Treaty, *supra* note 24.

<sup>100</sup> See *Timeline: 50 Years of Spaceflight*, *supra* note 41; see e.g., *About SpaceX*, SPACEX, <https://www.spacex.com/about>.

<sup>101</sup> See David Sarnacki, *Property Rights in Space: Asteroid Mining*, 2 TEX. A&M J. PROP. L. 123, 123 (2014); See *Timeline: 50 Years of Spaceflight*, *supra* note 41.

<sup>102</sup> See Sarnacki, *supra* note 101, at 138.

<sup>103</sup> *Id.* at 124.

<sup>104</sup> Jay Bennett, *One Chart Shows How Much SpaceX Has Come to Dominate Rocket Launches*, POPULAR MECHANICS (July 13, 2017), <https://www.popularmechanics.com/space/rockets/a27290/one-chart-spacex-dominate-rocket-launches/> (showing SpaceX's market share of space launches has gone from 5% in 2013 to 45% in 2017).

<sup>105</sup> See *Colonizing the Moon*, NASA, <https://sservi.nasa.gov/articles/colonizing-the-moon/> (last visited Oct. 11, 2019); Melia Robinson, *Elon Musk Wants to Colonize Mars with SpaceX – Here's What He Said It Will Be Like as One of the First Residents*, BUSINESS INSIDER (Mar. 11, 2018), <https://www.businessinsider.com/elon-musk-colonization-of-mars-sxsw-2018-3>.

place state that property cannot be owned.<sup>106</sup> Once colonies on celestial bodies start appearing and businesses start mining resources from celestial bodies, these regulations will be insufficient. State and non-State actors will likely demand some form of ownership rights over the property their colony is located on or over the resources they mined from celestial bodies. Without these property rights, a colony's right to the land it is located on will be undefined, and any mining of resources in space could be considered a violation of international treaties, which would significantly stifle the commercialization of space.<sup>107</sup>

*B. A Regulatory Black Hole: The Current State of Laws Governing Celestial Property*

Looking at how States claimed land during the Age of Exploration can help determine what has historically been recognized as a valid territorial claim.<sup>108</sup> During the Age of Exploration, States believed they could claim land if an explorer planted their flag on it.<sup>109</sup> The essential element here is the *planting of the flag*. It was understood that a physical presence was essential to being able to effectively assert rights over land. This sentiment should continue into today's practice with property on celestial bodies. While current treaties preempt and prohibit any land claims on celestial bodies, if an appropriate claim were to be made, it would surely require some form of physical presence there.<sup>110</sup>

Current U.N. treaties establish that States cannot claim sovereignty over, own property on, or exploit resources found on celestial bodies.<sup>111</sup> This poses serious problems regarding colonization rights and the ability to conduct commercial activities in space. Technically, according to the U.N. treaties, actors would have no valid legal claim of ownership over the land they settled and cultivated or the resources they mined.<sup>112</sup>

Consideration given to the ATS provides insight not only into a possible system that may work to regulate international activities on celestial bodies, but also to the flaws of the current system. While the ATS has been

<sup>106</sup> See Outer Space Treaty, *supra* note 24; Moon Treaty, *supra* note 39; Sarnacki, *supra* note 101, at 126.

<sup>107</sup> See Outer Space Treaty, *supra* note 24; Moon Treaty, *supra* note 39; Sarnacki, *supra* note 101, at 145.

<sup>108</sup> See Leslie I. Tennen, *Towards a New Regime for Exploitation of Outer Space Mineral Resources*, 88 NEB. L. REV. 794, 804 (2010); *Russia Plants Flag Under N. Pole*, *supra* note 12

<sup>109</sup> See Tennen, *supra* note 108; *Russia Plants Flag Under N. Pole*, *supra* note 12.

<sup>110</sup> See e.g. Outer Space Treaty, *supra*, note 24. As the saying goes, "possession is nine-tenths of the law." In order for any feasibly legitimate claim to be made over property on celestial bodies, especially if done in contradiction with international treaties, it is only reasonable to require to actor asserting ownership to possess the land prior to claiming ownership.

