



**Comments of  
TechFreedom**

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**In the Matter of  
Non-Interference of Lunar Activities  
Lunar Non-Interference Questionnaire  
NASA Office of Technology, Policy, and Strategy (OTPS)**

Submitted

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## INTRODUCTION AND BACKGROUND

TechFreedom files these comments in response to the “Lunar Non-Interference Questionnaire” (Questionnaire) issued by NASA’s Office of Technology, Policy, and Strategy (OTPS).<sup>1</sup> In this Request for Information (RFI), NASA seeks input on defining the terms “interference,” “contamination,” and “deconfliction” as they relate to lunar activities.<sup>2</sup> The goal is to “support NASA strategic decision-making on the protection needed for lunar activities.”<sup>3</sup>

The question of how operations can be conducted on the Moon in ways that don’t interfere with others is vital if we are to avoid diplomatic disputes or physical retaliation as lunar operations begin to proliferate. The questions presented represent complex legal issues that are not adequately addressed in the RFI. These comments focus on the legal underpinnings of “interference,” “contamination,” and “deconfliction,” and why an understanding of the legal, not technical, nature of these terms is vital. We further address NASA’s role in developing norms for outer space activities, and how this RFI fits into the larger story of American leadership in space. Because the RFI lacks any real legal explanation of the terms for which definitions are being sought from the scientific and technical community, the results of this exercise may not be helpful in actually developing an approach to avoiding harmful interference on the Moon. As part of this process, therefore, NASA should seek out and integrate the input from space law scholars and practitioners, who can provide much-needed context to the issues outlined in the RFI.

Founded in 2010, TechFreedom is a nonprofit think tank dedicated to promoting the progress of technology that improves the human condition. To this end, we seek to advance public policy that makes experimentation, entrepreneurship, and investment possible, and thus unleashes the ultimate resource: human ingenuity. Wherever possible, we seek to empower users to make their own choices online and elsewhere.

TechFreedom, and the undersigned author, have almost 40 years’ experience in outer space law and policy. A short list of our work includes:

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<sup>1</sup> See NASA Press Release, *OTPS seeks input from lunar community to inform a framework for further work on non-interference of lunar activities* (May 8, 2024), <https://www.nasa.gov/organizations/otps/otps-seeks-input-from-the-lunar-community-to-inform-a-framework-for-further-work-on-non-interference-of-lunar-activities/> (RFI). OTPS has set the response date as June 7, 2024.

<sup>2</sup> *Id.*

<sup>3</sup> *Id.*

- Prior Comments to NASA on its Technology Shortfalls;<sup>4</sup>
- Prior Comments to NASA on its Moon to Mars Objectives;<sup>5</sup>
- Testimony before the House and Senate on space issues;<sup>6</sup>
- Amicus briefs in key court cases related to outer space law and policy;<sup>7</sup>
- Law review and scholarly articles addressing key issues of space law;<sup>8</sup>

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<sup>4</sup> Comments of TechFreedom on Technology Shortfalls for NASA Space Technology Mission Directorate (STMD) (May 13, 2024), <https://techfreedom.org/wp-content/uploads/2024/05/TechFreedom-Technology-Shortfalls-for-NASA-Space-Technology-Mission-Directorate-May-13-2024.pdf>.

<sup>5</sup> Comments of TechFreedom on Moon to Mars Objectives (June 3, 2022), <https://techfreedom.org/wp-content/uploads/2022/06/TechFreedom-Comment-Moon-to-Mars-6-3-22.pdf>.

<sup>6</sup> *Continuing U.S. Leadership in Commercial Space at Home & Abroad: Hearing Before the H. Comm. on Space, Sci., & Tech.*, 118th Cong. (2023), <https://techfreedom.org/wp-content/uploads/2023/07/Space-Governance-Testimony-July-13-2023.pdf>; *Reopening the American Frontier: Exploring How the Outer Space Treaty Will Impact American Commerce and Settlement in Space: Before the S. Comm. on Commerce, Sci., & Transp. Subcomm. on Space, Sci., & Competitiveness*, 115th Cong. (2017) (written testimony of James E. Dunstan & Berin Szóka), <https://www.commerce.senate.gov/services/files/A9AD88B2-9636-4291-A5B0-38BC0FF6DA90> (for video of the hearing, see *Reopening the American Frontier: Exploring How the Outer Space Treaty Will Impact American Commerce and Settlement in Space*, U.S. SENATE COMMITTEE ON COMMERCE, SCIENCE, & TRANSPORTATION (May 23, 2017), <https://www.commerce.senate.gov/2017/5/reopening-the-american-frontier-exploring-how-the-outer-space-treaty-will-impact-american-commerce-and-settlement-in-space>).

<sup>7</sup> Brief for TechFreedom as Amicus Curiae Supporting Fed. Commc'ns Comm'n, *The International Dark-Sky Association, Inc. v. Fed. Commc'ns Comm'n*, No. 22-1337 (D.C. Cir. Ct. App. 2023), <https://techfreedom.org/wp-content/uploads/2023/06/TF-22-1337-International-Dark-Sky-Association-Inc.-v.-FCC.pdf>; Brief for TechFreedom as Amicus Curiae Supporting Respondent, *Viasat, Inc. v. Fed. Commc'ns Comm'n*, 47 F.4th 769 (D.C. Cir. 2022) (No. 21-1123), <https://techfreedom.org/wp-content/uploads/2021/09/File-Stamped-TechFreedom-Amicus-Brief-Viasat-v-FCC.pdf>.

<sup>8</sup> See J. Dunstan, *Regulating Outer Space: Of Gaps, Overlaps, and Stovepipes*, THE CENTER FOR GROWTH AND OPPORTUNITY (July 10, 2023), <https://www.thecgo.org/research/regulating-outer-space-of-gaps-overlaps-and-stovepipes/>; J. Dunstan, "Space Trash: Lessons Learned (and Ignored) from Space Law and Government," 39 J. SPACE L. 23 (2013); J. Dunstan, *Toward a Unified Theory of Space Property Rights*, in SPACE: THE FREE-MARKET FRONTIER (2002); J. Dunstan et al., *The Geostationary Orbit: Legal, Technical and Political Issues Surrounding Its Use in World Telecommunications*, 16 CASE WEST. RESERVE J. INT. L. 223 (1984).

- Presentations at scientific conferences on outer space law and policy, including on issues related to orbital debris;<sup>9</sup>
- Comments in agency proceedings on a variety of space-related issues;<sup>10</sup>
- Submissions to Congress and the White House on key space law and policy issues;<sup>11</sup>

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<sup>9</sup> J. Dunstan & Bob Werb, *Legal and Economics Implications of Orbital Debris Removal: Comments of the Space Frontier Foundation*, DARPA Orbital Debris Removal (ODR) Request for Information for Tactical Technology Office (TTO), DARPA-SN-09-68 (Oct. 30, 2009); J. Dunstan et al., *Doing Business in Space: This Isn't Your Father's (or Mother's) Space Program Anymore*, SPACE MANUFACTURING 13 (2001); J. Dunstan, *Earth To Space: I Can't Hear You; Selling Off Our Future To The Highest Bidder*, Space Manufacturing 11 (1997); J. Dunstan, *Generating Revenues in Space: Challenging Some of the Economic Assumptions of Space Exploitation*, Proceedings of the NASA Symposium on Lunar Bases and Space Professional Activities in the 21st Century (Apr. 1988).

