

# United States International Legal Framework for Lunar Exploration and Resource Extraction

June 16 2020

In April and May 2020, the United States signaled its determination to press ahead with two major space policy objectives: establishing a permanent U.S. presence on the moon and authorizing private companies to mine the moon. An April mandate to authorize and encourage private lunar resource extraction, including through pursuing international agreements, was followed by a U.S.-drafted framework for bilateral moon exploration and mining agreements known as the “Artemis Accords.”<sup>1</sup> In May, NASA released draft principles intended to underpin the Artemis Accords (the “NASA Principles”). Reported potential partners for the envisaged agreements include Canada, Japan, the United Arab Emirates and members of the European Union. However, the actions of the Trump Administration suggest that it will take steps for the United States to return to the moon in 2024 with or without international cooperation or agreement.

The moon’s surface contains a significant volume of hydrogen and oxygen—used for rocket propellant—which could facilitate onward travel to deeper space. This would, in turn, assist access to asteroids and other space objects that contain enormous amounts of minerals like nickel, iron, platinum and cobalt.<sup>2</sup> Proponents claim these metals could be mined and extracted without many of the regulatory, environmental and human rights issues associated with terrestrial mining.<sup>3</sup>

Both government and private actors are exhibiting increasing interest in space mining. So far, only Luxembourg and the United States have passed laws authorizing private ownership of space resources,<sup>4</sup> but private companies in the United Kingdom<sup>5</sup> and

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<sup>1</sup> The framework is apparently named the “Artemis Accords” for its relationship to the U.S. “Artemis Program” for lunar exploration. *Trump administration drafts pact for mining on the moon*, THE GUARDIAN (May 5, 2020), <https://www.theguardian.com/science/2020/may/05/trump-mining-moon-us-artemis-accords>.

<sup>2</sup> Manish Pandey & Michael Baggs, *Why does President Trump want to mine on the Moon?*, BBC NEWS (Apr. 12, 2020), <https://www.bbc.com/news/newsbeat-52228423>.

<sup>3</sup> Andrew Wong, *Space mining could become a real thing – and it could be worth trillions*, CNBC (May 15, 2018), <https://www.cnbc.com/2018/05/15/mining-asteroids-could-be-worth-trillions-of-dollars.html>.

<sup>4</sup> Jeff Foust, *Luxembourg adopts space resources law*, SPACE NEWS (July 17, 2017), <http://spacenews.com/luxembourg-adopts-space-resources-law/>; 51 U.S.C. 10101, U.S. Commercial Space Launch Competitiveness Act (Nov. 25, 2015), <https://www.congress.gov/114/plaws/publ90/PLAW-114publ90.pdf>.

Canada,<sup>6</sup> among others, are developing asteroid mining technologies. In 2019, Russia invited Luxembourg to collaborate on space mining.<sup>7</sup> In addition, China has long expressed its intention to mine the moon, recently launching a next-generation spacecraft to increase its deep space exploration capacity.<sup>8</sup>

On April 6, 2020, President Trump issued an “Executive Order on Encouraging International Support for the Recovery and Use of Space Resources.” The Executive Order reaffirms the long-held U.S. position that the 1979 Moon Agreement—which the United States has neither signed nor ratified and which has 18 member countries<sup>9</sup>—does not represent customary international law.<sup>10</sup> The Moon Agreement provides that the moon and its resources are the “common heritage of mankind” and prohibits claims of ownership to those resources.<sup>11</sup> By contrast, the Executive Order rejects the concept that outer space is a “global commons” akin to international waters and other shared resources. It further states that the United States shall “encourage international support for the public and private recovery and use of resources in outer space” and directs the State Department to pursue a strategy of bilateral and multilateral agreements.<sup>12</sup> This statement goes further than the U.S. Commercial Space Launch Competitiveness Act, signed in 2015,<sup>13</sup> which provided for private ownership of “any asteroid resource or space resource” but did not expressly contradict the Moon Agreement.<sup>14</sup>

The Executive Order clarifies the U.S. position that it can lawfully support private extraction and use of resources on the moon, a position reaffirmed in the NASA

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<sup>5</sup> Guila Carbonaro, *UK’s first asteroid mining mission planned for 2021*, CGTN (Jan. 4, 2020), <https://newseu.cgtn.com/news/2020-01-04/UK-s-first-asteroid-mining-mission-planned-for-2021-MXr46n148o/index.html>.