<sup>111</sup> See *id.*

<sup>112</sup> See *id.*; Moon Treaty, *supra* note 39.

effective in preventing armed conflicts from arising over Antarctica, it is nearly half a century old and certain issues have begun to arise that were not possibly foreseen at the time of its creation.<sup>113</sup> Similarly, the treaties governing activities in space are outdated and face numerous challenges when attempting to cope with the situations presented by the rapidly developing technology of today's society.<sup>114</sup> Updated treaties, on both outer space and Antarctica, could alleviate modern day problems by more directly addressing them.

U.S. domestic law has recently sought to encourage commercial endeavors in space and foster increased commercial activities.<sup>115</sup> U.S. lawmakers have passed laws, such as the SPACE Act of 2015, to help encourage these kinds of commercial developments and to adapt to the rapidly changing space industry.<sup>116</sup> Current U.S. law allows private actors to claim ownership over resources obtained from celestial bodies.<sup>117</sup> However, by doing so, the U.S. is in direct contradiction with the U.N. Outer Space Treaty and Moon Treaty.<sup>118</sup>

Unsurprisingly, as discussed above, U.S. case law on space-based activities is significantly limited. In *Nemitz v. NASA*, the Ninth Circuit ruled in favor of NASA, finding that Nemitz's ownership claim to an asteroid had no legal basis and that it was in violation of the Outer Space Treaty.<sup>119</sup> This case is a clear instance of U.S. courts upholding the validity of certain provisions from within the Outer Space Treaty as binding on the United States and on private U.S. citizens.<sup>120</sup> The court had stated that private citizens could not claim property rights to an asteroid.<sup>121</sup> However, the key distinction here is that the citizen had not made physical contact with the asteroid prior to his claim of ownership.<sup>122</sup> No cases have yet presented themselves where people have claimed ownership over celestial bodies with which they have made actual, physical contact.

One essential consideration when seeking to establish a legal system to govern activities in outer space is the different legal impact treaties have on public versus private actors. The terms of treaties can be negotiated by States, but private actors have historically been unable to take part in such negotiations.<sup>123</sup> Further, treaties bind only the States that sign onto and ratify

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<sup>113</sup> See Dodds, *supra* note 58.

<sup>114</sup> See e.g. Outer Space Treaty, *supra* note 24.

<sup>115</sup> See SPACE Act, *supra* note 76.

<sup>116</sup> *Id.*

<sup>117</sup> *Id.*

<sup>118</sup> See *id.*; Outer Space Treaty, *supra* note 24; Moon Treaty, *supra* note 39.

<sup>119</sup> *Nemitz*, 2004 WL 3167042, at \*2; Outer Space Treaty, *supra* note 24.

<sup>120</sup> See *Nemitz*, 2004 WL 3167042, at \*1; Outer Space Treaty, *supra* note 24 (stating that no party can claim ownership over any celestial body).

<sup>121</sup> *Nemitz*, 2004 WL 3167042, at \*1.

<sup>122</sup> *Id.*; Davidson, *supra* note 90.

<sup>123</sup> See States, Territories, and Governments, 1 HACKWORTH DIGEST OF INTERNATIONAL LAW ch. 2, §10, at 50. The American Instructions for the Geneva Convention stated that the U.S. did not mind the Red Cross being present but strictly did not want the Red Cross to have a

them,<sup>124</sup> but are not binding on nongovernmental actors.<sup>125</sup> As indicated by the increasing activities of private actors in outer space, it is essential that private actors be considered when creating a legal system for space-based activities and be bound by such a system.<sup>126</sup> On Earth, while current treaties do not bind private actors, the home nations of such actors are held responsible for the actions of these private parties. However, if a private actor were to come into possession of bountiful resources on a far-away celestial body, one that could potentially be enough to cripple the global economy,<sup>127</sup> it would be near impossible to hold the private actor accountable. Therefore, in order to head off potential legal challenges by private actors in the future, any proposed solution must be binding on both private and public actors alike.

Despite the U.S. attempting to encourage commercial activity in space and allowing resources to be claimed from space, there are still clear gaps in the regulations covering property rights in space. Furthermore, the conflicts between current U.S. law and international treaties makes clear that the international community at large is not entirely on the same page regarding property rights in space.<sup>128</sup> With the increasingly global economic environment and the rapidly growing commercialization of space, the problem still remains – are actors able to claim property rights on celestial bodies and over resources from those bodies?