<sup>10</sup> TechFreedom has commented in matters such as: Space Innovation & Facilitating Capabilities for ISAM, IB Docket Nos. 22-271 & 22-272 (Apr. 29, 2024), <https://techfreedom.org/wp-content/uploads/2024/04/TechFreedom-FCC-ISAM-Comments.pdf>; Revision of the Big LEO Spectrum Sharing Plan, RM-11975 (Apr. 25, 2024), <https://techfreedom.org/wp-content/uploads/2024/04/TechFreedom-Comments-SpaceX-Petition-1-6-GHz.pdf>; Mitigation Methods for Launch Vehicle Upper Stages on the Creation of Orbital Debris, Docket No. FAA-2023-1858 (Dec. 22, 2023), <https://techfreedom.org/wp-content/uploads/2023/12/TechFreedom-comments-Mitigation-Methods-for-Launch-Vehicle-Upper-Stages-on-the-Creation-of-Orbital-Debris-12-22-23.pdf>; Development of a National Spectrum Strategy, Docket No. NTIA-2023-0003 (Apr. 17, 2023), <https://techfreedom.org/wp-content/uploads/2023/04/Comment-NTIA-RFC-4-17-23.pdf>; National Science and Technology Strategy for U.S. Activities in Cislunar Space (July 20, 2022), <https://techfreedom.org/wp-content/uploads/2022/07/TechFreedom-Comment-OSTP-Cislunar-Economy-7-20-22.pdf>; Allocation of Spectrum for Non-Federal Space Launch Operations, ET Docket No. 13-115 (Sept. 10, 2021), <https://techfreedom.org/wp-content/uploads/2021/09/TechFreedom-Reply-Comments-13-115-9-10-21.pdf> (allocation of spectrum for non-federal space launches); Letter from TechFreedom to Fed. Comm'ns Comm'n (Nov. 2, 2020), <https://techfreedom.org/wp-content/uploads/2021/03/TechFreedom-Letter-to-FCC-11-2-20.pdf> (warning of danger of FCC granting "market access" to a company proposing very large satellites and licensed by a government (Papua New Guinea) which is not a signatory to the Liability Convention).

<sup>11</sup> Comments of TechFreedom on OSTP Request for Comment on National Orbital Debris Research and Development Plan, 86 Fed. Reg. 61335 (Dec. 31, 2021), <https://techfreedom.org/wp-content/uploads/2022/01/TechFreedom-Comments-OSTP-Orbital-Debris-Strat-Plan.pdf>; Letter from TechFreedom to S. Subcomm. on Space & Sci. (July 21, 2021), <https://techfreedom.org/wp-content/uploads/2021/07/Letter-to-Senate-Space-Subcommittee-7-21-21.docx-1.pdf> (concerning the loophole of allowing U.S. companies to get "flag of convenience" licenses from foreign jurisdictions).

We are therefore well-versed in issues related to space law and policy and welcome the opportunity to comment on OTPS's request for input related to a "framework for further work on non-interference of lunar activities."<sup>12</sup>

## **I. The RFI Questionnaire Lacks the Necessary Framing and Context to Produce Useful Results**

The Questionnaire asks for input on four broad topics:

- 1) Definitions of the key terms "interference," "contamination," and "deconfliction";
- 2) Understanding the Potential Value of a Site;
- 3) Impacting the Potential Value of a Site; and
- 4) Mitigation Mechanisms.<sup>13</sup>

From there, "OTPS intends to use the responses to these questions to inform the development of a framework for future work."<sup>14</sup> But beyond that, the RFI provides virtually no context or other framing to assist those seeking to comment. Read in a vacuum, responses are sure to vary considerably, and will lack any guideposts. For example, the Questionnaire asks: "What attributes/characteristics are relevant to site selection in consideration of science objectives?"<sup>15</sup> It goes on to ask: "What human or robotic actions/events may negatively impact the value of a lunar site?"<sup>16</sup> If I'm a lunar scientist studying, for example, the depth at which water deposits exist at the lunar poles,<sup>17</sup> my response would be that no activities can be conducted on or near where I wish to study, because such activities could impact the results of my experiment. Conversely, if my lunar activity of choice is to gobble up hectares of regolith to extract commercially profitable amounts of Helium-3,<sup>18</sup> then I don't much care if others are engaged in activities within my vicinity (so long as they're not

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<sup>12</sup> See RFI, *supra* note 1.

<sup>13</sup> *Id.*

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

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

<sup>17</sup> See, e.g., Tathagata Chakraborty et al., *On the Reachability and Genesis of Water Ice on the Moon*, 211 ISPRS J. PHOTOGRAMMETRY REMOTE SENSING 392, 392 (May 2024), <https://www.sciencedirect.com/science/article/pii/S0924271624000935>.

<sup>18</sup> DENNIS WINGO, MOONRUSH: IMPROVING LIFE ON EARTH WITH THE MOON'S RESOURCES 69 (2004) ("It would take about 30 tons a year of helium-3 (assuming the reactors were designed, built and up and running) to provide all of the energy needs of the United States. That is in contrast to the several *billions* barrels of oil that we use per year to generate electricity and there would be zero CO<sub>2</sub> pollution as well.") (emphasis in original).

physically in my way as I chew up regolith). And if I’m fundamentally opposed to any commercial activity on the Moon,<sup>19</sup> then my response will be that any *commercial* activity will create “contamination,” and must be outlawed completely, or at least highly restricted and heavily regulated.<sup>20</sup>

Finally, and critically, the RFI does not even mention the concept of, let alone seek input on, “safety zones” of operations, which are at the heart of this issue. As discussed more fully below, much of the RFI is guided by concepts adopted in the Artemis Accords.<sup>21</sup> Specifically, Section 11, paragraph 6 of the Artemis Accords states:

The Signatories intend to use their experience under the Accords to contribute to multilateral efforts to further develop international practices, criteria, and rules applicable to the definition and determination of safety zones and harmful interference.<sup>22</sup>

Section 11, paragraph 7 goes on to specify “principles related to safety zones.”<sup>23</sup> Are safety zones part of this discussion, or are responders supposed to craft their own ideas of

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<sup>19</sup> See, e.g., Frank Tavares, *Ethical Exploration and the Role of Planetary Protection in Disrupting Colonial Practices* (Planetary Science and Astrobiology Decadal Survey, White Paper 2020), <https://arxiv.org/pdf/2010.08344> (“Violent colonial practices and structures—genocide, land appropriation, resource extraction, environmental devastation, and more—have governed exploration of Earth, and if not actively dismantled, will define the methodologies and mindset we carry forward into space exploration. It is critical that ethics and anticolonial practices are a central consideration of planetary protection. We must actively work to prevent capitalist extraction on other worlds, respect and preserve their environmental systems, and acknowledge the sovereignty and interconnectivity of all life.”).

