

# ***REACTING TO MAJOR SPACE EVENTS ON THE MOON AND IN CISLUNAR SPACE***

***—After Action Report—***



## **WHAT DO WE WANT SPACE TO LOOK LIKE?**

*What policies are  
necessary to get there?*

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**AMERICAN FOREIGN  
POLICY COUNCIL**

# ***REACTING TO MAJOR SPACE EVENTS ON THE MOON AND IN CISLUNAR SPACE***

**September 2024**

**WORKSHOP 2 | MARCH 6, 2024 | AFTER ACTION REPORT**

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*The views, opinions, and recommendations expressed in this report are those of the authors and do not necessarily reflect the official policy or position of any government agency or individual participant. Participants' involvement does not imply endorsement of all contents.*

## EXECUTIVE SUMMARY

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This report details the outcomes of a series of high-stakes, seminar-style wargames conducted by a simulated National Space Council (NSpC) to address potential near-term space-related scenarios that could significantly impact U.S. public perception, resourcing, and policy.

Designed to prepare U.S. leaders for possible space occurrences over the next two to three decades, this workshop engaged an assembled team of players representing various U.S. governmental and strategic positions. Participants, drawn from a cross-section of U.S. space leadership including military, civilian, private, and academic sectors, engaged in robust discussions to anticipate potential concerns, tensions, and cross-sector impacts of future developments in space.

The simulations focused on scenarios that might plausibly confront the United States within the next two administrations. Several of the scenarios were direct challenges by the People’s Republic of China (PRC) to U.S. leadership in space. In all cases, the scenarios occurred within the context of U.S.-China strategic competition and carried with them strategic implications for U.S. space policy and international relations. Scenarios included early PRC successes with 3D-printed structures on the Moon, attempts by a private company to claim real property on the Moon, a PRC land grab via declaration of safety zones on the Moon, the success of Chinese Lunar industry, and the need to conduct an in-space rescue of civilians.

The workshop was geared toward developing strategic responses that balanced defense, diplomacy, and public communication while considering the long-term geopolitical landscape and the fast-evolving arena of space technology and exploration. Below is a summary of the scenarios, a real-world rationale for their selection, and NSpC participants’ recommendations:

*(Please note that the recommendations were developed during a high-pressure, time-constrained simulation designed to emphasize the challenges of developing real-time responses to an actual crisis. These recommendations represent the consensus of the expert participants under these conditions. However, a more thorough analysis that benefits from additional time and consideration of these and other potential crises will appear in a forthcoming book.)*

Scenario / Selection Rationale	NSpC Participants’ Recommendations
<p><b><i>Scenario 1: PRC Wows World With 3D-Printed Moon Structures</i></b>  <u>A PRC lander demonstrates 3D printing on the Moon.</u>  <b><i>Selection Rationale:</i></b> <i>Chang’e 8 is scheduled to test 3D printing technology in 2028.</i></p>	<ol style="list-style-type: none"> <li>1. Reinvigorate space leadership: emphasize economic and scientific benefits; enhance public and international engagement</li> <li>2. Expand NASA’s Lunar ambitions: develop bolder plans and partnerships; empower private-sector innovation</li> <li>3. Assert U.S. Lunar presence: counter China’s actions; uphold American values on the Moon</li> </ol>

Scenario / Selection Rationale	NSpC Participants' Recommendations
<p><b>Scenario 2: China Beats the U.S. Back to the Moon</b>  <u>The PRC succeeds in landing astronauts on the Moon ahead of NASA.</u>  <b>Selection Rationale:</b> NASA human landing on the Moon is delayed until at least 2027, and PRC acceleration of its program may allow an early landing by 2027 or 2028.</p>	<ol style="list-style-type: none"> <li>1. Launch “High Frontier Program”: guarantee orbital propellant purchases; develop asteroid resources; accelerate timelines; focus on commercial leadership</li> <li>2. Mobilize private sector: utilize NSpC to gather companies; set near-term Lunar goals; develop multifaceted space ecosystem</li> <li>3. Expand U.S. Space Force role: extend defense beyond near-Earth orbit; support private companies; justify funding to public</li> </ol>
<p><b>Scenario 3: Can a Private Company Claim the Moon?</b>  <u>A private company makes a land claim on the Moon.</u>  <b>Selection Rationale:</b> Private interests would be advanced by claims of exclusive use; commercial entities now have access to the Lunar surface; the non-appropriation ideal of the Outer Space Treaty may not survive contact with commercial mining interests.</p>	<ol style="list-style-type: none"> <li>1. Update licensing regime: anticipate future needs; consider enabling policy changes; explore multilateral agreements</li> <li>2. Assert U.S. authority via licensing; balance incentives with defense/safety benefits</li> <li>3. Develop enforcement mechanisms: consider various enforcement models; balance with industry encouragement</li> <li>4. Leverage U.S. licensing for strategic advantage</li> <li>5. Create U.S.-led international space security coalition</li> </ol>
<p><b>Scenario 4: Are China’s Moon Safety Zones a Massive Lunar Land Grab?</b>  <u>The PRC declares large areas as safety zones.</u>  <b>Selection Rationale:</b> The PRC has exhibited challenging territorial behavior regarding research-rich areas on Earth; some expect the PRC will use this same playbook on the Moon.</p>	<ol style="list-style-type: none"> <li>1. Economic protection: implement trading pauses; consider market intervention; explore economic sanctions; address mineral trade and independence</li> <li>2. Legal and strategic response: collaborate with allies internationally; pursue legal action for treaty violations; evaluate military options and U.S. Space Force role; assert Lunar presence</li> <li>3. Public engagement strategy: emphasize Moon’s economic and strategic value; highlight climate research potential; develop narrative appealing to investors and public; consider innovative nonmilitary solutions</li> </ol>
<p><b>Scenario 5: China’s Lunar Factory Crushes U.S. Ambitions</b>  <u>A Chinese Lunar factory demonstrates new industrial might.</u>  <b>Selection Rationale:</b> The PRC has announced its intention to industrialize the Moon, to build factories on the Moon, and to build a Moon-Earth economic zone. What happens when this becomes reality?</p>	<ol style="list-style-type: none"> <li>1. Develop a holistic counterstrategy: expose China’s competitive tactics; advance U.S. Lunar presence; create strong civilian-military program</li> <li>2. Enhance mass driver capabilities</li> <li>3. Accelerate commercial mass driver development: utilize CHIPs Act for research and engineering</li> <li>4. Reassess deterrence options</li> <li>5. Intensify monitoring of emerging capabilities, both open source and classified</li> </ol>

Scenario / Selection Rationale	NSpC Participants' Recommendations
<p><b>Scenario 6: Lunar Odyssey Stranded: Is Rescue Possible?</b>  <u>A circum-Lunar cruise requires rescue.</u>  <b>Selection Rationale:</b> SpaceX hopes to use Starship for Cislunar cruises. What happens if a private spaceflight operation in Cislunar space requires rescue?</p>	<ol style="list-style-type: none"> <li>1. Lead rescue: private sector with government support or NASA-led international coalition</li> <li>2. Establish international rescue authority with standardized interfaces</li> <li>3. Create Lunar Coast Guard: focus on port-like operations; develop necessary capabilities and standards</li> <li>4. Promote safety culture through incentives</li> <li>5. Enhance rescue capabilities: purchase from private sector; establish separate Lunar Coast Guard; mandate insurance and standby vehicles; implement training and certification requirements</li> <li>6. Define government's role and liability in space rescue operations</li> </ol>

Strategic recommendations drawn from the entire scenario set:

1. **The U.S. needs a strategy for competitive economic and industrial development.**
  - The U.S. must deploy the full range of economic tools to create incentives for the private sector to create in-space industry.
  - The U.S. must create allied international economic development institutions for space to forward the Artemis block.
  - The U.S. must reprioritize U.S. government Lunar investments with a greater emphasis on scalable in-situ resource utilization and in-space manufacturing.
2. **The U.S. must develop a Space Security Alliance.**
  - Numerous provocations require the mobilization of a collective security community.
  - Such a “NATO for space” must be built in advance of when it would be needed.
3. **The U.S. should develop contingency plans for provocations below the level of armed conflict.**
  - The U.S. should develop in advance contingency plans and options to respond to a Lunar land grab, or Lunar weaponization, before such a crisis emerges.
  - U.S. Space Force responsibilities need to include protecting private industry and enforcing U.S interests in Cislunar space.
4. **The U.S. must be postured for space rescue.**
  - Develop a forward-looking White House strategy and implementation guidance similar to its National Preparedness Strategy for Near Earth Object Hazards and Planetary Defense.
  - Assign responsibilities for space rescue in the Unified Command Plan.

## PROJECT OVERVIEW

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The AFPC Space Policy Initiative co-directors have designed a series of workshops to examine near-term scenarios that could have a significant *psychological impact on public perceptions* of space, and thus on resourcing and policy. The aim of the project is to offer options, add context, and prepare U.S. leaders for space occurrences over the next two to three decades. For these workshops, the project authors have assembled teams of players who represent surrogates of a National Space Council (NSpC) and are presenting them with a set of scenarios that might simultaneously appear in the media, forcing players to shape a U.S. government response. This process will allow the project authors anticipate concerns, tensions, and cross-sector impacts of future developments in space. During the workshops, each space scenario is discussed, with a focus on addressing two primary questions:

1. How do we anticipate the situation being framed in the public media, and what sort of action is likely to be demanded from public officials?
2. What options exist for the United States, and which option is selected and why?