### C. *Analyzing Previously Proposed Solutions to Govern Celestial Property*

While many recognize that property rights in space need to be delineated and adapted to the rapidly changing, privatizing, and commercializing space industry, few offer a solution. Many either fail to proffer a solution altogether or state that a solution should be determined, but

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vote in the convention, as it is not a sovereign State and therefore the treaty was not binding on it.

<sup>124</sup> See U.N. Committee on the Peaceful Uses of Outer Space, *supra* note 28.

<sup>125</sup> See HACKWORTH DIGEST OF INTERNATIONAL LAW, *supra* note 123, at 50; *see also* *Mars: We Are Not Alone* (National Geographic television broadcast Nov. 12, 2018). The second season of the National Geographic series *Mars* provides a fictional, dramatic rendition of an international cooperative colony on Mars and its interactions with a colony created by a private organization. The series also provides analysis from real world experts and players in the space industry, such as Neil DeGrasse Tyson and Elon Musk, to name a few. One of the most emphatic points made throughout the second season is the lack of power treaties and current international regulations have over private, non-public actors.

<sup>126</sup> See Yuhas, *supra* note 5.

<sup>127</sup> See Parnell, *supra* note 1; Shivali Best, *NASA Plans to Explore a \$10,000 Quadrillion Asteroid that Could Cause the World's Economy to Collapse*, DAILY MAIL (Jan. 18, 2017 3:15 AM), <https://www.dailymail.co.uk/sciencetech/article-4128582/Nasa-plans-explore-expensive-asteroid.html>. A large influx in precious metals, such as those contained in asteroids, could devastate the global economy and devalue currencies around the world.

<sup>128</sup> See *SPACE Act*, *supra* note 76; Outer Space Treaty, *supra* note 24.

at a later date.<sup>129</sup> Additionally, some of the solutions offered are based on old doctrines or on models currently in place that would be ineffectual on a large scale.

i. First in Possession

One option that has been offered as a possible legal solution is a new adaptation of an old system – the First In Possession Ownership Doctrine that was used during 17<sup>th</sup>, 18<sup>th</sup>, and 19<sup>th</sup> century exploration.<sup>130</sup> The First in Possession Ownership Doctrine is equivalent to the way European countries planted a flag and claimed all the land as their own. This doctrine gives ownership over property to the first person to arrive there and claim it.<sup>131</sup>

However, this solution fails to address a number of problems. Allowing first-in-possession ownership could create an instance where two actors have unknowingly (or knowingly) put in action plans to utilize the same celestial body.<sup>132</sup> In this case, this solution could lead to a waste of resources and hostilities if the second-to-arrive actor is not allowed to use the property on the celestial body the first actor has claimed.

Furthermore, this solution encourages speed.<sup>133</sup> While speed is important, actors must also take into account the safety of any manned travel being conducted. By encouraging speed and providing lifetime property rights to the first actor there, this solution could lead to dangerous shortcuts being taken, potentially resulting in harm and loss of life.<sup>134</sup>

Additionally, this solution does not address potential waste. Under the First In Possession Ownership Doctrine, if an actor uses the land for a certain amount of time after arriving but then its activities go dormant, that actor would still have perpetual rights to the property, despite it sitting idle.<sup>135</sup> Another actor, who failed to reach the property first, may have an actual, productive, ongoing use for that property, but this use may go unrealized and

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<sup>129</sup> See Hassan Safavi, *Legal Aspects of Settlement on the Moon and Mars*, 34 PROC. ON L. OUTER SPACE 85, 85-94 (1991); *Regulating Space: Innovation, Liberty, and International Obligations: Hearing before the Subcommittee on Space, H. Comm. on Science, Space, and Technology*, 115th Cong. (2017) (testimony of Laura Montgomery, Attorney and Sole Proprietor, Ground Based Space Matters, LLC) [*hereinafter* Regulating Space].

<sup>130</sup> Brandon C. Gruner, *A New Hope for International Space Law: Incorporating Nineteenth Century First Possession Principles into the 1967 Space Treaty for the Colonization of Outer Space in the Twenty-First Century*, 35 SETON HALL L. REV. 299, 355-57 (2004).

<sup>131</sup> *Id.*

<sup>132</sup> *But see id.*

<sup>133</sup> *Id.* at 344.