<sup>20</sup> See, e.g., Marko Filižović and ShahrYar Mahmoud Sharei, *The U.N. Needs to Form a Parliament to Regulate Space Mining*, SPACENEWS (May 13, 2024), <https://spacenews.com/the-un-needs-form-parliament-regulate-space-mining/>.

<sup>21</sup> NASA, THE ARTEMIS ACCORDS: PRINCIPLES FOR COOPERATION IN THE CIVIL EXPLORATION AND USE OF THE MOON, MARS, COMETS, AND ASTEROIDS FOR PEACEFUL PURPOSES (2020), <https://www.nasa.gov/wp-content/uploads/2022/11/Artemis-Accords-signed-13Oct2020.pdf?emrc=653a00> [hereinafter Artemis Accords].

<sup>22</sup> *Id.* § 11, ¶ 6.

<sup>23</sup> *Id.* § 11, ¶ 7 (“The Signatories intend to observe the following principles related to safety zones: (a) The size and scope of the safety zone, as well as the notice and coordination, should reflect the nature of the operations being conducted and the environment that such operations are conducted in; (b) The size and scope of the safety zone should be determined in a reasonable manner leveraging commonly accepted scientific and engineering principles; (c) The nature and existence of safety zones is expected to change over time reflecting the status of the relevant operation. If the

“mitigation mechanisms” that do not contemplate formal safety zones, as contemplated in the Artemis Accords?

Context matters, and here the legal framing of these issues is critical.

**A. Concepts of Non-Interference and Contamination Stem from the 1967 Outer Space Treaty**

The starting point of any legal analysis related to outer space must be the international treaty regime. Article IX of the 1967 Outer Space Treaty (OST) sets forth three critical concepts: “due regard,” “contamination,” and “interference.”

In the exploration and use of outer space, including the Moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of cooperation and mutual assistance and shall conduct all their activities in outer space, including the Moon and other celestial bodies, with *due regard to the corresponding interests* of all other States Parties to the Treaty. States Parties to the Treaty shall pursue studies of outer space, including the Moon and other celestial bodies, and conduct exploration of them so as to avoid their *harmful contamination* and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose. If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the Moon and other celestial bodies, would cause potentially *harmful interference* with activities of other States Parties in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the Moon and other celestial bodies, would cause potentially *harmful interference* with activities in the peaceful exploration and use of outer space, including the Moon and

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nature of an operation changes, the operating Signatory should alter the size and scope of the corresponding safety zone as appropriate. Safety zones will ultimately be temporary, ending when the relevant operation ceases; and (d) The Signatories should promptly notify each other as well as the Secretary-General of the United Nations of the establishment, alteration, or end of any safety zone, consistent with Article XI of the Outer Space Treaty.”).



other celestial bodies, may request consultation concerning the activity or experiment.<sup>24</sup>

Article IX must be read in conjunction with, and not as overriding, two other core concepts in the Outer Space Treaty. First, OST Article I, states:

Outer space, including the Moon and other celestial bodies, ***shall be free for exploration and use*** by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.<sup>25</sup>

Second, OST Article II 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>26</sup>

Indeed, one can argue that Articles I and II take precedence, and Article IX is subordinate. This is because Articles I and II are self-executing: they lay out clear statements of international law which do not require further domestic legislation to implement.<sup>27</sup> What, after all, would domestic legislation look like were it necessary to implement Articles I and II? Is Congress required to say, “we agree that outer space is free to explore or use” (as relates to Article I), or “we agree with Article II and won’t claim ownership of a celestial body” (as relates to Article II)? At most, such language would merely recite that Congress intends to pass no law which would result in an abrogation of either Article I or Article II. Or, as it did

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<sup>24</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies Art. IX, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty] (emphasis added).

<sup>25</sup> *Id.* at Art. I (emphasis added).

<sup>26</sup> *Id.* at Art. II.

<sup>27</sup> See *Medellin v. Texas*, 552 U.S. 491, 519 (2008); see also Brian Bozzo, *Not Because It Is Easy: Exploring National Incentives for Commercial Space Exploration Through a Geopolitical Lens*, 11 DREXEL L. REV. 597, 614-615 (2019) (“Additionally, Article II’s discussion of sovereign appropriation and Article VI’s description of “continuing supervision” impose ambiguous burdens on the United States, leaving additional freedom for the United States and other signatories to the Outer Space Treaty to determine the nature and degree of their oversight.”). *But see* Laura Montgomery, *US Regulators May Not Prevent Private Space Activity on the Basis of Article IV of the Outer Space Treaty* (Mercatus Working Paper, Mercatus Center at George Mason University, 2018) (in which the author argues that Article I may not be self-executing).

with regard to mining asteroids, Congress might merely explain why its domestic legislation is consistent with U.S. treaty obligations<sup>28</sup>

Article IX, on the other hand, clearly requires both domestic legislation and international agreement to put the necessary meat on the bones of terms such as “due regard,” “contamination,” and “interference.” And those terms, in turn, must be interpreted within the larger context of the freedom accorded under Article I to “explore and use”<sup>29</sup> outer space, so long as those activities do not result in the *de facto* appropriation of a portion of a celestial body, or cause interference to the legally cognizable rights of others “to use” outer space.

For example, say that Country A establishes a base on the rim of Shackleton Crater, near one of the areas allowing for easiest access to the water deposits in the permanently shadowed regions (PSRs) below the rim. Country A further claims a non-interference (safety) zone around its encampment which effectively denies access to the PSRs below, arguing that anyone working within that zone might cause damage to Country A’s facilities and equipment.<sup>30</sup> How should such a claim be evaluated? Should the claim of an expansive non-interference zone be balanced against the fact that such a zone could exclude others from the opportunity to “explore and use” the PSR below Shackleton’s rim? Should it make a difference whether the proposed conflicting use was based on a desire to conduct science or whether it involved commercially using the water found in the PSR? And could such a safety zone effectively become the equivalent of an appropriation of that area in violation of Article II of the OST?<sup>31</sup>

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<sup>28</sup> See *infra* Section II.E, related to Congress’s passage of Space Resource Exploration and Utilization Act of 2015, 51 U.S.C. §§ 51301-51303 (2015), and its relationship to Article II of the Outer Space Treaty.