Our aim is for these discussions to help policymakers make better decisions. By *anticipating what political pressures will be felt by U.S. government policymakers*—including how the public, the press, Congress, allies, and adversaries may respond—and *examining potential responses* for the U.S. (in new policies, executive orders, dedicated strategies, and national-level guidance), we hope this series of workshops will help prepare U.S. policymakers for a number of foreseeable scenarios they may encounter—before those events occur—and arm them with the foresight and policy options needed to steer the wisest course.

### Methodology

Given the timeline of the scenarios that the workshop encompassed and the nature of the objectives, a seminar-style wargame was chosen. Six scenarios with the People’s Republic of China as the first mover were created and given to the players in advance of the workshop. The players, collectively forming the National Space Council, were given an hour to formulate and brainstorm different ideas and appropriate reactions to the scenario. No barriers to communication were implemented, though the wargame’s inherent speed challenges the players to remain as concise as possible. Additionally, injections with headlines and various new incidents were interspersed throughout discussion time. At the end of the hour, participants were asked to present and reason out their chosen course of action.

To mitigate groupthink among the participants, one “External Press Agitator” was placed into the group and directed to challenge or question the group’s decision-making. Without a red team to react to the players’ actions, the press agitator was the next best option to encourage discussion of the possible consequences of their actions. To adjust for political bias during the recommendations, the administration for the NSpC assumed a Republican administration for the first three scenarios and a Democratic administration for the following three scenarios, each with a divided U.S. House of Representatives.

Participants for the workshop were selected for their deep substantive knowledge of U.S. space activities or policy along with their likelihood to serve or advise those who serve at a senior level in future administrations. The participant list includes senior space leaders across the military, civilian, private, and academic sectors (see participant list for names and affiliations).

The workshop follows Chatham House rules, so as to encourage brainstorming and experimentation.

The following participants formed the simulated NSpC for the second workshop:

- |  |  |
|--|--|
| 1. Vice President                                  | 8. Assistant to the President for Domestic Policy          |
| 2. Secretary of Defense                            | 9. Director of the Office of Science and Technology Policy |
| 3. Director of National Intelligence               | 10. Chinese Communist Party Subject Matter Expert          |
| 4. Secretary of Commerce                           | 11. White House Press Secretary/ External Press Agitator   |
| 5. Secretary of State                              | 12. Presidential Policy Advisor                            |
| 6. NASA Administrator                              |  |
| 7. Lunar and Asteroid Mining Subject Matter Expert |  |

## Workshop 2 Introduction

For the second workshop, focus was placed on reacting to major space events above and beyond geostationary orbit and focused on Lunar/Cislunar development. *The People’s Republic of China (PRC) has outlined a grand vision for space and over the next two decades has plans to—among other milestones—unveil incrementally improved capabilities for developing a Moon-Earth economic zone, including 3D printing Lunar factories. The PRC has identified many of the same sites of interest on the Lunar South Pole, and concerns have been raised about the potential for conflict over limited land.* Each of these scenarios carries strategic significance for U.S. policymakers, and this workshop provided an opportunity to analyze them.

The six scenarios contained herein were constructed as a result of recent news headlines that have demonstrated an adversary capability or development toward a capability that could be destabilizing and elicit a reaction from the U.S. government. After the first workshop, participants universally agreed that the U.S. is currently “behind the eight ball” with regard to advancements in space—despite holding a massive head start and benefitting from the advent of reusable rockets. In comparison to China, participants were emphatic that *there is a clear and decisive disparity between the two nations’ visions and strategies for space.* After walking through each scenario and realizing that certain near-term developments could provide China with a decided strategic advantage, it became imperative that the U.S. should invest in certain areas to avoid having to face the daunting headlines experienced in the six scenarios. The result of the second workshop was along the same lines.

The report contains a description of each scenario, the rationale for the specific scenarios’ selection, a summary of the participant discussion, and the recommendations from the NSpC players, followed by a summary of the key takeaways and recommendations from the whole exercise. Finally, an appendix is attached containing the assessment, concerns, and recommendations of each NSpC participant along with the discussion highlighting the group’s tensions and options considered for each scenario.

## Scenario 1: PRC Wows World With 3D-Printed Moon Structures

**The Daily Astronomer | Front Page**

February 19, 2028

The People’s Republic of China has taken a giant leap forward in Lunar ambition, showcasing a stunning series of robotically 3D-printed structures on the Moon’s surface. Robotic arms, orchestrated by Chinese engineers, have been constructing igloo-like edifices out of Lunar regolith, streamed live for an enraptured global audience. This display of technological might has brought China’s Lunar base from a concept to a burgeoning reality, overshadowing NASA’s plans with an awe-inspiring vision of extraterrestrial architecture.



Amid this celestial construction boom, the United States finds its own space efforts under scrutiny. NASA’s plans for an eventual Artemis Base Camp, once the pinnacle of American space ambition, now appear less vibrant, almost anemic, when cast against the dynamic backdrop of China’s proactive Lunar construction. This has stirred a wave of discontent among Americans, who question their investments in NASA. “What are we paying for? Why can’t NASA do any of this stuff?” echoes across social media and news forums, as the public demands more tangible results.

The European Space Agency (ESA), Japan Aerospace Exploration Agency (JAXA), and the Canadian Space Agency (CSA) have taken keen notice of these developments. While not shifting allegiances, they are openly questioning whether NASA can truly fulfill the Artemis Accords’ vision. Their concerns reflect a broader international unease about the current pace and direction of U.S.-led Lunar exploration.

Meanwhile, nations such as Brazil, Nigeria, and Argentina, all signatories to the Artemis Accords, are now expressing renewed interest in China’s International Lunar Research Station (ILRS). Their engagement with the ILRS signifies a possible pivot toward what is perceived as a more immediate and ambitious Lunar future.

American commercial space firms argue that they have the capability to match and exceed China’s achievements. Yet they express frustration at a perceived lack of NASA’s drive to innovate in kind. In response to the public outcry and the commercial sector’s readiness, space advocacy organizations are pushing Congress to hold hearings, seeking to rekindle the pioneering spirit within NASA and ensure America’s place at the forefront of Lunar exploration.

The PRC’s 3D-printed Lunar structures not only have redefined what’s possible in space architecture but also have stirred a strategic reassessment among America’s partners and allies. As the Lunar landscape begins to bear the marks of human ingenuity, the United States is now at a crossroads, facing the imperative to inspire and execute a vision of space exploration that rises to meet the challenges and opportunities of our time.

***Note:** The President saw this article and is concerned. He has asked the Vice President to convene a National Space Council to provide the President with options and recommendations for immediate response and long-term programmatic response options.*



## Scenario Selection Rationale

The ability to 3D print on the Lunar surface—using Lunar materials—opens up the potential for a self-expanding industrial capability that could scale independent of launch. A nation that does not have a comparable capability could be perceived as falling behind. The potential of a self-replicating industrial capability on Lunar industrial development has been known by NASA since 1983,<sup>1</sup> and was further developed by Johns Hopkins University in 2004<sup>2</sup> and Lewis-Weber in 2016.<sup>3</sup> The stark national security implications were recognized by NASA authors in 2016.<sup>4</sup> A critical component of such systems is additive manufacturing, or 3D printing. The PRC has announced a program to develop and demonstrate 3D printing on the Moon<sup>5</sup> to build bricks<sup>6</sup> and habitats,<sup>7</sup> and published a vision of how it could enable an ambitious Lunar base,<sup>8</sup> starting with Chang’e 8 in 2028, where China will first begin to demonstrate this technology for the world.<sup>9</sup>

## Discussion Summary

1. **Urgent Action or No Need to Overreact:** Council members were divided on the urgency of the situation, with some advocating for immediate action to counter China’s achievements, while others cautioned against appearing overly reactive.
2. **Public-Private Collaboration and Decoupling:** The role of the private sector in the U.S. response was heavily debated. Some members argued for leveraging the capabilities of American commercial space firms to innovate and unify the response, while others raised concerns about the need to decouple from U.S. corporations active in China.
3. **Proposed Strategies and Political Challenges:** Various controversial options were proposed, including updating the Artemis Accords, establishing economic zones on the Moon, emphasizing national values and priorities, and declassifying information about China’s alleged Lunar pollution. However, the council also acknowledged the need to reassure allies, showcase U.S. capabilities, consider the impact of upcoming elections,

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<sup>1</sup> “Replicating Systems Concepts: Self-Replicating Lunar Factory and Demonstration,” in *Advanced Automation for Space Missions*, ed. Robert A. Freitas, Jr., and William P. Gilbreath. NASA Conference Publication 2255 (NASA and American Society for Engineering Education, 1980),

<https://ntrs.nasa.gov/api/citations/19830007081/downloads/19830007081.pdf>.