<sup>134</sup> *Id.*

<sup>135</sup> Brandon C. Gruner, *A New Hope for International Space Law: Incorporating Nineteenth Century First Possession Principles into the 1967 Space Treaty for the Colonization of Outer Space in the Twenty-First Century*, 35 SETON HALL L. REV. 299, 340 (2004).

the property may go to waste under the First In Possession Ownership Doctrine.

Finally, this proffered solution does not address what would qualify to establish first in possession ownership – if unmanned drones could establish such rights or if manned exploration and arrival is required.

## ii. Registration of Space Activities

Another potential solution is requiring the registration of all activities in space and on celestial bodies.<sup>136</sup> This solution relies on the belief that, if all actors know what each other are doing, they will avoid one another, preventing hostile disputes over rights to the same property.<sup>137</sup> However, this solution fails to recognize that the real issue is property rights, not that actors will be unaware of what others are doing. While space is expansive, there are only a limited number of easily accessible celestial bodies.<sup>138</sup> Therefore, it is impractical to believe that, simply because one party has registered activity on the nearest mineral-rich celestial body, another party will not attempt to exploit that deposit as well. This solution offers no adequate form of dispute resolution if the registration of activities is insufficient to preempt property rights conflicts from arising.<sup>139</sup>

## iii. Refining Old International Regulations Under A New International Governing Body

In *Transporting a Legal System for Property Rights: from the Earth to the Stars*, space law scholar Rosanna Sattler proposes creating a new international governing body with controlling jurisdiction to enforce a legal system over outer space activities.<sup>140</sup> Sattler appreciates the need to establish laws regulating property rights in space in order to “stimulate commercial enterprise on the [M]oon, asteroids, and Mars.”<sup>141</sup> Yet, while Sattler’s article artfully articulates the reasons a solution is needed and proposes a reasonable governing framework, it fails to propose and outline exactly what property rights would be enforced by this newly proposed international governing body.<sup>142</sup>

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<sup>136</sup> Regulating Space, *supra* note 129.

<sup>137</sup> See generally *id.*

<sup>138</sup> See ASTERANK, <http://www.asterank.com> (last visited Sept. 30, 2019); *Asteroid Mining: Potential Targets*, WIKIPEDIA, [https://en.wikipedia.org/wiki/Asteroid\\_mining#Potential\\_targets](https://en.wikipedia.org/wiki/Asteroid_mining#Potential_targets) (last updated Oct. 11, 2019).

<sup>139</sup> See Regulating Space, *supra* note 129.

<sup>140</sup> Rosanna Sattler, *Transporting a Legal System for Property Rights: from the Earth to the Stars*, 6 CHI. J. INT'L L. 23, 44 (2005).

<sup>141</sup> *Id.* at 27.

<sup>142</sup> *Id.* at 44.

## iv. Use It or Lose It

Wayne White Jr., attorney and CEO of aerospace and defense technology and services company SpaceBooster LLC, has written extensively on space law and property rights in space.<sup>143</sup> White has proposed a number of solutions for space property rights, most prominently that which would provide property rights for those who control and use the property.<sup>144</sup> While this solution ensures economic efficiency, with no property going claimed and unused, it fails to address exactly what is necessary to qualify as ‘using’ property and what jurisdiction would govern disputes between States.<sup>145</sup> White’s solution proposes only a “mini-treaty” and focuses on States passing domestic laws to govern their citizens.<sup>146</sup> Without an overarching international agreement, White’s solution could allow for States to enact conflicting domestic laws, which would likely lead to international uncertainty and conflict.

*D. A Better Solution – Temporary, Renewable Property Rights*

It is essential for both public and private actors to know where they stand legally when conducting activities in outer space. If actors do not know the legal status of their activities, it is discouraging. Therefore, an accepted legal framework over activities in outer space, and property rights on celestial bodies, must be established. All States should implement an internationally agreed upon system that presents a legal framework addressing: the need to provide assurance of the enforceability of property rights claims, the need to avoid the inequity seen during the time of global colonization, and the need to avoid potential waste through perpetual property rights. This article’s proposed system would combine elements of some of the previously offered solutions. It would seek to establish a legal framework governing space-based activities, while continuing to encourage exploration and innovation.