<sup>29</sup> One can argue that “and use” might be the most important two words in outer space law. See, e.g., J. Dunstan, *Toward a Unified Theory of Space Property Rights*, in *SPACE: THE FREE-MARKET FRONTIER* (CATO Institute, 2002) (“The good news is that the Outer Space Treaty contains a number of provisions that protect the interests of private individuals and their activities in space. Article I makes clear, for instance, that both the exploration *and use* of outer space shall be free of restraint and discrimination, and that there shall be free access to all parts of space.”) (emphasis in original) (citations omitted).

<sup>30</sup> Keep in mind that Article IV of the Outer Space Treaty protects the equipment of each spacefaring country, as well as individuals engaged in space activities. “The use of any equipment or facility necessary for peaceful exploration of the Moon and other celestial bodies shall also not be prohibited.” Outer Space Treaty, *supra* note 24, Art. IV.

<sup>31</sup> See, e.g., Inesa Kostenko, *Artemis Accords and the Future of Space Governance: Intentions and Reality*, 8 *ADVANCED SPACE L.* 40, 46 (2021) (“However, the question arises whether the security

Fundamentally, these are legal and diplomatic issues, not technical ones. So, while NASA may seek input from the “scientific or technical community,” as it is doing with its questionnaire, it is the lawyers and diplomats who must develop the legal and international norms and agreements that will shape lunar development. Ignoring the key legal issues, therefore, will render the output of this exercise of little use or consequence.

**B. The Artemis Accords Are Neither International Nor Domestic Law and Convey No Additional Authority to NASA to Make U.S. Policy**

The Artemis Accords<sup>32</sup> provide some language related to non-interference. Section 11 of the Accords begins by invoking Article IX:

Consistent with Article IX of the Outer Space Treaty, a Signatory authorizing an activity under these Accords commits to respect the principle of due regard. A Signatory to these Accords with reason to believe that it may suffer, or has suffered, harmful interference, may request consultations with a Signatory or any other Party to the Outer Space Treaty authorizing the activity.<sup>33</sup>

But before NASA invokes the Artemis Accords as providing it authority to develop a non-interference framework, and specifically to introduce the notion of “deconfliction,”<sup>34</sup> we must understand what the Artemis Accords are, their legal status, and whether they provide

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zones will not turn into attempts to establish national sovereignty on celestial bodies or their occupation, which is prohibited by Art. 2 of the Space Treaty. After all, in practice, there may be a situation where Entity 1 establishes an appropriate security zone in a part of a celestial body, in which case the free access of Entity 2 to that part may be regarded by Entity 1 as a harmful interference with its use of outer space. At the same time, Entity 1 can, in practice, engage in space activities in the same area of the celestial body for a long time, building the necessary infrastructure for the life and work of its personnel.”).

<sup>32</sup> Artemis Accords, *supra* note 21.

<sup>33</sup> *Id.* § 11, ¶ 3.

<sup>34</sup> Clearly, the RFI recognizes the Artemis Accords as governing NASA’s activities. “Deconfliction has been identified as an area of further work in Section 11 of the Artemis Accords and will be an area of increasing importance as the number of commercial and international actors operating on the lunar surface grows.” See RFI, *supra* note 1. It concludes that “[t]his questionnaire aims to contribute to the development of a framework for further deconfliction activity.” *Id.* To do this, the RFI requests commenters provide a definition of “deconfliction.” *Id.* The problem is that the term “deconfliction” itself does not appear in the international treaty regime, only within the Artemis Accords. As such, there is no reason to believe that any U.S. input into defining “deconfliction” will have any impact on crafting international norms, given that the Artemis Accords themselves, while representing a broad set of bilateral partners, are not an international agreement.

NASA with any additional statutory authority to create the contemplated non-interference framework.

The Artemis Accords are a set of bilateral agreements (now with 42 signatories) that set forth agreement by the signatories as to how the Artemis Program will be implemented. Technically, they relate only to the specific activities which are contemplated by the United States, with its international partners, to return humans to the surface of the Moon. The Accords are an important document. But the Artemis Accords do not constitute international law or create any real international norms. The Accords are not a treaty.<sup>35</sup> The Accords are not even U.S. domestic law. Congress never codified them. They are, at most, what their words say they are: “a practical set of principles, guidelines, and best practices to enhance the governance of the civil exploration and use of outer space with the intention of advancing the Artemis Program.”<sup>36</sup> And the Accords themselves contain no enforcement mechanisms. Instead, “[t]he Signatories intend to implement the principles set out in these Accords through their own activities by taking, as appropriate, measures such as mission planning and contractual mechanisms with entities acting on their behalf.”<sup>37</sup>

As such, the Artemis Accords provide no new authority to NASA to implement their provisions.

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<sup>35</sup> See, e.g., Artemis Accords, *supra* note 21, § 13, ¶ 2 (“The Government of the United States of America will maintain the original text of these Accords and transmit to the Secretary-General of the United Nations a copy of these Accords, which is not eligible for registration under Article 102 of the Charter of the United Nations, with a view to its circulation to all the members of the Organization as an official document of the United Nations.”). Article 102 of the U.N. Charter is the mechanism by which treaties are formally adopted by the U.N. A recognition in the Artemis Accords that they are not eligible for registration under Article 102 is a clear understanding that they do not constitute an international treaty. Balázs Bartóki-Gönczy & Boldizsár Nagy, *Introductory Note to the Artemis Accords*, 62 INT’L LEGAL MATERIALS 888 (May 29, 2023), <https://www.cambridge.org/core/journals/international-legal-materials/article/artemis-accords/5874DB518591888E52CF2B816E4593F0>; Kostenko, *supra* note 31, at 42 (“This fundamentally distinguishes the Artemis Agreement from the four main international legal acts on which the space powers of the world are guided in their activities.”).

<sup>36</sup> Artemis Accords, *supra* note 21, § 1.

<sup>37</sup> *Id.*

### **C. The Artemis Accords Make Clear That Interference Must Be “Harmful” in Order to Trigger International Responsibility**

One guidance NASA can take from the Artemis Accords is on the meaning of the term “interference.” That term is used ten times in the Artemis Accords.<sup>38</sup> In each case, however, the term “harmful” precedes “interference.” For example, Section 11, paragraph 4 states: “The Signatories commit to seek to refrain from any intentional actions that may create harmful interference with each other’s use of outer space in their activities under these Accords.”<sup>39</sup> Similarly, under Section 11, paragraph 6: “The Signatories intend to use their experience under the Accords to contribute to multilateral efforts to further develop international practices, criteria, and rules applicable to the definition and determination of safety zones and harmful interference.”<sup>40</sup>

Thus, under the Artemis Accords, this RFI misses the mark. While the announcement speaks of “a framework for further work on non-interference of lunar activities,” it should instead have focused on a “framework of *non-harmful* interference of lunar activities.” Without defining what “harmful” is, NASA itself may be violating the Artemis Accords: a framework that could prohibit “interference” that is not harmful would appear to violate the Artemis Accords. As such, the first question the RFI should have asked is not to define “interference,” but to define “*harmful* interference.” Legally, the two terms are clearly distinct. Unless NASA properly defines “harmful interference,” it should not propose any mechanism for deconfliction that fails to differentiate between harmful and non-harmful interference.