<sup>2</sup> Gregory S. Chirikjian, “An Architecture for Self-Replicating Lunar Factories,” Final Report, April 26, 2004,

[https://www.niac.usra.edu/files/studies/final\\_report/880Chirikjian.pdf](https://www.niac.usra.edu/files/studies/final_report/880Chirikjian.pdf).

<sup>3</sup> Justin Lewis-Weber, “Lunar-Based Self-Replicating Solar Factory,” *New Space* 4, no. 1 (2016): 53–62,

<https://space.nss.org/wp-content/uploads/Lunar-Based-Self-Replicating-Solar-Factory.pdf>.

<sup>4</sup> Philip T. Metzger, Anthony Muscatello, Robert P. Mueller, and James Mantovani, “Affordable, Rapid Bootstrapping of Space Industry and Solar System Civilization,” *Journal of Aerospace Engineering* 26, no. 1 (2013): 18–29, <https://arxiv.org/pdf/1612.03238>.

<sup>5</sup> Avery S., “Building on the Moon: China’s 3D Printing Mission,” *3D Printing News*, April 25, 2023,

<https://www.3dnatives.com/en/building-on-the-moon-chinas-3d-printing-mission-250420236/>.

<sup>6</sup> Andrew Jones, “A Prototype Robotic ‘Mason’ Could Fly on the Chang’e 8 Lunar South Pole Mission,” Space.com, April 18, 2023, <https://www.space.com/china-moon-3d-printing-bricks-change-8-2028>.

<sup>7</sup> “China to Test Out 3D Printing Technology on Moon to Build Habitats,” Reuters, April 24, 2023,

<https://www.reuters.com/technology/space/china-test-out-3d-printing-technology-moon-build-habitats-2023-04-24/>.

<sup>8</sup> American Foreign Policy Council translation of presentation at 3rd Annual Space Science Conference, hosted by the Chinese Society of Space Research and the Zhe Jiang Province Science and Technology Association, “Proposal to Develop China’s Lunar Orbital Space Station and Moon,” October 15, 2023,

<https://www.youtube.com/watch?v=7fKINCi879o>.

<sup>9</sup> Avery S., “Building on the Moon.”

and acknowledge the importance of controlling the narrative to boost the administration's standing.

### NSpC Participants' Recommendations

**Recommendation 1:** Revamp leadership, especially with the public, international allies/partners, and messaging, as space is an engine for the 21st century economy, innovation, and scientific discovery.

**Recommendation 2:** NASA should conduct bigger plans with the Starship Lunar base, public-private partnerships, and large industrial base, and unleash the private sector, dismissing China's actions as being important.

**Recommendation 3:** The response should have a clear narrative that China building islands on the Moon is unacceptable and the U.S. will not stand for it and will uphold American values on the Moon.

## Scenario 2: China Beats the U.S. Back to the Moon

*In a high-stakes race to the Moon, the United States faces a pivotal moment that could redefine its global leadership in space exploration. With China's recent successes and ambitious Lunar plans, the question looms: Can the U.S. keep up?*

**In The Daily Astronomer | Front Page**  
November 10, 2029

In an era when space exploration has taken center stage, recent developments in Lunar exploration are rapidly reshaping the landscape of global space leadership. The United States, traditionally at the forefront of space exploration, now finds itself in a race against time and geopolitical rivals to maintain its dominance beyond Earth's atmosphere.



### China's Lunar Leap

The catalyst for this renewed race is none other than China. The China National Space Administration (CNSA) has orchestrated a series of breathtaking Lunar missions, culminating in their groundbreaking achievement of landing astronauts on the Moon, ahead of the U.S. return. Their Chang'e series, including Chang'e 7 and Chang'e 8, have captured the world's attention with their successful Lunar landings, Lunar sample returns, and the robotic site preparations for a permanent Lunar base.

But it's not just their Lunar conquests that have the world talking. China's announcement of its intent to establish a semipermanent Lunar base to develop new industrial technologies within five years has sent shockwaves through the global space community. This ambitious plan signifies a tectonic shift in Lunar exploration and geopolitical power dynamics.

### Global Partnerships Emerge

Recognizing the strategic importance of Lunar presence, other spacefaring nations are racing to catch up and collaborate. India and Russia, both space titans in their own right, have declared their Lunar aspirations and extended their hands in partnership. The international space arena is buzzing with discussions of joint Lunar missions and cooperative Lunar bases.

Intriguingly, China has not closed the door on collaboration, extending invitations to join its Lunar endeavors. With newfound alliances forming, the global community is contemplating the merits of cooperation versus competition in the final frontier.

### The Great Divide: Cancel or Continue Artemis?

Meanwhile, NASA, the U.S. space agency that once planted the Stars and Stripes on the Lunar surface, is facing a peculiar divide. Under the Artemis program, NASA is striving to put

American astronauts back on the Moon. However, the debate within the nation is intense and incongruous.

Some argue passionately for the continuation of Artemis, believing it is essential for maintaining U.S. space leadership and scientific exploration. Others, however, advocate for canceling the program, citing budget constraints and the need to focus on more pressing domestic issues. The world watches as the U.S. grapples with its Lunar identity crisis.

*Note: The President saw this article and is concerned. He has asked the Vice President to convene a National Space Council to provide the President with options and recommendations for immediate response and long-term programmatic response options.*

## Scenario Selection Rationale

An early human landing, ahead of U.S. efforts, would change the perception of global leadership and whether the U.S. can keep up. It could either increase pressure on NASA or put NASA's funding in jeopardy.

China has articulated an ambitious plan for the Moon, including as a supplier of energy for sustainable development, since as early as 2002.<sup>10</sup> China's crewed mission is not an end in itself but is meant to enable a permanent sustained presence<sup>11</sup> from which to develop a Lunar industry<sup>12</sup> and a Moon-Earth economic zone.<sup>13</sup> Toward that end, China is already signing up international partners to participate in its International Lunar Research Station (ILRS)<sup>14</sup> and launched a number of robotic precursors.

In 2019, following China's successful Change'4 landing on the Lunar far side, Vice President Mike Pence addressed NASA, stating,

Now, make no mistake about it: We're in a space race today, just as we were in the 1960s, and the stakes are even higher. Last December, China became the first nation to land on the far side of the Moon and revealed their ambition to seize the Lunar strategic high ground and become the world's preeminent spacefaring nation... And I'm here, on the President's behalf, to tell the men and women of the Marshall Space Flight Center and the American people that, at the direction of the President of the United States, it is the stated policy of this administration and the United States of America to return American astronauts to the Moon within the next five years. And let me be clear: The first woman and the next man on the Moon will both be American astronauts, launched by American rockets, from American soil... But to accomplish this, we must redouble our efforts here in Huntsville and throughout this program. We must accelerate the SLS program to meet this objective. But know this: The President has directed NASA and

<sup>10</sup> David Whitehouse, "China Denies Manned Moon Mission Plans," BBC, May 21, 2002, <http://news.bbc.co.uk/2/hi/sci/tech/2000506.stm>.

<sup>11</sup> Aedan Yohannan, "China's Space Strategy Dwarfs U.S. Ambitions," American Foreign Policy Council, March 11, 2024, <https://www.afpc.org/publications/articles/chinas-space-strategy-dwarfs-u.s-ambitions>.

<sup>12</sup> Xinhua, "Exploiting Earth-Moon Space: China's Ambition After Space Station," *China Daily*, March 8, 2016, [https://www.chinadaily.com.cn/china/2016-03/08/content\\_23775949.htm](https://www.chinadaily.com.cn/china/2016-03/08/content_23775949.htm).

<sup>13</sup> Cao Siqu, "China Mulls \$10 Trillion Earth-Moon Economic Zone," *Global Times*, November 1, 2019, <https://www.globaltimes.cn/content/1168698.shtml#:~:text=China%20is%20mulling%20of%20establishing,generat,e%20%2410%20trillion%20a%20year>.

<sup>14</sup> Andrew Jones, "Egypt Joins China's ILRS Moon Base Initiative," *SpaceNews*, December 7, 2023, <https://spacenews.com/egypt-joins-chinas-ilrs-moon-base-initiative/>.

Administrator Jim Bridenstine to accomplish this goal by any means necessary.... If our current contractors can't meet this objective, then we'll find ones that will. If American industry can provide critical commercial services without government development, then we'll buy them. And if commercial rockets are the only way to get American astronauts to the Moon in the next five years, then commercial rockets it will be.<sup>15</sup>

Though NASA was tasked formally in the National Space Policy to “[l]ead a program to land the next American man and the first American woman on the Moon by 2024, followed by a sustained presence on the Moon by 2028,”<sup>16</sup> NASA will miss both goals. The first human return is now projected to be 2027,<sup>17</sup> and NASA’s plans do not even include a permanent presence but only a small habitat for short-duration stays. In contrast, China articulated a desire to land humans before 2030<sup>18</sup> with the possibility of its spacecraft being ready as early as 2027,<sup>19</sup> and is reporting progress on its lander and rover.<sup>20</sup> Thus, the combination of NASA delays and PRC acceleration make it possible that NASA will fail to execute the U.S. policy goal that the next human landed on the Moon will be an American.