<sup>6</sup> Sahar Fatima & Vince Morello, *Another giant leap for mankind*, CIM MAGAZINE (June 21, 2016), <https://magazine.cim.org/en/technology/another-giant-leap-for-mankind/>.

<sup>7</sup> Vladimir Soldatkin, *Russian wants to join Luxembourg in space mining*, REUTERS (Mar. 6, 2019), <https://www.reuters.com/article/us-luxembourg-ussiaspace/russia-wants-to-join-luxembourg-in-space-mining-idUSKCN1Q10Q>.

<sup>8</sup> Eric Berger, *China’s largest rocket takes flight with its next-generation spacecraft*, ARS TECHNICA (May 5, 2020), <https://arstechnica.com/science/2020/05/chinas-largest-rocket-takes-flight-with-its-next-generation-spacecraft/>.

<sup>9</sup> The current State Parties to the treaty are Armenia, Australia, Austria, Belgium, Chile, Kazakhstan, Kuwait, Lebanon, Mexico, Morocco, the Netherlands, Pakistan, Peru, the Philippines, Saudi Arabia, Turkey, Uruguay and Venezuela. *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, UNITED NATIONS TREATY COLLECTION (last updated May 15, 2020), [https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg\\_no=XXIV-2&chapter=24&clang=en](https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXIV-2&chapter=24&clang=en).

<sup>10</sup> Executive Order on Encouraging International Support for the Recovery and Use of Space Resources (“Executive Order”), (Apr. 6, 2020), <https://www.whitehouse.gov/presidential-actions/executive-order-encouraging-international-support-recovery-use-space-resources/>, Sec. 2.

<sup>11</sup> Moon Agreement, art. 11, paras. 1 and 3.

<sup>12</sup> Executive Order, Secs. 1, 3.

<sup>13</sup> 51 U.S.C. 10101, U.S. Commercial Space Launch Competitiveness Act (Nov. 25, 2015), <https://www.congress.gov/114/plaws/publ90/PLAW-114publ90.pdf>.

<sup>14</sup> *Id.*, Sec. 51303.

Principles. The NASA Principles indicate that NASA will require foreign space agencies to execute bilateral Artemis Accord agreements “grounded in the Outer Space Treaty of 1967”—a treaty which the United States has ratified—to participate in the U.S.-led Artemis Program for lunar exploration.<sup>15</sup> The NASA Principles make clear that exploitation of space resources “can and will be conducted under the auspices of the Outer Space Treaty.”<sup>16</sup> One of the core principles is that the extraction and use of lunar resources “will be critical to support safe and sustainable space exploration and development.”<sup>17</sup>

Yet, in spite of these representations, the U.S. position may be in tension not only with the Moon Agreement, but also with the Outer Space Treaty. The Outer Space Treaty prohibits “national appropriation” of “the Moon and other celestial bodies” by “claim of sovereignty.”<sup>18</sup> Scholars disagree on whether private ownership, use or sale of space resources would require a “claim of sovereignty.”<sup>19</sup> The NASA Principles’ reference to provisions of the Outer Space Treaty suggest that the United States may not view lunar mining as “national appropriation”, and that all future mining by the private sector will have to be authorized and supervised by countries, who will ultimately bear any legal liability under international law.<sup>20</sup>

Statements by the United States notably do not assert sovereignty over moon resources. The NASA Principles also suggest a U.S. strategy for lunar exploitation based on cooperation with like-minded countries rather than unilateral action. The NASA Principles call for full transparency between signatories, inter-operability of technology and full public disclosure of scientific data.<sup>21</sup> Further, the NASA Principles propose creating exclusive “safety zones” around moon bases to safely spread out mining operations and the protection of common “heritage sites” for historically important areas, which could include the Apollo landing site.<sup>22</sup> While this appears to be an effort to avoid allegations that the United States is claiming sovereignty over resources or historic lunar sites, privatization of moon resources will itself be contentious. For example, Russia condemned attempts to privatize space resources and characterized U.S.