### **D. The Terms “Interference” and “Contamination” Have Completely Different Meanings in the Outer Space Treaty, Yet are Conflated in the RFI**

Critical for this discussion, the RFI essentially equates the terms “interference” and “contamination.”<sup>41</sup> But these terms have very different meanings in Article IX of the OST.

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<sup>38</sup> *Id.* § 11, ¶¶ 1, 3, 4, 5, 6, 7, 9, 10.

<sup>39</sup> *Id.* § 11, ¶ 4.

<sup>40</sup> *Id.* § 11, ¶ 6.

<sup>41</sup> *See* RFI, *supra* note 1 (“Although lunar interference and contamination concerns have been broadly identified and expanded beyond the initial findings of the 2016 report (e.g., plume surface interactions and dust, hazardous waste, propellant deposition from overflight, electromagnetic interference), there is not broad consensus in the lunar scientific or technical community on key questions such as how to understand the potential value of lunar sites, how to mitigate the impacts of interference or contamination at such sites, and how to determine the change in value of a lunar site should certain interference or contamination activities occur.”). The terms “interference and contamination” or “interference or contamination” appear five times in the RFI, but are effectively treated as synonyms.

“Interfere” is not specifically defined within Article IX, so can proceed only based on its plain meaning of that term: “to interpose in a way that hinders or impedes; come into collision or be in opposition.”<sup>42</sup>

The term “contamination,” in contrast, has a particular definition within Article IX: “States Parties to the Treaty shall pursue studies of outer space, including the Moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose.” The idea of “contamination” contains two related concepts: (1) “inbound” contamination, contaminating the environment of the Earth by introducing extra-terrestrial materials into the Earth ecosystem and (2) “outbound” contamination, introducing Earth-produced contaminants into the celestial body environment.<sup>43</sup>

There is no discussion in Article IX, however, of intra-celestial body contamination—the notion that activities on a celestial body can contaminate by introducing indigenous materials to other parts of the celestial body.<sup>44</sup> In other words, Article IX does not appear to cover a claim of “contamination” on the lunar surface simply because a lander kicks up regolith that travels to another area of the Moon. Thus, the following question posed in the RFI may not be correct as a matter of international space law (even if it is correct as a matter of science and engineering):

What human or robotic actions/events may negatively impact the value of a lunar site? Such as chemical contamination, physical contact, hardware

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<sup>42</sup> *Interfere*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/interfere> (last visited June 5, 2024).

<sup>43</sup> See, e.g., Victoria Sutton, *Planetary Protection and Regulating Human Health: A Risk that is Not Zero*, 19 HOUS. J. HEALTH L. & POLICY 71, 74 (2019) (“In general, ‘planetary protection’ means both (1) forward contamination of other celestial bodies with biological material from Earth and (2) back contamination of Earth with potential life from other celestial bodies.”).

<sup>44</sup> See, e.g., Biswanath Gupta & Tamoghna Agasti, *The Curious Case of Article IX and Outer Space Environment*, 2 J. ENV'T IMPACT MGMT. POL'Y 7 (Feb. 19, 2022), <https://hmjournals.com/journal/index.php/JEIMP/article/view/464/928> (discussing the history of Article IX of the OST, and particularly, the rejection of proposed language from India’s delegation that would have protected the environment of space from “contamination or pollution.” That language would contemplate a claim being brought for cross-contamination as a form of “pollution.” But as this article shows, Article IX ultimately was limited to concepts of contamination put forth by the U.S. and Soviet delegations which was focused much more on what we now consider “outbound” and “inbound” contamination, and not a much broader meaning to encompass all “environmental pollution” in space.).

proximity (for example Apollo hardware causing localized “moon quakes” due to heating and cooling differences vs surroundings), waste hazards, etc.<sup>45</sup>

The only one of these scenarios that triggers a “contamination” claim would be the introduction of an Earth-sent chemical. The other examples all relate to activities, which, while they might constitute “interference” (if the result is documented harm), do not constitute “contamination” as that term is defined in Article IX. Thus, commenters should not be heard to claim that one lunar operation somehow “contaminates” their proposed activity. Potential harmful interference, yes, but not contamination.

Further, unlike in the RFI, the Artemis Accords do not even use the term “contamination.” NASA should not move forward with further work in this area until it clarifies the distinction between “contamination” and “interference.”

Equating those two terms would lead to absurd results that could severely hamper the ability of countries (and private entities) to use the lunar surface. NASA should reject any framework for non-interference that uses as the basis for interference a claim that an activity would somehow “contaminate” another activity through the introduction of lunar-based elements (e.g., regolith ejecta, dust) from one area of the Moon to another. Given the physics of the Moon (esp., lack of atmosphere and one-sixth gravity), the spreading of dust and regolith is a natural byproduct of any activity, but especially from rocket landings and takeoffs.<sup>46</sup> Considering that to be “contamination” and thus “interference,” would make lunar development, and especially *in situ* resource utilization on the Moon, virtually impossible. As discussed more fully below, such a framework would contradict U.S. law.

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<sup>45</sup> RFI, *supra* note 1.

<sup>46</sup> See, e.g., R. N. Watkins et al., *Understanding Rocket Exhaust Effects in Polar Regions During Powered Descent on the Moon* (Working Paper, Lunar and Policy Institute, 2020) (“During lunar landings, dust and small rock particles are blown away at high velocities, spreading particles across the entire surface of the Moon, potentially confounding upper surface science, and even inserting dust into lunar orbit and impacting orbital hardware.”); see also NASA STI REPOSITORY, LUNAR COLD TRAP CONTAMINATION BY LANDING VEHICLES (2014) (“The emerging interest in lunar mining poses a threat of contamination to pristine craters at the lunar poles, which act as ‘cold traps’ for water and may harbor other valuable minerals Crider and Vondrak (2002).”). Note the use of the term “contamination” from scientific, not legal, perspective.

**E. U.S. Law Recognizes Property Rights in Extracted Materials, Explicitly Contemplating Disturbing Lunar Regolith**

In 2015 Congress passed the U.S. Commercial Space Launch Competitiveness Act<sup>47</sup> which contained Title IV, the Space Resource Exploration and Utilization Act of 2015:

Section 402: The bill directs the President, acting through appropriate federal agencies, to:

- facilitate the commercial exploration for and commercial recovery of space resources by U.S. citizens;
- discourage government barriers to the development of economically viable, safe, and stable industries for the commercial exploration for and commercial recovery of space resources in manners consistent with U.S. international obligations; and
- promote the right of U.S. citizens to engage in commercial exploration for and commercial recovery of space resources free from harmful interference, in accordance with such obligations and subject to authorization and continuing supervision by the federal government.