## Discussion Summary

1. **Balancing Public-Private and Government Initiatives:** Participants stressed the *importance of maintaining U.S. technical leadership in space* and public perception of the event. The discussion highlighted the need to leverage private-sector innovation through economic incentives, such as tax holidays and commercial orbital transportation services, rather than relying solely on NASA or military programs.
2. **Economic Strategy and Defense Considerations:** Economic strategy and the role of defense were debated, with suggestions to *create economic trade zones on the Moon* and demonstrate rapid advancements through programs like SpaceX’s Starship, while cautioning against militarizing the issue.
3. **Geopolitical and Security Concerns:** Concerns were raised about China’s potential to reshape global power dynamics through its Lunar presence. The need to form and *strengthen international alliances* was emphasized, with proposals to expand the Artemis Accords and involve more international partners. Security concerns about China’s military intentions on the Moon were also discussed, with calls for accelerated timelines and effective public messaging to counter China’s influence.

<sup>15</sup> White House, “Remarks by Vice President Pence at the Fifth Meeting of the National Space Council | Huntsville, AL,” March 26, 2019, <https://trumpwhitehouse.archives.gov/briefings-statements/remarks-vice-president-pence-fifth-meeting-national-space-council-huntsville-al/>.

<sup>16</sup> White House, “National Space Policy of the United States of America,” December 9, 2020, <https://trumpwhitehouse.archives.gov/wp-content/uploads/2020/12/National-Space-Policy.pdf>.

<sup>17</sup> Jeff Foust, “GAO Report Warns Artemis 3 Landing May Be Delayed to 2027,” *SpaceNews*, December 1, 2023, <https://spacenews.com/gao-report-warns-artemis-3-landing-may-be-delayed-to-2027/>.

<sup>18</sup> Andrew Jones, “China Sets Sights on Crewed Lunar Landing Before 2030,” *SpaceNews*, May 29, 2023, <https://spacenews.com/china-sets-sights-on-crewed-lunar-landing-before-2030/>; Mike Wall, “How China Will Land Astronauts on the Moon by 2030,” *Space.com*, July 13, 2023, <https://www.space.com/china-astronauts-moon-landing-2030-plan>

<sup>19</sup> Andrew Jones, “China to Launch Moon Astronauts’ New Spacecraft for 1st Time in 2027 or 2028,” *Space.com*, July 20, 2023, <https://www.space.com/china-launch-new-astronaut-moon-spacecraft-2027>.

<sup>20</sup> Xinhua, “China Achieves Progress in Equipment Development for Manned Moon Landing,” July 22, 2023, <https://english.news.cn/20230722/1ec49c6d1b9e4307898293bf88368381/c.html>.

## NSpC Participants' Recommendations

**Recommendation 1:** Announce the “High Frontier Program” as changing the game, being proactive and strategic. The program will include guaranteed purchase of propellant in orbit, subsidized development of asteroid resources, several legislative moves, grander programs, and accelerated timelines; and it will be commercially led (not JUST for NASA)—which is where Artemis largely is today.

**Recommendation 2:** Galvanize the private sector as U.S. strength is multidimensional. Utilize the NSpC to gather private companies and what they could accomplish in the next year or two for being on the Moon, but also as a multifaceted ecosystem.

**Recommendation 3:** U.S. Space Force must support and defend private companies. Defense needs to be pushed out further than near-Earth orbit (NASA is in 100 percent agreement). We need to find a way to pay for it and have justification to the American people.

### Scenario 3: Can a Private Company Claim the Moon?

**The Daily Astronomer | Front Page**

October 20, 2030

In a groundbreaking move poised to reshape the dynamics of space exploration and Lunar development, Starlight Ventures, under the visionary leadership of CEO Jason Morrow, has successfully planted its privately funded lander, the *Lunar Pioneer*, on the Moon. While the Federal Aviation Administration facilitated this achievement with a launch license, Starlight Ventures argues that existing legal frameworks fall short of governing their activities on the Lunar surface comprehensively. The company claims to be at the forefront of establishing safety and operational zones on the Moon, aligning with the Artemis Accords' principles for ensuring safe and sustainable space exploration.



Strategically headquartered in Vanuatu, known for its tax sheltering benefits and liberal use of flags of convenience for company and vessel registrations, Starlight Ventures leverages the island nation's non-signatory status to the Outer Space Treaty to its advantage. This positioning allows the company a unique flexibility in navigating the complexities of international space law. Vanuatu's prompt recognition of Starlight Ventures' Lunar claim, following the *Lunar Pioneer*'s landing, underscores the strategic use of Vanuatu's global financial system stance to bolster the company's ambitions on the Moon.

The claim over the Lunar Peaks of Eternal Light, regions valued for their continuous sunlight, crucial for the energy needs of future Lunar bases, highlights the strategic importance of this move. With the Lunar Exploration Corporation (LEC) of China set to launch a competing mission in just weeks, the race for these invaluable Lunar territories underscores the urgency of securing strategic Lunar locations. The implication is clear: Had Starlight Ventures not acted, LEC or another competitor would likely have claimed this critical Lunar site.

This bold initiative by Starlight Ventures has ignited a global debate on the need for modernized space law, sovereignty, and the shared heritage of outer space. Establishing a safety zone on the Moon, the company not only challenges existing international norms but also sets a controversial precedent that could redefine the future of Lunar governance and exploration, amid concerns over tax sheltering and the use of flags of convenience.

This situation places the U.S. administration in a dilemma. As suggested by one think tank pundit, "Does the U.S. preserve its strategic foothold and leadership on the Lunar frontier with its own commercial actor, setting a concerning precedent for others and allowing the company to 'speed' unchecked, or does it constrain Starlight Ventures and risk losing its foothold to China?" This conundrum underscores the intricate balance between fostering innovation and maintaining strategic leadership in the new era of space exploration.

*Note: The President saw this article and is concerned. He has asked the Vice President to convene a National Space Council to provide the President with options and recommendations for immediate response and long-term programmatic response options.*

## Scenario Selection Rationale

The Artemis Accords<sup>21</sup> have championed the idea of safety zones on the Moon to prevent harmful interference but provided no guidance as to their size. If an actor was to declare a safety zone of such size and expanse that it appeared to be excessive and exclude others, it might trigger a wide range of responses, from demarches, to nonrecognition, to rapid counterclaims.

Many observers see the nonappropriation clause as untenable in the face of space mining.<sup>22</sup> Already multiple attempts at commercial Lunar landings have been made by SpaceIL,<sup>23</sup> Astrobotic,<sup>24</sup> and a partial success by Intuitive machines in 2024.<sup>25</sup>

Certain U.S. companies have far more ambitious plans for large-scale development (for example, Lockheed, Cislune, Blue Origin, Lunar Resources, OffWorld). While the U.S. enjoys a launch advantage, other nations—friendly or neutral—may provide a more favorable route to securing space resources. Luxembourg, the United Arab Emirates (UAE), Japan, and India all have pro-space resource laws or policies. Several years ago, the UAE even contemplated a \$18 billion sovereign wealth fund to industrialize the Moon. Several island states are known to be favorable locations for international off-shore banking, tax havens,<sup>26</sup> and money laundering and are willing to provide “flags of convenience” for international shipping.<sup>27</sup> Of note, several island states are not signatories to the Outer Space Treaty (OST)<sup>28</sup> and have not given up their sovereign right to claim territory in space. A claim originating from a non-OST state would provide an interesting legal challenge to the OST. Early claims could enable an advantage, and it is not clear how the world would react to a commercial claim.

## Discussion Summary

1. **Balancing U.S. Leadership and Private-Sector Interests:** The U.S. must navigate the challenges posed by *unchecked commercial operations* and claims of extraterrestrial self-sovereignty while mitigating the *risk of losing strategic Lunar locations* to competitors like China.

<sup>21</sup> NASA, “The Artemis Accords,” <https://www.nasa.gov/artemis-accords/>.

<sup>22</sup> Matt Hrodey and Tree Meinck, “No One Owns Outer Space, but Could Space Mining Change That?” *Discover*, September 11, 2023, <https://www.discovermagazine.com/technology/no-one-owns-outer-space-but-could-space-mining-change-that>.

<sup>23</sup> NASA, “Bereshheet,” <https://science.nasa.gov/mission/beresheet/>.

<sup>24</sup> NASA, “Peregrine Mission 1 (Astrobotic),” <https://nssdc.gsfc.nasa.gov/nmc/spacecraft/display.action?id=PEREGRN-1>.

<sup>25</sup> Ellyn Lapointe and Morgan McFall-Johnsen, “NASA Is Back on the Moon—With the First Commercial Lunar Landing Ever,” *Business Insider*, February 22, 2024, <https://www.businessinsider.com/intuitive-machines-im-1-odysseus-moon-lunar-landing-mission-nasa-2024-2>.