The key elements of this proposed solution are: ownership over harvested resources; temporary property rights to property, awarded to the first party to physically arrive at a location and claim it; renewable rights to the property after an certain time period, provided the property is being used and the rights of others are being respected; a delineated territorial boundary for such property right claims; international recognition of these property rights for land and resources on celestial bodies; regulations with equal effect

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<sup>143</sup> See e.g. Wayne White, *Nemitz vs. U.S., the First Real Property Case in United States Courts*, 47 PROC. ON L. OUTER SPACE 339, 349 (2004); Wayne N. White, Jr., *Implications of a Proposal for Real Property Rights in Outer Space*, 42 PROC. ON L. OUTER SPACE 366, 371 (1999); Wayne N. White, Jr., *Real Property Rights in Outer Space*, 40 PROC. ON L. OUTER SPACE 370, 380-81 (1997).

<sup>144</sup> White, Jr., *Real Property Rights in Outer Space*, *supra* note 142, at 380-81.

<sup>145</sup> *Id.*

<sup>146</sup> *Id.*

on private and public actors alike; and compulsory jurisdiction over space-based conflicts vested within an independent international tribunal.

This proposed system would use the first in possession doctrine in part, similar to how property rights were determined in the Age of Exploration, but would not create these rights in perpetuity, unlike in the past.<sup>147</sup> It would establish ownership rights for a set period of time, akin to how U.S. patent ownership rights are given – allowing for renewal at the end of the ownership period if the claim is still valid and being properly used.<sup>148</sup> This system would also use portions of the registration solution previously discussed;<sup>149</sup> however, unlike that solution, it would not merely require registration but would also vest property rights in actors. The proposed solution would also establish clear legal definitions regarding what exactly qualified as “use” of the property, in order to ensure there was no uncertainty or confusion by actors regarding if they would be able to renew their ownership rights.

Importantly, this proposed system would establish property rights over only limited portions of land and would not allow for wholesale claiming of entire celestial bodies. International law currently recognizes that a nation’s territorial boundaries extend 12 nautical miles offshore.<sup>150</sup> While there have been a number of disputes by bordering countries over the exact delineation of their own territorial waters,<sup>151</sup> an extensive legal framework and rulings by the ICJ have helped create an international consensus and prevented these disputes from escalating to the point of physical hostilities.<sup>152</sup> Similar territorial boundaries must be established for celestial bodies. Twelve nautical miles extending out may not be feasible, as some asteroids and celestial bodies are even smaller than that.<sup>153</sup> However, a certain territorial extension beyond established outposts on celestial bodies, the exact distance to be determined through international deliberation in the same way the 12 nautical mile boundary was reached,<sup>154</sup> will help prevent close encounters and contentious property disputes between competing parties. Therefore, this is an essential element of the proposed celestial property right regulation solution.

The most challenging, and the most important, aspect of any proposed system of regulations over space-based activities is the enforcement

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<sup>147</sup> See Gruner, *supra* note 130, at 355-57.

<sup>148</sup> *Patent FAQs*, USPTO, <https://www.uspto.gov/help/patent-help#patents>.

<sup>149</sup> See *Regulating Space*, *supra* note 129.

<sup>150</sup> See U.N. Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 3.

<sup>151</sup> See *e.g.* North Sea Continental Shelf Cases (Ger. v. Den. and Neth.), Judgment, 1969 I.C.J. 4 (Feb. 20). This was a dispute over territorial boundaries in the North Sea on the continental shelf, a resource rich area. Stark similarities can be drawn between the dispute between nations over resources in this case and potential future land disputes in outer space over resources.

<sup>152</sup> *Id.*

<sup>153</sup> See *Asteroids*, *supra* note 1.

<sup>154</sup> See United Nations Convention on the Law of the Sea, *supra* note 152, at art. 3.

of such regulations. In order to be effective and to have any impact on the actions of actors in outer space, it is essential that the system be internationally recognized. The most effective form of recognition would be in the form of a widely ratified U.N. treaty.<sup>155</sup> Decreased participation in international treaties over space-based activities shows why this is such a challenge – as their activities grow in scope, countries are increasingly reluctant to submit themselves to an international body to govern their activities in outer space.<sup>156</sup> However, without an international agreement, especially amongst the space powerhouse States,<sup>157</sup> any system of property rights will be ineffectual. In order to properly regulate property rights on celestial bodies, this proposed system of temporary property rights must be both widely ratified and overseen by an international governing body.