A U.S. citizen engaged in commercial recovery of an asteroid resource or a space resource shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell it according to applicable law, including U.S. international obligations.<sup>48</sup>

Thus, any framework developed by NASA must recognize the rights of U.S. citizens to engage in the “recovery of space resources,” and it must heed the limitations placed by Congress on any agency to creating “barriers to the development of economically viable, safe, and stable

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<sup>47</sup> U.S. Commercial Space Launch Competitiveness Act, 51 U.S.C. §§ 51301-51303, 60126, 70104 (2015).

<sup>48</sup> *Id.* at Title IV. Note that Congress declared that this domestic legislation does not abrogate U.S. obligations under Article II of the OST. “It is the sense of Congress that the United States does not, by enactment of this Act, assert sovereignty or sovereign or exclusive rights or jurisdiction over, or ownership of, any celestial body.” *Id.* § 403.



industries for the commercial exploration for and commercial recovery of space resources in manners consistent with U.S. international obligations.”<sup>49</sup>

Indeed, it can be argued that the “right of U.S. citizens to engage in commercial exploration for and commercial recovery of space resources free from harmful interference” would actually take precedence over, for example, claims that such activities would interfere with (or indeed “contaminate”) the scientific experiments of others. At the least, in any claim of interference, the right to commercially exploit outer space resources cannot be ignored. Any framework that disregards or discounts these commercial rights would be subject to legal challenge.

## **II. NASA’s Authority to “Develop[] A Framework for Future Work” Is Highly Questionable**

From the discussion above, a “framework for future work” clearly will involve complex legal and diplomatic issues. While NASA may have technical expertise in this area, and certainly can tap into the space scientific and commercial community for feedback and support, its overall role in developing international space norms is not clear. Before the agency embarks on serious consideration of these issues, therefore, its statutory authority over international space law issues must be examined.

### **A. The NASA Act Gives NASA Only a Limited Role in Establishing U.S. Foreign Policy**

It is a basic axiom of administrative law, rooted in the republican nature of government, that an administrative agency “has no power to act . . . unless and until Congress confers power upon it.”<sup>50</sup> When it comes to NASA’s authority to set U.S. foreign policy, NASA’s enabling statute, the NASA Act of 1958,<sup>51</sup> says the following:

[NASA], under the foreign policy guidance of the President, may engage in a program of international cooperation in work done pursuant to the Act, and in the peaceful application of the results thereof, pursuant to agreements made by the President with the advice and consent of the Senate.

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<sup>49</sup> *Id.* § 402; *see also* Artemis Accords, *supra* note 21, § 10, ¶ 2 (“The Signatories affirm that the extraction of space resources does not inherently constitute national appropriation under Article II of the Outer Space Treaty, and that contracts and other legal instruments relating to space resources should be consistent with that Treaty.”).

<sup>50</sup> *La. Pub. Serv. Comm’n v. Fed. Commc’ns Comm’n*, 476 U.S. 355, 374 (1986).

<sup>51</sup> National Aeronautics and Space Act of 1958, Pub. L. No. 85-568, § 205, 72 Stat. 426 (1958).

NASA is not free, therefore, to establish U.S. foreign policy on its own, but must work under the “foreign policy guidance of the President,” and “pursuant to agreements made by the President with the advice and consent of the Senate.”<sup>52</sup> Congress has imbued it with no additional statutory authority in this area.

**1. The Executive Branch has not Delegated Authority to NASA to Create a Non-Interference Framework**

The RFI fails to cite to any “foreign policy guidance of the President” or point to “agreements made by the President with the advice and consent of the Senate” which provide NASA the necessary delegated authority to move forward with its proposed framework. Indeed, Executive Order 13914, issued April 6, 2020, gives the lead role in this area, at least as it relates to commercial use of outer space resources, to the State Department.

The Secretary of State, in consultation with the Secretary of Commerce, the Secretary of Transportation, the Administrator of the National Aeronautics and Space Administration, and the head of any other executive department or agency the Secretary of State determines to be appropriate, shall take all appropriate actions to encourage international support for the public and private recovery and use of resources in outer space, consistent with the policy set forth in section 1 of this order. In carrying out this section, the Secretary of State shall seek to negotiate joint statements and bilateral and multilateral arrangements with foreign states regarding safe and sustainable operations for the public and private recovery and use of space resources.<sup>53</sup>

When the Biden Administration took office in January 2021, it took no action to overturn EO 13914. Rather, it issued Executive Order 14056 on December 1, 2021, reconstituting the National Space Council, and reaffirming its role is as an advisor to the President.<sup>54</sup> Further, “The operation of the Council shall not interfere with the existing lines of authority in or responsibilities of any agency.”<sup>55</sup> EO 14056 provided no specific guidance to NASA or any other agency to undertake non-interference frameworks, or otherwise contradict EO

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<sup>52</sup> *Id.*

<sup>53</sup> Exec. Order No. 13,914, 85 Fed. Reg. 20381 (Apr. 6, 2020).

<sup>54</sup> Exec. Order No. 14,056, 86 Fed. Reg. 68871 (Dec. 1, 2021) (“The Council shall advise and assist the President on space policy and strategy. In particular, it shall: (i) review, develop, and provide recommendations to the President on space policy and strategy.”).

<sup>55</sup> *Id.* § 3(b).

13914's assignment of the State Department as the lead agency related to space resource development.

Equally important, EO 14056 did not revoke or otherwise modify earlier Space Policy Directives. This includes SPD-1, "Presidential Memorandum on Reinvigorating America's Human Space Exploration Program" (2017),<sup>56</sup> SPD-2, "Streamlining Regulations on Commercial Use of Space" (2018),<sup>57</sup> and SPD-3, "National Space Traffic Management Policy" (2018).<sup>58</sup> None of these directives provide NASA with any specific authority in this area. Indeed, NASA should read with caution SPD-2, which declares:

It is the policy of the executive branch to be prudent and responsible when spending taxpayer funds, and to recognize how government actions, including Federal regulations, affect private resources. It is therefore important that regulations adopted and enforced by the executive branch promote economic growth; minimize uncertainty for taxpayers, investors, and private industry; protect national security, public-safety, and foreign policy interests; and encourage American leadership in space commerce.<sup>59</sup>

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<sup>56</sup> Memorandum on Reinvigorating America's Human Space Exploration Program, 2017 DAILY COMP. PRES. DOC. 902 (Dec. 11, 2017), <https://www.govinfo.gov/content/pkg/DCPD-201700902/pdf/DCPD-201700902.pdf> (SPD-1) (modified Presidential Policy Directive-4 of June 28, 2010 to define the goal of the U.S. to "Lead an innovative and sustainable program of exploration with commercial and international partners to enable human expansion across the solar system and to bring back to Earth new knowledge and opportunities. Beginning with missions beyond low-Earth orbit, the United States will lead the return of humans to the Moon for long-term exploration and utilization, followed by human missions to Mars and other destinations.").