<sup>26</sup> Iram Ghafoor, “Top 15 Offshore Tax Havens in the World,” Yahoo Finance, May 31, 2023, <https://finance.yahoo.com/news/top-15-offshore-tax-havens-102342802.html>; and “Top Ten Caribbean Tax Havens for Offshore Banking,” Global Citizen Solutions, July 29, 2024, <https://www.globalcitizensolutions.com/top-ten-offshore-tax-havens-in-the-caribbean/>

<sup>27</sup> Anna Fleck, “Flags of Convenience Dominate Maritime Freight,” Statista, January 11, 2023, <https://www.statista.com/chart/29086/flags-of-convenience/#:~:text=The%20figures%20from%20the%20United,of%20the%20world's%20cargo%20capacity>.

<sup>28</sup> “Outer Space Treaty Parties Map,” Wikipedia, March 1, 2022, [https://en.wikipedia.org/wiki/Outer\\_Space\\_Treaty#/media/File:Outer\\_Space\\_Treaty\\_parties\\_map\\_colors\\_updated\\_03012022.svg](https://en.wikipedia.org/wiki/Outer_Space_Treaty#/media/File:Outer_Space_Treaty_parties_map_colors_updated_03012022.svg).



2. **Addressing Governance, Legal, and Security Complexities:** The *lack of clarity regarding Lunar governance, enforcement mechanisms, territory division*, and legal matters in space underscores the need for a comprehensive approach to Lunar policy.
3. **Strategic Control and Enforcement:** Suggestions for U.S. control *included treating claims as U.S. “islands,” granting government shares in companies*, developing a legal framework for Moon activities, involving a space force or international body for *enforcement*, and gathering intelligence on company principals.

## NSpC Participants’ Recommendations

**Recommendation 1:** Streamline and make a *licensing regime* more effective in anticipating future private claims/activities on the Moon. Must decide if there is a need for *enabling policy* changes and a potential multilateral agreement (do we want the Moon to be carved up?).

**Recommendation 2:** Assert that the U.S. has authority over Lunar activities due to the licensing regime. Could disincentivize companies from exclusively relying on U.S. launches, but offering defense or safety in exchange could be a big benefit.

**Recommendation 3:** Enforcement aspects (federation, U.S. Space Force, or Star Trek) balance with encouraging industry.

**Recommendation 4:** Leverage the situation to U.S. advantage through U.S. licensing regime.

**Recommendation 5:** Need a *U.S.-led international space security coalition*.

## Scenario 4: Are China's Moon Safety Zones a Massive Lunar Land Grab?

**The Daily Astronomer | Front Page**  
July 1, 2031

In a landmark address to the United Nations, a spokesperson for the Chinese government declared China's intent to establish safety zones for its burgeoning Lunar operations. While this announcement was presented as a necessary measure to ensure the security and stability of China's Lunar missions, it has ignited a celestial conundrum with far-reaching implications.



Experts and scholars from prominent think tanks around the world were quick to scrutinize China's proposed Lunar safety zones. Their analysis unveiled a startling revelation: These claimed operating areas encompass a staggering 60 percent of the coveted Peaks of Eternal Light, a Lunar region celebrated for its perpetual sunlight and proximity to vital water resources. Furthermore, the declared zones overlap significantly with the territorial claims of not one but two fellow Artemis Accords signatories, India and Japan.

This revelation has sent ripples of concern across the international community. Critics argue that while ensuring the safety of Lunar operations is paramount, the extent of China's claimed safety zones raises questions about equity and access in the rapidly expanding arena of space exploration.

U.S. commercial companies, feeling the squeeze of this celestial standoff, are adding pressure to policymakers, expressing their concerns. They are eager not only to safeguard their own Lunar ambitions but also to make comparable claims to protect their interests or seek the protective mantle of the U.S. Space Force. Investors are equally jittery, fearing that the outcome of this Lunar dispute could significantly impact the stock market, as the fate of numerous space-related enterprises hangs in the balance.

While the United States is not directly impacted by these contested zones, the issue has triggered a reevaluation of several critical aspects. In addition to assessing freedom of navigation concerns and territorial access, American policymakers are weighing the importance of supporting their allies in the Artemis Accords, such as India and Japan. Both nations have already signaled their intentions to permit international commercial operations within their Lunar territories, raising the prospect of potential access for U.S. companies.

As the debate surrounding China's Lunar safety zones intensifies, the world watches with bated breath to see how the United States and the international community will navigate this complex celestial dilemma. How might the U.S. cope with the intricate interplay of Lunar diplomacy, space governance, and strategic partnerships in the face of this Lunar land grab?

***Note:** The President saw this article and is concerned. He has asked the Vice President to convene a National Space Council to provide the President with options and recommendations for immediate response and long-term programmatic response options.*

## Scenario Selection Rationale

While the Moon itself has more land area than the entire continent of Africa, there are certain unique regions, such as the Peaks of Eternal Light,<sup>29</sup> that are quite small yet strategic because of their simultaneous access to constant sunlight as well as to the permanently shadowed regions that hold large reservoirs of ice and volatile resources. Early, uncoordinated occupation might be perceived as a land grab. It is already clear that the U.S. and China are looking at the same landing sites,<sup>30</sup> and some observers anticipate a scenario not unlike China's actions in the South China Sea<sup>31</sup>—including the current NASA administrator, who stated, “And it is true that we better watch out that they don't get to a place on the Moon under the guise of scientific research. And it is not beyond the realm of possibility that they say, ‘Keep out, we're here, this is our territory.’”<sup>32</sup> On Earth, China has declared administrative control of areas in the South China Sea<sup>33</sup> and declared air defense identification zones (ADIZ) in the East China Sea,<sup>34</sup> challenging the status quo and U.S. leadership.

## Discussion Summary

1. **Economic Impact and Market Response:** American companies and investors in Lunar operations risk significant losses due to China's actions. Officials suggested measures like temporary trading pauses, market intervention, and economic sanctions to protect businesses and mitigate market volatility.
2. **Territorial and Legal Challenges:** China's Lunar safety zones aim to establish new norms, raising concerns about control over critical territories like the Peaks of Eternal Light. International cooperation with allies and possible legal action against China for Outer Space Treaty violations were discussed, despite complex legal challenges. *Military responses ranged from strong presence to covert operations and reevaluating the U.S. Space Force's role*
3. **Public Support and Strategic Communication:** Gaining public support for Lunar operations is challenging, especially among progressive groups. Emphasizing the Moon's economic and strategic importance and its potential for climate research can help build support. Innovative nonmilitary solutions, like “Operation Throw-Shade,” were proposed

<sup>29</sup> Martin Elvis, Tony Milligan, and Alanna Krolikowski, “The Peaks of Eternal Light: A Near-Term Property Issue on the Moon,” *Space Policy* 38 (November 2016): 30–26,

<https://www.sciencedirect.com/science/article/abs/pii/S0265964616300194>.

<sup>30</sup> Noor Al-Sibai, “Awkward! The US and China Are Looking at the Same Moon Landing Sites,” *Futurism*, September 24, 2022, <https://futurism.com/the-byte/us-china-moon-landing-sites>.

<sup>31</sup> Malcolm Davis, “Space: The Next South China Sea,” *Australian Strategic Policy Institute*, July 12, 2018, <https://www.aspistrategist.org.au/china-the-us-and-the-race-for-space/>.

<sup>32</sup> Bryan Bender, “‘We Better Watch Out’: NASA Boss Sounds Alarm on Chinese Moon Ambitions,” *Politico*, January 1, 2023, <https://www.politico.com/news/2023/01/01/we-better-watch-out-nasa-boss-sounds-alarm-on-chinese-moon-ambitions-00075803>.

<sup>33</sup> Huong Le Thu, “Fishing While the Water Is Muddy: China's Newly Announced Administrative Districts in the South China Sea,” *Asia Maritime Transparency Initiative*, May 6, 2020, <https://amti.csis.org/fishing-while-the-water-is-muddy-chinas-newly-announced-administrative-districts-in-the-south-china-sea/>.

<sup>34</sup> Jaemin Lee, “China's Declaration of an Air Defense Identification Zone in the East China Sea: Implications for Public International Law,” *ASIL Insights*, August 19, 2014, <https://www.asil.org/insights/volume/18/issue/17/china%E2%80%99s-declaration-air-defense-identification-zone-east-china-sea>.

to counter China's exploitation. Developing a narrative that appeals to both investors and the public is crucial.

### NSpC Participants' Recommendations

**Recommendation 1:** Uptick discreet activities and demonstrate freedom of movement. Surveillance and reconnaissance activities can include military personnel.

**Recommendation 2:** To protect commercial and allied interests, pursue a strategy of legal action ("lawfare") to challenge China's territorial claims, particularly through coordinated efforts with India and other Artemis Accords signatories. Territorial claims and interest are based on Chinese Communist Party claims. Consider leveraging international forums like the United Nations Office for Outer Space Affairs (UNOOSA), even if not the ideal mechanism, to assert collective rights. Backstop the private sector (if needed). Make immediate contact if circuit breakers hit bands. Declare pause on trading. *Sanction offenders* in safety zones.

**Recommendation 3:** Ban China's sales of minerals whether on the Moon or Earth and build up U.S. mineral independence.

**Recommendation 4:** Leak certain parts of U.S. strategy to offset China, showing their action is unfair, polluting, and irresponsible. Climate and tech will benefit from this.