Further, the jurisdiction of the governing body over celestial property rights must be compulsory. In certain circumstances and treaties, compulsory arbitration or jurisdiction of the International Court of Justice (ICJ) is woven into the agreement.<sup>158</sup> In order for the proposed solution and regulation to be most effective, all parties to the treaty must submit to compulsory jurisdiction. Compulsory jurisdiction is most common in international agreements over things such as trade rights, and less common over agreements on things such as human rights.<sup>159</sup> This is due to the fact that international community can reciprocate the violation of trade agreements with in-kind retaliations.<sup>160</sup> However, this kind of retaliation is not as enticing, or not even possible, for violations of agreements over things such as human rights. Property rights on celestial bodies are more akin to trade rights, and the threat of in-kind retaliation should be enough to keep parties in line. A shining example of this is the Antarctic Treaty System, which has stood as an internationally recognized treaty preventing hostile territorial disputes for nearly fifty years.<sup>161</sup> However, in order to get States to agree to compulsory jurisdiction and to assuage any concerns States may have about giving up control of cases they are involved in to an international

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<sup>155</sup> See e.g. Outer Space Treaty, *supra* note 24; Moon Treaty, *supra* note 39. Most nations are willing to abide by the regulations set forth in the Outer Space Treaty, but few abide by the Moon Treaty as it has received nearly nonexistent support internationally.

<sup>156</sup> See generally Outer Space Treaty, *supra* note 24; Moon Treaty, *supra* note 39. Comparatively, very few countries are parties to the most recent U.N. treaty over space activities, and the treaty that most clearly regulates property rights in space.

<sup>157</sup> U.N. Committee on the Peaceful Uses of Outer Space, *supra* note 28.

<sup>158</sup> See e.g. *Introduction into the WTO Dispute Resolution System*, WTO, [https://www.wto.org/english/tratop\\_e/dispu\\_e/dispu\\_settlement\\_cbt\\_e/c1s3p3\\_e.htm](https://www.wto.org/english/tratop_e/dispu_e/dispu_settlement_cbt_e/c1s3p3_e.htm).

<sup>159</sup> *Id.*

<sup>160</sup> See generally *Current Foreign Retaliatory Actions*, INT'L TRADE ADMIN., [https://www.trade.gov/mas/ian/tradedisputes-enforcement/retaliations/tg\\_ian\\_002094.asp](https://www.trade.gov/mas/ian/tradedisputes-enforcement/retaliations/tg_ian_002094.asp) (Last visited October 10, 2019).

<sup>161</sup> See Leslie Hook & Benedict Mander, *The Fight to Own Antarctica*, FIN. TIMES (May 24, 2018), <https://www.ft.com/content/2fab8e58-59b4-11e8-b8b2-d6ceb45fa9d0>.

tribunal,<sup>162</sup> the proposed international tribunal would consist of five members, with one judge from each of the States that are a party to the litigation and the other three neutral judges selected jointly by the two States' judges.<sup>163</sup>

Any celestial property rights system must be internationally recognized and respected in order to be effective, and the most effective way to ensure the system is respected is in the same manner current agreements mentioned above are ensured – through the threat of compulsory jurisdiction, sanctions, and retaliation.

#### IV. CONCLUSION

Land is an indescribably precious resource, and a finite one. As Mark Twain once stated, “[b]uy land, they ain’t making any more of it.”<sup>164</sup> For this reason, for millennia, wars have been fought over land. Yet, since the late twentieth century and the establishment of the United Nations, nations have mostly been able to control their ambitions and disagreements, and there have been few wars over land. Most international disputes are currently resolved through negotiation and conversation instead of combat.<sup>165</sup> However, as people push into new territories, new laws must be established to maintain order and to deal with new, changing circumstances. Without a proper, comprehensive system in place to regulate outer space and activities on celestial bodies, it is entirely possible that off-planet disagreements could lead to actual hostilities and the interstellar environment could begin to become a lawless expanse akin to the Wild West.<sup>166</sup>

The commercialization of space travel is already upon us, and the exploration and colonization of celestial bodies is the inevitable next step. The internationally recognized space treaties of the mid-twentieth century are far outdated and ill-equipped to deal with the expansion of space travel and increased involvement of private corporate actors. While many people have recognized the need for appropriate regulation of space-based activities, most have simply discussed the issue and pushed it aside to be dealt with at a later

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<sup>162</sup> Concern over submitting to compulsory jurisdiction of an international tribunal was likely one of the factors resulting in the decline in participation in the Moon Treaty. *See generally* Moon Treaty, *supra* note 39.