<sup>57</sup> Memorandum on Streamlining Regulations on Commercial Use of Space, 2018 DAILY COMP. PRES. DOC. 372 (May 24, 2018), <https://www.govinfo.gov/content/pkg/DCPD-201800372/pdf/DCPD-201800372.pdf> (SPD-2).

<sup>58</sup> Memorandum on National Space Traffic Management Policy, 2018 DAILY COMP. PRES. DOC. 431 (June 18, 2018), <https://www.govinfo.gov/content/pkg/DCPD-201800431/pdf/DCPD-201800431.pdf> (SPD-3).

<sup>59</sup> SPD-2, *supra* note 57, § 1. The current administration's policy to encourage a commercial space sector was again emphasized in UNITED STATES SPACE PRIORITIES FRAMEWORK, THE WHITE HOUSE (Dec. 2021), <https://www.whitehouse.gov/wp-content/uploads/2021/12/United-States-Space-Priorities-Framework--December-1-2021.pdf> ("U.S. commercial space activities are on the cutting edge of space technology, space applications, and space-enabled services. To facilitate the growth of U.S. industry and support the creation of American jobs, the United States will clarify government and private sector roles and responsibilities and support a timely and responsive regulatory environment. U.S. regulations must provide clarity and certainty for the authorization and

In moving forward with work in this area, therefore, NASA should specifically address how its framework will “promote economic growth” and “minimize uncertainty for taxpayers, investors, and private industry.”

The most recent substantive document issued by the National Space Council speaks generally to “Strengthening U.S. International Space Partnerships.”<sup>60</sup> Regarding NASA’s role, the National Space Council stated:

Enabling International Contributions on the Moon: At the direction of the Vice President during the September 2022 National Space Council meeting, NASA developed a lunar surface architecture definition document to identify areas the United States is seeking commercial and international partnerships in Moon to Mars exploration. NASA is working with international space agency on multiple future partnership opportunities, including a Japanese pressurized crew rover, an Italian crew habitation module, European Space Agency lunar cargo landers, and a Canadian science and utilization rover.<sup>61</sup>

Nowhere in this document, or any other that we can find, has the current Administration, either directly, or through the National Space Council, designated NASA as the lead agency on developing international legal norms on non-interference for lunar operations.

## **2. NASA May Be Making the Same Mistake Here as it Did with the Artemis Accords**

The RFI invokes the Artemis Accords as one of the bases for the RFI: “Deconfliction has been identified as an area of further work in Section 11 of the Artemis Accords and will be an area of increasing importance as the number of commercial and international actors operating on the lunar surface grows.”<sup>62</sup>

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continuing supervision of non-governmental space activities, including for novel activities such as on-orbit servicing, orbital debris removal, space-based manufacturing, commercial human spaceflight, and recovery and use of space resources. To create free and fair market competition internationally, the United States will work with allies and partners to update and harmonize space policies, regulations, export controls, and other measures that govern commercial activities worldwide.”).

<sup>60</sup> *Fact Sheet: Strengthening U.S. International Space Partnerships*, THE WHITE HOUSE (Dec. 20, 2023), <https://www.whitehouse.gov/briefing-room/statements-releases/2023/12/20/fact-sheet-strengthening-u-s-international-space-partnerships/>.

<sup>61</sup> *Id.*

<sup>62</sup> RFI, *supra* note 1.

TechFreedom was highly critical of NASA in rolling out the Artemis Accords. As we said in 2020, “NASA was never designed to be a regulatory agency, and shouldn’t be . . . In the end, the Artemis Accords must reflect buy-in from all branches of the U.S. government, not just NASA, and from our international partners as well.”<sup>63</sup> We were concerned then, as we are now, that NASA is exceeding both its statutory authority as well as delegated authority from the White House in setting U.S. foreign policy. Just because NASA took the initiative to craft the Artemis Accords, they didn’t become U.S. policy until implemented by the State Department.<sup>64</sup> The same pattern appears to be emerging here: NASA is taking the lead on a framework for non-interference, apparently in the hopes that the State Department will again acquiesce and implement whatever NASA comes up with. That’s not how foreign policy is generally made in the United States, even if it worked that way to produce the Artemis Accords. And especially here, where NASA appears to be ignoring the legal issues implicit in this framework, NASA should not get out in front of its celestial skis in reaching what are fundamentally legal conclusions without proper input from those with expertise in outer space law.

### **3. NASA is Usurping the Role of the State Department in Creating U.S. Foreign Policy**

“The Department of State,” the White House explains, “plays the lead role in developing and implementing the President’s foreign policy. Major responsibilities include United States representation abroad, foreign assistance, foreign military training programs, countering international crime, and a wide assortment of services to U.S. citizens and foreign nationals seeking entrance to the United States.”<sup>65</sup> The State Department certainly agrees in relation to its role in forming U.S. space diplomacy:

This first Strategic Framework for Space Diplomacy outlines how State Department diplomacy will advance continued U.S. space leadership and will expand international cooperation on mutually beneficial space activities, while promoting responsible behavior from all space actors, strengthening the

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<sup>63</sup> *Artemis Accords: One Small Step for NASA, Not So Giant a Leap for Space Law*, TECHFREEDOM (May 15, 2020), <https://techfreedom.org/artemis-accords-one-small-step-for-nasa-not-so-giant-a-leap-for-space-law/>.

<sup>64</sup> *See Artemis Accords*, U.S. DEP’T OF STATE, <https://www.state.gov/artemis-accords/> (last visited June 7, 2024) (“Co-led for the United States by the Department of State and the National Aeronautics and Space Administration (NASA), the Artemis Accords were launched on October 13, 2020.”).

<sup>65</sup> *The Executive Branch*, THE WHITE HOUSE, <https://www.whitehouse.gov/about-the-white-house/our-government/the-executive-branch/> (last visited June 7, 2024).

understanding of, and support for, U.S. national space policies and programs, and promoting international use of U.S. space capabilities, systems, and services.<sup>66</sup>

In that document, NASA is mentioned only once, as one of 13 agency “partners” in the endeavor.<sup>67</sup> Moreover, the State Department clearly views itself as taking the lead on implementing the various space policy directives and executive orders discussed above:

These policy guidelines prioritize partnership, and diplomatic and public diplomacy efforts led by the Department of State, in coordination with other Executive Branch departments and agencies. The Department’s international engagements can enhance U.S. leadership in space exploration, science, and applications, and promote development in other countries’ space policies, practices, and regulations in a manner that aligns with our domestic national security and foreign policy objectives.<sup>68</sup>

Understandably, some have questioned the State Department’s track record in space diplomacy. “It is imperative that the State Department, too, be in space. Today’s diplomats, not tomorrow’s, must develop a deep understanding of the interdisciplinary legal and policy aspects of outer space and a firm grasp of national priorities, interests, opportunities and policy constraints in space. State must invest in space as an increasingly vital element in all the various areas in which we work.”<sup>69</sup> While the State Department has not engaged as some would like in matters related to outer space, that perceived “gap”<sup>70</sup> doesn’t provide NASA with the authority to step in and overtly conduct space diplomacy.