## Scenario 5: China's Lunar Factory Crushes U.S. Ambitions

**The Daily Astronomer | Front Page**

*October 1, 2031*

In a striking display of extraterrestrial industrial might, China has “stolen the march” on the United States by commencing large-scale Lunar regolith mining and deploying solar cells manufactured on the Moon. This initiative, directly utilizing techniques first proposed by U.S. universities and companies, including Blue Origin and Lunar Resources, has positioned the PRC at the forefront of sustainable development and green energy production in space.



The PRC's swift and visually impactful Lunar advancements have not only accelerated General Zhang Yulin's ambition to “industrialize the Moon to build solar power satellites” but have also unsettled the global perception of American leadership in space and sustainability. With megawatts of power expected to flow from these solar cells, the implications extend far beyond mere energy generation. This power surge sets the stage for operating a Lunar “mass driver,” an ambitious project that would facilitate the transportation of materials from the Moon to Earth or other space destinations, revolutionizing space logistics and commerce.

China's Lunar surge seeks to claim leadership in the critical global agenda of sustainable development, green energy, and combating climate change. The PRC asserts that harnessing solar power on the Moon is a giant leap toward a carbon-neutral future, as it offers a continuous and emission-free energy source. The stunning pace of China's achievements on the Moon—laid out for the world to see in daily broadcasts—contrasts starkly with the slower, more methodical progress of U.S. efforts, casting doubt on America's position as a space leader.

The framework for an expansive Lunar power grid is now materializing and, with it, the potential to power a mass driver, a concept that could transform Lunar materials into a powerhouse of space-based industry and commerce. Such a tool would be a game-changer for in-situ resource utilization, presenting a novel approach to off-world development.

As China's Lunar program unfolds with remarkable speed and scale, it challenges the United States to reevaluate its strategic priorities in space. American stakeholders, from the halls of Congress to Silicon Valley, are now compelled to respond with renewed vigor and vision. The race to secure a sustainable future has extended beyond Earth, and the next move will determine the balance of spacefaring leadership in the decades to come.

***Note:** The President saw this article and is concerned. He has asked the Vice President to convene a National Space Council to provide the President with options and recommendations for immediate response and long-term programmatic response options.*

### Scenario Selection Rationale

Commencement of actual Lunar regolith mining and Lunar-manufactured solar cell deployment would be a significant departure from past exploration. It would likely change perceptions about the strategic importance of the Moon, as well as trigger new environmental concerns. High-level PRC leaders have articulated their desire to create a “Moon-Earth economic zone” generating a

continent’s worth of economic activity (\$10 trillion/year in 2050)<sup>35</sup> and proposed an ambitious initial plan for a base.<sup>36</sup> The PRC’s military leadership has announced its intention to industrialize the Moon to build solar power satellites.<sup>37</sup>

U.S. policy has articulated the importance of leading in the space economy and pursuing a Lunar industrial base across the past two administrations,<sup>38</sup> and has even become part of at least one party’s platform.<sup>39</sup> These goals are reflected in NASA’s “Moon to Mars Objectives”<sup>40</sup> and have been the subject of a DARPA program to develop a Lunar economy in 10 years, Luna-10.<sup>41</sup> Moreover, the U.S. Space Force, Air Force Research Laboratory, Defense Innovation Unit “State of the Space Industrial Base” report identified “space manufacturing and resource extraction for terrestrial and in space markets” as one of the “six areas most vital to over US national power in space, and the areas most likely to be at the center of gravity in great power competition.”<sup>42</sup>

The U.S. originated the concept of mega-scale industrial development to build solar power satellites circa 1979–1985,<sup>43</sup> updated in 2016.<sup>44</sup> The potential of a self-replicating industrial capability on Lunar industrial development has been known by NASA since 1983<sup>45</sup> and was further developed by Johns Hopkins University in 2004.<sup>46</sup> Its national security implications were recognized by NASA authors in 2016.<sup>47</sup> Currently, multiple U.S. firms—including Blue Origin, OffWorld, ICON, Lunar Resources, Cislune, and Ethos Space—have major industrial ambitions and are developing in-space industrial capabilities such as metal refining, volatiles extraction, structure building, and photovoltaic cells. American allies in

<sup>35</sup> Cao Siqi, “China Mulls \$10 Trillion Earth-Moon Economic Zone.”

<sup>36</sup> American Foreign Policy Council translation of presentation at 3rd Annual Space Science Conference.

<sup>37</sup> Xinhua, “Exploiting Earth-Moon Space.”

<sup>38</sup> White House, “A New Era for Deep Space Exploration and Development,” National Space Council, July 23, 2020, [https://csp.aerospace.org/sites/default/files/2021-08/NSpC\\_New\\_Era\\_for\\_Space\\_23Jul20.pdf](https://csp.aerospace.org/sites/default/files/2021-08/NSpC_New_Era_for_Space_23Jul20.pdf); and White House, “National Cislunar Science & Technology Strategy,” Cislunar Technology Strategy Interagency Working Group of the National Science & Technology Council, November 2022, <https://www.whitehouse.gov/wp-content/uploads/2022/11/11-2022-NSTC-National-Cislunar-ST-Strategy.pdf>.

<sup>39</sup> Mark Whittington, “Republican Party Platform Goes All in on Space Exploration,” *Washington Examiner*, July 19, 2024, <https://www.washingtonexaminer.com/restoring-america/courage-strength-optimism/3090928/republican-party-platform-goes-all-in-space-exploration/>.

<sup>40</sup> NASA, “Moon to Mars Objectives,” September 2022, <https://www.nasa.gov/wp-content/uploads/2022/09/m2m-objectives-exec-summary.pdf?emrc=119caf>.

<sup>41</sup> Fibertek, “DARPA 10-Year Lunar Architecture Capabilities Study (LunA-10), Lunar Infrastructure Optical Node (LION),” [https://www.darpa.mil/attachments/DISTRO%20A%20-%20LunA-10%20LSIC%20Presentation\\_Fibertek.pdf](https://www.darpa.mil/attachments/DISTRO%20A%20-%20LunA-10%20LSIC%20Presentation_Fibertek.pdf).

<sup>42</sup> Steven J. Butow, Thomas Cooley, Eric Felt, and Joel B. Mozer, “State of the Space Industrial Base 2020: A Time for Action to Sustain US Economic & Military Leadership in Space,” [https://assets.ctfassets.net/3nanhbfr0pc/3TLIib4Z2UZG7szZdyVFuf/bafb12c16a37ee673b1ba30e72935c07/State\\_of\\_the\\_Space\\_Industrial\\_Base\\_2020\\_Workshop\\_Report\\_July\\_2020\\_FINAL.pdf](https://assets.ctfassets.net/3nanhbfr0pc/3TLIib4Z2UZG7szZdyVFuf/bafb12c16a37ee673b1ba30e72935c07/State_of_the_Space_Industrial_Base_2020_Workshop_Report_July_2020_FINAL.pdf).

<sup>43</sup> NASA, “Lunar Resources Utilization for Space Construction,” April 30, 1979, <https://nss.org/wp-content/uploads/2017/07/1979-Lunar-Resources-Utilization-1-Summary.pdf>; NASA, “Solar Power Satellite Built of Lunar Materials,” September 21, 1985, <https://nss.org/wp-content/uploads/2017/07/1985-SPS-Lunar-Materials-Study.pdf>.

<sup>44</sup> Lewis-Weber, “Lunar-Based Self-Replicating Solar Factory.”

<sup>45</sup> “Replicating Systems Concepts: Self-Replicating Lunar Factory and Demonstration.”

<sup>46</sup> Chirikjian, “An Architecture for Self-Replicating Lunar Factories.”

<sup>47</sup> Metzger et al., “Affordable, Rapid Bootstrapping of Space Industry and Solar System Civilization.”

Europe have likewise examined an industrial base to build solar power satellites<sup>48</sup> and provided a vision video.<sup>49</sup>

Past studies of using Lunar materials to build solar power satellites and space habitats have often preferred the use of mass drivers,<sup>50</sup> whose dual-use applications have been explored in fiction.<sup>51</sup>

The importance of such an advance is likely to be taken very seriously, as evidenced by this recent exchange in the House Natural Resources Committee on “The Mineral Supply Chain and the New Space Race.”<sup>52</sup>

**Congressman Collins:** “Well, let’s look at a worst-case scenario then Dr. Autry & Dr. Hanlon really quick—I know I’m running out of time—what’s the worst case if China wins the race for space mining and how would that negatively impact the United States, and Dr. Autry you want to start with that?”

**Dr. Greg Autry:** “I don’t want to be hyperbolic here, but if China wins the race in space, we’ve ceded the strategic high ground militarily and we’ve ceded the entire economic future, and the United States will be relegated to a backwater position for the rest of human history. I honestly think that this is an existential point.”

**Dr. Michelle L.D. Hanlon:** “I agree with Dr. Autry, ... if the Chinese will have the ability to not only block us to the Moon but to all of space, and humanity’s future lies in space.”