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<sup>15</sup> *Artemis Accords: Principles for a Safe, Peaceful, and Prosperous Future*, NASA, <https://www.nasa.gov/specials/artemis-accords/index.html>.

<sup>16</sup> *Id.*

<sup>17</sup> *Id.*

<sup>18</sup> Outer Space Treaty, art. II.

<sup>19</sup> See Andrew Lintner, “Extraterrestrial Extraction: The International Implications of the Space Resource Exploration and Utilization Act of 2015,” *THE FLETCHER FORUM OF WORLD AFFAIRS* 40:2, 144-48 (2016) (discussing varying possible interpretations of the Outer Space Treaty’s applicability to space mining).

<sup>20</sup> *Id.* (citing Articles II, VI, and XI of the Outer Space Treaty).

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

<sup>22</sup> *Id.*

lunar mining plans as an “invasion.”<sup>23</sup> Recently, seven Canadian space law experts advised their government to treat space resources as a “global commons” rather than the U.S. approach.<sup>24</sup>

The United States is poised to take several steps to advance its lunar exploration. On April 30, 2020, when announcing the award of Artemis Program spacecraft contracts to three American companies, NASA administrator Jim Bridenstine stated that initial U.S. missions to the moon may not involve the previously planned multilateral “lunar gateway” project for establishing an international presence in lunar orbit.<sup>25</sup> On May 6, 2020, Bridenstine said that the United States may premise participation in the Artemis Program on other countries adopting certain “norms of behavior” in space.<sup>26</sup> Indeed, the recently released NASA Principles appear to be a U.S.-led effort to codify these norms. NASA will hope that the public/private collaboration that resulted in SpaceX’s Crew Dragon carrying NASA astronauts to the International Space Station at the end of May can also help meet the United States’ lunar ambitions, and it has already contracted with SpaceX, Blue Origin and Dynetics to produce lunar landers.<sup>27</sup>

As the United States takes forward these initiatives, it may develop, test, and strain elements of the existing international legal regime. The United States’ position creates potential opportunities and risks for private entities. If the United States pushes ahead without international consensus as to the relevant international legal framework, other countries may refuse to recognize certain of the rights it grants to private entities. Without collaboration, different countries may award the same permissions or rights to entities within their own jurisdiction. At the same time, the determination of the United States and other countries to push the multilateral discussion forward will not only speed up the potential for private involvement in space activities, but may also increase certainty by creating multilateral consensus on some of the more contentious questions and gaps in the current legal framework in a manner that is fit for purpose.

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Please do not hesitate to contact us with any questions.

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<sup>23</sup> Marc Bennetts, *US plan for moon mining is like Iraq invasion, says Russia*, THE TIMES (May 10, 2020), <https://www.thetimes.co.uk/article/us-plan-for-moon-mining-is-like-iraq-invasion-says-russia-sqgvpvqvt>.

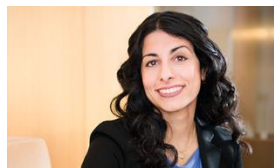
<sup>24</sup> Steven Chase, *Canada urged not to endorse U.S. approach to space mining*, THE GLOBE AND MAIL (Apr. 19, 2020), <https://www.theglobeandmail.com/canada/article-canada-urged-not-to-endorse-us-approach-to-space-mining/>.

<sup>25</sup> Kenneth Chang, *NASA Picks Moon Lander Designs by Elon Musk and Jeff Bezos Rocket Companies*, N.Y. TIMES (Apr. 30, 2020), <https://www.nytimes.com/2020/04/30/science/nasa-moon-lander.html>.

<sup>26</sup> Jeff Foust, *Bridenstine ties international cooperation on Artemis to norms of behavior in space*, SPACE NEWS (May 6, 2020), <https://spacenews.com/bridenstine-ties-international-cooperation-on-artemis-to-norms-of-behavior-in-space/>.

<sup>27</sup> Kenneth Chang, *NASA Picks Moon Lander Designs by Elon Musk and Jeff Bezos Rocket Companies*, N.Y. TIMES (Apr. 30, 2020), <https://www.nytimes.com/2020/04/30/science/nasa-moon-lander.html>.

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