Yet that has not stopped NASA from acting as “Washington’s shadow diplomat.”<sup>71</sup>

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<sup>66</sup> U.S. DEP’T OF STATE, A STRATEGIC FRAMEWORK FOR SPACE DIPLOMACY 3 (2023), <https://www.state.gov/wp-content/uploads/2023/05/Space-Framework-Clean-2-May-2023-Final-Updated-Accessible-5.25.2023.pdf>.

<sup>67</sup> *Id.* at 12.

<sup>68</sup> *Id.* at 6.

<sup>69</sup> David A. Epstein, *Boosting Space Diplomacy at State*, FOREIGN SERV. J. (May 2022), <https://afsa.org/boosting-space-diplomacy-state>.

<sup>70</sup> See generally J. Dunstan, *Regulating Outer Space*, *supra* note 8.

<sup>71</sup> Matt Berg, *Meet Washington’s shadow diplomat. Spoiler . . . it’s NASA*, POLITICO (Nov. 11, 2023, 5:00 AM), <https://www.politico.com/news/2023/11/11/meet-washingtons-shadow-diplomat-secret-its-nasa-00125298>.

NASA plays an unusual and often overlooked role in America's global outreach. It's influential but not explicitly aligned with the Pentagon, State Department or other makers of Washington's foreign policy. And its ability to push the executive branch's international objectives through other channels is a formidable tool in diplomacy efforts.<sup>72</sup>

Finally, the RFI does not disclose that whatever framework NASA develops, NASA is not free to implement it without getting full buy-in from other agencies, with the State Department running that process.

During the discussions [over adoption of the Artemis Accords], [the National Space Council's Users Advisory Group] members reviewed their meetings with the Department of State, which is responsible for the C-175 process. It is the standard process by which the US government authorises international negotiations. C-175 gathers interagency consensus across all agencies involved in such activities, and makes sure there are no concerns, objections or issues before authorisation is granted. A key issue, one state department official noted, was "going through the interagency process and getting the authority, and then proceed with the actual negotiating process of sharing the text with other countries, getting their ideas on board, and building new versions of the text that ultimately other countries were willing to sign on to."<sup>73</sup>

Based on this, TechFreedom urges NASA to engage with, and take direction from, the State Department on its framework for non-interference on the Moon. Moving out ahead of the State Department at best will lead to confusion, and at worse will compromise vital U.S. foreign policy which is not within NASA's purview.

## **B. NASA Lacks the Necessary Legal and Foreign Policy Expertise to Act Independently in This Area**

The RFI relies heavily on the 2016 "Lunar Exploration Roadmap," published by the Lunar Exploration Analysis Group (LEAG).<sup>74</sup>

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<sup>72</sup> *Id.*

<sup>73</sup> NANCY RIORDAN ET AL., SPACE DIPLOMACY AND THE ARTEMIS ACCORDS 8-9 (2023), <https://arxiv.org/pdf/2311.12137>.

<sup>74</sup> See RFI, *supra* note 1; PAUL ABEL ET AL., LUNAR EXPLORATION ANALYSIS GROUP, THE LUNAR EXPLORATION ROADMAP (2016), <https://www.lpi.usra.edu/leag/LER-2016.pdf>.

Although lunar interference and contamination concerns have been broadly identified and expanded beyond the initial findings of the 2016 report (e.g., plume surface interactions and dust, hazardous waste, propellant deposition from overflight, electromagnetic interference), there is not broad consensus in the lunar scientific or technical community on key questions such as how to understand the potential value of lunar sites, how to mitigate the impacts of interference or contamination at such sites, and how to determine the change in value of a lunar site should certain interference or contamination activities occur.<sup>75</sup>

Undersigned counsel is familiar with many of the 36 members of the LEAG Steering Committee, and deeply respects their work. Nonetheless, as far as we can tell, none of these individuals is either: (a) a lawyer or (b) has substantial foreign policy experience. The LEAG Steering Committee is made up almost entirely of scientists and engineers. That is fine when it comes to defining scientific and engineering issues, but virtually useless in teasing out the thorny legal and diplomatic issues related to Article IX non-interference.

Assume, for example, that you gathered together a number of automobile experts and asked them to design a new car. Their charging document, however, failed to disclose the speed limits that would apply to this new car, what types of roads it would be expected to be driven on, safety, fuel efficiency, or emission standards, or import/export laws related to automobiles. All of these are key legal concepts that an automotive engineer would normally encounter in the design process. Without these guardrails, the design for the new automobile would vary greatly based on the expertise of the engineers. A Formula 1 team would no doubt produce a design for an incredibly fast and maneuverable car for use on a racetrack. A Baja 500 team would produce a design optimized for off-road travel, with large wheels, high ground clearance, and the ability to travel long distances without refueling. A team of urban planners would most likely design a small car able to navigate narrow streets, park in small spaces, and emit very low levels of pollutants. But has any designed the *right* car? They could never know.

The same thing applies here, and as noted in the introduction, without articulating the legal and policy standards that are in play (and in not even referring to the vague language of Article IX of the OST or the Artemis Accords), commenters from the “lunar scientific or technical community” are free to provide their own personal thoughts on what constitutes “interference,” “contamination,” and “deconfliction,” as well as provide “mitigation mechanisms” to avoid or correct any of these. How can these responses be anything other

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<sup>75</sup> RFI, *supra* note 1.



than the manifestation of their own areas of expertise or opinions? And how could these responses truly aid in designing a framework for non-interference zones when the core legal and foreign policy issues are ignored?

It's too late at this point to recall the RFI. In evaluating the responses, and certainly in taking the next steps in developing whatever this new framework is intended to be, NASA needs to engage with lawyers, diplomats, and even national security experts and the Space Force, who ultimately might be tasked to enforce whatever framework emerges.

### CONCLUSION

TechFreedom appreciates the opportunity to respond to the RFI and questionnaire. Creating international agreement on how operations will be conducted on the Moon free of harmful interference is *the* next great space law question that must be answered. While scientific and technical input is important, the fundamental questions are of a legal and diplomatic nature. Andrew G. Haley, the author of one of the first major books on space law in 1963 summed it up best:

In context after context as problems are examined it must be kept in mind that as space science and technology move forward at hypersonic speed, the law cannot afford to remain earthbound. The mildest possible penalty for such a lag will be confusion. The maximum price we may pay is mutual destruction.<sup>76</sup>

We will remain engaged in this process and look forward to providing future input on these critical issues which are vital to opening the space frontier.

Respectfully submitted,

\_\_\_\_\_/s/\_\_\_\_\_  
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<sup>76</sup> ANDREW G. HALEY, SPACE LAW & GOVERNMENT 123 (1963).