An early success in space industrialization is likely to trigger concerns about the U.S. falling behind.

**Note:** We provided additional scenario information as private information to the director of national intelligence player (to share with others) that there was evidence of military R&D designs for mass driver–launched weapons, with low confidence of any decision to pursue, but there was potential stockpiling of component materials, suggesting that the mass driver might become an Earth-strike weapon.

## Discussion Summary

1. **Violation of the Outer Space Treaty and Potential Weaponization:** *The council fears that China’s Lunar capabilities, such as mass drivers and energy production facilities, could be weaponized, posing a direct threat to Earth’s security. China’s actions are a blatant violation of the Outer Space Treaty, raising concerns about their intentions and the potential for an arms race in space.*

<sup>48</sup> Astrostrom, “Greater Earth Lunar Power Station: Final Report,” June 2023,

[https://nebula.esa.int/sites/default/files/neb\\_study/2753/GEO-LPS-Final-Report\\_June\\_2023.pdf](https://nebula.esa.int/sites/default/files/neb_study/2753/GEO-LPS-Final-Report_June_2023.pdf).

<sup>49</sup> Astrostrom, “Greater Earth Energy Synergies,” <https://www.youtube.com/watch?v=UfoWgs3dL-U>.

<sup>50</sup> Henry Kolm, “L5: Mass Driver Update,” L5 News, September 1980, <https://nss.org/15-news-mass-driver-update/>.

<sup>51</sup> Robert A. Heinlein, *The Moon Is a Harsh Mistress* (New York: Penguin, 2018).

<sup>52</sup> House Committee on Natural Resources, “The Mineral Supply Chain and the New Space Race,” December 12, 2023, [https://www.youtube.com/watch?v=QbD2ka\\_1tZI&t=1721s](https://www.youtube.com/watch?v=QbD2ka_1tZI&t=1721s); Greg Autry, “The Mineral Supply Chain and the New Space Race,” *Forbes*, December 16, 2023, <https://www.forbes.com/sites/gregautry/2023/12/16/the-mineral-supply-chain-and-the-new-space-race/>.

2. **Economic and Energy Market Disruption:** The scale of China’s achievements could *severely disrupt global energy and economic markets*, particularly the U.S. energy market (\$10 trillion domestic, \$120 trillion global). This disruption may weaken the U.S.’s economic sanctions tool against China, removing a crucial diplomatic leverage point.
3. **Recommendations and Balanced Approach:** Support U.S. private industry through initiatives like the *CHIPS Act and increased R&D funding to develop comparable Lunar capabilities*. Enhance intelligence and surveillance efforts, implement monitoring systems and inspections, and collaborate with allies to counter potential threats. *Focus on the economic and energy competition aspects while addressing national security concerns*, emphasizing transparency, international cooperation, and support for private industry.

### NSpC Participants’ Recommendations

**Recommendation 1:** *Build a holistic plan-ahead for the country to counter economic–intellectual property problems.* The administration should be prepared that information about the plan will be leaked. The holistic plan includes the following:

1. Exposing China and how it is competing (economic and industry)
2. Domestic policy council to identify what else the U.S. can do to advance its position and get on the Moon and make up lost time
3. Strong civilian program that can pursue the military side and that Congress would support

**Recommendation 2:** *Build and expand mass driver capabilities.*

**Recommendation 3:** *Leverage the commercial sector to rapidly enhance mass-driver capabilities (CHIPS Act–related scale-up for research and engineering).*

**Recommendation 4:** Revisit potential deterrence options.

**Recommendation 5:** Large-scale monitoring of emerging capabilities, both open and classified.



## Scenario 6: *Lunar Odyssey* Stranded: Is Rescue Possible?

The Daily Astronomer | Front Page

June 12, 2029

In a harrowing event that has gripped the world, the *Lunar Odyssey*, a commercial spacecraft on a pioneering Lunar tourism mission, suffered a catastrophic collision during an in-space refueling operation. With the crew stranded in Lunar orbit, questions are mounting about the capabilities of the U.S. Space Force to conduct a rescue operation, and whether international assistance from other spacefaring nations will be necessary.



The accident has thrown a spotlight on the nascent space tourism industry, touted for its ambition to make Lunar travel accessible to private citizens. The *Lunar Odyssey* mission, the brainchild of a leading space tourism company, promised an unprecedented journey around the Moon for private citizens. It was a testament to human ambition and technological prowess, relying on a sequence of complex maneuvers including a critical in-space refueling to ensure the spacecraft's return journey. However, the collision, occurring during docking with the refueling station, has precipitated a crisis, highlighting the precarious nature of space operations and the dire consequences of miscalculations in the unforgiving vacuum of space.

The commercial space industry, once buoyed by the allure of space exploration, is now confronting a moment of truth. The *Lunar Odyssey* mishap has prompted a reevaluation of the risks associated with space tourism and sparked a conversation about the collective responsibility of the global community to protect those who venture beyond our planet.

The ensuing emergency has prompted urgent deliberations over the potential role of the U.S. Space Force in orchestrating a rescue mission. Established with the aim of safeguarding U.S. interests in space, the Space Force now finds itself at the center of a global conversation about its operational scope and the extent of its capabilities in responding to spaceflight crises.

As the world watches, the predicament of the *Lunar Odyssey* has catalyzed a broader discourse on the necessity for international collaboration in space. Analysts and the public alike are questioning whether the U.S. will seek the assistance of other spacefaring nations to aid in the recovery of the stranded tourists. This situation highlights not only the complexities of space rescue operations but also the imperative for a cooperative approach to space exploration and safety.

*Note: The President saw this article and is concerned. He has asked the Vice President to convene a National Space Council to provide the President with options and recommendations for immediate response and long-term programmatic response options.*

### Scenario Selection Rationale

Until recently, the only crewed spaceflight was by NASA astronauts, with only NASA having significant on-orbit responsibilities. However, the U.S. has now begun its first orbital tourism flights by SpaceX with plans for Cislunar tourism. What happens if something goes wrong and they need rescue? We now have both a U.S. Space Command and a U.S. Space Force (USSF)

with responsibilities to “protect American interests in space” but at present very little capability to respond. The inability of NASA, USSPACECOM, and the USSF to rescue American citizens would likely create significant public outcry.

There has been a significant increase in orbital space tourism, with plans by SpaceX for Cislunar cruises for tourism.<sup>53</sup> While the industry and Congress have good reasons for wanting to extend the regulatory learning period,<sup>54</sup> incidents such as the *Titan* submersible disaster<sup>55</sup> have brought home that such adventures can be dangerous and may require significant resources to be mobilized for attempted rescue. More recently, troubles with Boeing Starliner showed that commercial crewed systems can encounter problems.<sup>56</sup> Both the Aerospace Corporation<sup>57</sup> and RAND Corporation<sup>58</sup> have examined the gap in a space rescue capability, which has become a subject for public debate.<sup>59</sup> The USSF Space Futures Workshop and “State of the Space Industrial Base” report<sup>60</sup> both forecast a future need for space rescue. Even the deputy space command commander, Gen. John Shaw, said that “as humankind continues to travel further out from the most special place in the cosmos, the command will be ready to execute its responsibility for the human space-flight support mission.”<sup>61</sup> In connection with the anticipated increase in human activities on the Moon, an Air Force Institute of Technology–led interagency working group has even explored the need for Lunar search and rescue.<sup>62</sup>

How might such an incident appear in the public consciousness and for the National Space Council if a circum-Lunar private spaceflight mission encountered trouble?

<sup>53</sup> Elizabeth Howell, “Meet the dearMoon Crew of Artists, Athletes and a Billionaire Riding SpaceX’s Starship to the Moon,” Space.com, December 26, 2022, <https://www.space.com/meet-dearmoon-crew-spacex-moon-mission>.

<sup>54</sup> Jeff Foust, “House Speaker Introduces Bill to Extend Commercial Spaceflight Regulatory Learning Period,” *SpaceNews*, September 22, 2023, <https://spacenews.com/house-speaker-introduces-bill-to-extend-commercial-spaceflight-regulatory-learning-period/>.

<sup>55</sup> Leonard David, “How Will Space Tourism Be Impacted by the Titan Submersible Tragedy?” Space.com, July 28, 2023, <https://www.space.com/spaceflight-titan-submersible-tragedy-impacts>.

<sup>56</sup> Ian Whittaker, “Astronauts Are Stuck on the International Space Station After Yet More Problems With Boeing’s Beleaguered Starliner,” *The Conversation*, July 15, 2024, <https://theconversation.com/astronauts-are-stuck-on-the-international-space-station-after-yet-more-problems-with-boeings-beleaguered-starliner-234409>.

<sup>57</sup> Grant Cates, “The In-Space Rescue Capability Gap,” Center for Space Policy and Strategy, July 29, 2021, <https://csps.aerospace.org/papers/space-rescue-capability-gap>.

<sup>58</sup> Bruce McClintock, Dan McCormick, Katie Feistel, et al., “Select Space Concepts for the New Space Era,” RAND Corporation, November 2023, [https://www.rand.org/content/dam/rand/pubs/perspectives/PEA2600/PEA2644-1/RAND\\_PEA2644-1.pdf](https://www.rand.org/content/dam/rand/pubs/perspectives/PEA2600/PEA2644-1/RAND_PEA2644-1.pdf).