<sup>163</sup> Non-state actors and private organizations would be represented on the tribunal by a judge from the country they are headquartered in.

<sup>164</sup> Douglas A. McIntyre, *Memo to Congress: “Buy Land, They Ain’t Making Any More Of It,”* TIME (Jan. 28, 2009), <http://content.time.com/time/business/article/0,8599,1874407,00.html>.

<sup>165</sup> Security Council and Mediation, UNITED NATIONS, <https://peacemaker.un.org/peacemaking-mandate/security-council> (last visited October 10, 2019).

<sup>166</sup> *See Wild West*, MERRIAM-WEBSTER <https://www.merriam-webster.com/dictionary/Wild%20West> (last visited September 30, 2019). The changing, unfamiliar environment in the western American frontier combined with a lack of effective legal framework resulted in it being known as the “Wild West.”

date. The United States government has taken some steps to address the issue and encourage domestic corporations to continue innovation and exploration, but this is an inadequate solution for an industry that will operate on an international scale and impact nations across the globe.<sup>167</sup>

The time is here to consider and implement laws and regulations to govern public and private international activities and land rights in space. Failure to consider the topic now could result in unregulated, unrestricted, unfathomable corporate activity and international animosity as parties try to lay claim to large swaths of celestial bodies while retroactively legislating property rights. The proposed system, allowing for temporary, renewable property rights to be claimed over small portions of land on celestial bodies, would allow actors to feel secure in their rights while preventing inequitable land grabbing. Only a system such as this can both provide adequate regulation and continue encouraging development and exploration. The United States should lead the charge to develop an internationally recognized framework for property rights on celestial bodies that governs State and nongovernmental actors alike.<sup>168</sup>

Therefore, the United States should propose a new international treaty establishing guidelines and an independent international organization. This organization would create and define temporary property rights of land on celestial bodies. It would be binding on both private and public parties alike, and the organization would establish a monitoring body to watch over these claims. This would provide assurances to those actors conducting commercial activities in space that their rights are secure, for a time, while avoiding perpetual property rights which could lead to inequity, waste, and land grabbing.

Ambition has long driven mankind. Whether it be to new heights, such as building a personal computer or landing on the Moon, or to unimaginable atrocities, such as seeking to expand territorial boundaries through unadulterated warfare or developing atomic weapons, ambition has been a driving force since the beginning. Now, ambition is driving both countries and companies to strive to be the first to do a variety of different things in outer space. In order to keep this ambition in check, and to prevent

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<sup>167</sup> National Space Policy of the United States of America, NAT'L AERONAUTICS AND SPACE ADMIN., [https://history.nasa.gov/national\\_space\\_policy\\_6-28-10.pdf](https://history.nasa.gov/national_space_policy_6-28-10.pdf) (last visited October 10, 2019).

<sup>168</sup> Based on its past experience with the United Nations, the United States should be eager to be one of the founding members of a system governing activities in space. As a founding member of the United Nations, the United States was granted a permanent seat on the Security Council, a vital power that many other countries were not given. *See generally History of the United Nations*, UNITED NATIONS, <https://www.un.org/en/sections/history/history-united-nations/> (last visited Sept. 30, 2019); *United Nations Security Council Current Members*, UNITED NATIONS, <https://www.un.org/securitycouncil/content/current-members> (last visited October 10, 2019). As a leader in the space industry, the United States could secure its own interests while furthering international cooperation by being a proponent and founder of a system governing activities in space.

it from creating hostile situations, certain guidelines must be established. When faced with such a wide-open frontier, only an international community united behind a common set of regulations can hold other parties back. Yet, it is imperative that such a system not be prohibitively restrictive, as a burdensome regulatory system is unlikely to last.

The proposed model that allows for temporary, renewable property rights to be granted over a limited territory on a first in possession basis strikes the perfect balance between the lawless Wild West and an overly restrictive junta. It crafts a system that encourages innovation and exploration while preventing stagnation, abuse, and monopolization. It creates a fair system that the international community should be willing to join, in which the community at large holds one another accountable through compulsory submission to a recognized international tribunal. And it ensures that the final frontier remains a lawful one.