<sup>59</sup> Bryan Bender, “A Space Rescue Service? Calls Grow to Create a Quick Response Force for Astronauts in Distress,” *Politico*, November 2, 2022, <https://www.politico.com/news/2022/11/02/space-rescue-service-astronauts-00064633>.

<sup>60</sup> J. Olson, S. Butow, E. Felt, T. Cooley, and J. Mozer, “State of the Space Industrial Base 2021,” [https://assets.ctfassets.net/3nanhbfr0pc/43TeQTAMdYrym5DTRhjd3/1218bd749befdde511ac2c900db3a43b/Space\\_Industrial\\_Base\\_Workshop\\_2021\\_Summary\\_Report\\_-\\_Final\\_15\\_Nov\\_2021.pdf](https://assets.ctfassets.net/3nanhbfr0pc/43TeQTAMdYrym5DTRhjd3/1218bd749befdde511ac2c900db3a43b/Space_Industrial_Base_Workshop_2021_Summary_Report_-_Final_15_Nov_2021.pdf).

<sup>61</sup> John E. Shaw, Jean Purgason, and Amy Soileau, “Sailing the New Wine-Dark Sea: Space as a Military Area of Responsibility,” *Aether* 1, no. 1 (2022): 35–44, [https://www.airuniversity.af.edu/Portals/10/AEtherJournal/Journals/Volume-1\\_Issue-1/06-Shaw.pdf](https://www.airuniversity.af.edu/Portals/10/AEtherJournal/Journals/Volume-1_Issue-1/06-Shaw.pdf).

<sup>62</sup> Benjamin J. Johnis, “Lunar Search and Rescue: The Next Step for Human Spaceflight Recovery,” Air Force Institute of Technology (AFIT) Scholar Theses and Dissertations, 6996, March 2023, <https://scholar.afit.edu/cgi/viewcontent.cgi?article=7999&context=etd>.

## Discussion Summary

1. **Immediate Rescue vs. Long-Term Frameworks:** Strong support for a NASA-led rescue with international partners and private-sector involvement (Starship, Blue Origin). Proposals for a space coast guard, international rescue protocols, and standardized interfaces.
2. **Private Sector vs. Government Responsibility:** Emphasis on private insurance and rescue services in space tourism licensing; concerns over taxpayer burden. Advocates for a supportive but not dominant government role, with the potential creation of a “Space Guard.”
3. **Public Perception and Geopolitical Implications:** Concerns about rescuing wealthy individuals and expectations for USSF readiness; need for clear communication. Risks if China leads rescue; calls for a U.S.-led coalition and international cooperation.

## NSpC Participants’ Recommendations

**Recommendation 1:** Immediate actions must be led by the private sector with U.S. government assistance *or* a NASA-led international coalition.

**Recommendation 2:** Establish an *international rescue authority with standard interfaces* and rendezvous, proximity operations, & docking (RPOD) subsystem, despite only the U.S. and China having the ability.

**Recommendation 3:** Establish a new distinct area for Coast Guard Lunar area with enforcement and regulations of ports as the U.S. views Moon operations as port-like and focus more on the maritime domain:

1. Must invest in areas of capabilities that ports have.
2. Establish necessary standards.

**Recommendation 4:** Create incentives and a culture of safety in the broader ecosystems. Incentives are important to be safe.

**Recommendation 5:** *Purchase rescue capabilities* from the private sector and stand up the Coast Guard as separate from the USSF:

1. Create insurance requirements for all U.S.-licensed entities with humans in space.
2. Companies will also be required to have a standby vehicle for missions.
3. Require training and certifications (light touch).

**Recommendation 6:** Determine role of government and the U.S. government exposure to liability for search and rescue.

## CONCLUSIONS AND MACRO RECOMMENDATIONS

Once again, the series of high-stakes, wargaming scenarios presented to the simulated National Space Council proved that the U.S. is at a turning point in a new space race. Strategic competition in the space domain could shift the U.S. from being the premier space power to an observer state with a comparatively weaker economic and national security posture in the near future. As scenarios unfolded—from China’s rapid advancements in Lunar exploration to private claims on Lunar territory—it was clear U.S. policymakers do not have the necessary insight or tools to handle these potential situations. As identified in our first workshop, it is time for a strategic reassessment.

First and foremost, if the U.S. has any hope of competing in space, there must be an aggressive push to establish a permanent U.S. presence on the Moon by 2030, possibly bolstered by the implementation of a “High Frontier Program” that leverages public-private partnerships through the development of Lunar industrialization. If the U.S. government can make it a priority to facilitate orbital propellant purchase, provide tax incentives to foster private-sector investment, and encourage asteroid mining, it would push the U.S. space sector to truly develop infrastructure that could lead to a thriving Lunar economy. A CHIPS Act–style initiative for space technologies in the areas of in-situ resource utilization, space-based manufacturing, and Lunar power demonstration could help counter Chinese ambitions, while simultaneously advancing U.S. economic and national security.

Space governance is an area that will also require immediate attention. It’s essential for the U.S. and its partner nations to update the Artemis Accords to include specific provisions on safety zones, resource extraction rights, and dispute resolution mechanisms. The scenarios highlighted the gaps in existing space law that will need to be considered and addressed either with international treaties or through the U.S. government and the private sector establishing norms—given that allowing our competitors to do so could cause irreparable damage.

The role of the U.S. Space Force must evolve to meet these new challenges. Changes will likely be necessary to establish a broader mandate that includes responsibilities for Cislunar space domain awareness, protection of U.S. assets, and potential peacekeeping operations. Moreover, to be able to carry out new initiatives, we will need investment in rapid deployment capabilities to Lunar orbit and the surface for protecting U.S. interests. As a Lunar industrialization materializes, there will be additional complexities that necessitate development of search-and-rescue operations, space traffic regulations, and an international rescue authority.

Countering the effectiveness of Chinese space operations is paramount and requires a multifaceted approach. Enhanced situation awareness, with new types of sensor systems, and possibly having presence on the Lunar surface to conduct freedom of navigation operations in disputed Lunar regions will be a necessity. Mechanisms will need to be in place to challenge adversary attempts to “territorialize” the Moon. Additionally, leadership in pioneering space-based solar power technologies and Lunar extraction methods will be important to ensure the stability and growth of U.S. energy markets and offset China’s gains in this domain.

Ultimately, the encouragement, government support, and success of these initiatives hinges on robust public support. The U.S. will need to develop a space strategy that adequately considers the risks of inaction and the benefits to our economic and national security interests, and then prioritizes the aforementioned and communicates this to the public. There is a clear need to capture the public imagination and foster a commitment to developing Lunar

industrialization—and not just for explorative purposes, but because it will secure the U.S. as a premier spacefaring nation and promote our values beyond Earth.

The following are strategic recommendations drawn from the entire scenario set:

1. **The U.S. needs a strategy for competitive economic and industrial development.**
  - The U.S. must deploy the full range of economic tools to create incentives for the private sector to create in-space industry.
  - The U.S. must create allied international economic development institutions for space to forward the Artemis block.
  - The U.S. must reprioritize U.S. government Lunar investments with a greater emphasis on scalable in-situ resource utilization and in-space manufacturing.
2. **The U.S. must develop a Space Security Alliance.**
  - Numerous provocations require the mobilization of a collective security community.
  - Such a “NATO for space” must be built in advance of when it would be needed.
3. **The U.S. should develop contingency plans for provocations below the level of armed conflict.**
  - The U.S. should develop in advance contingency plans and options to respond to a Lunar land grab, or Lunar weaponization, before such a crisis emerges.
  - U.S. Space Force responsibilities need to include protecting private industry and enforcing U.S. interests in Cislunar space.
4. **The U.S. must be postured for space rescue.**
  - Develop a forward-looking White House strategy and implementation guidance similar to its National Preparedness Strategy for Near Earth Object Hazards and Planetary Defense.
  - Assign responsibilities for space rescue in the Unified Command Plan.

## LIST OF PARTICIPANTS

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**Mr. Richard Harrison** is the Vice President of Operations and Director of the Defense Technology Program at AFPC, where he co-directs the AFPC Space Policy Initiative (SPI). He has published numerous articles and is co-author of *The Next Space Race: A Blueprint for American Primacy* (Praeger, 2023) and co-editor of *Cyber Insecurity: Navigating the Perils of the Next Information Age* (Rowman & Littlefield, 2016). Prior to his work at AFPC, Harrison spent several years as a systems engineer in the aerospace sector for Lockheed Martin. He completed his master's degree in Security Studies from Georgetown University's School of Foreign Service and also earned a bachelor's degree in Aerospace Engineering from Penn State University.

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## APPENDIX

The appendix provides a comprehensive overview of the scenarios explored during the workshop, offering valuable insights and supplementary data. Each scenario is accompanied by detailed information that was furnished to the participants, specifying the assigned Democratic or Republican administration in power. The appendix also includes the assessments, concerns, and recommendations put forth by each National Space Council (NSpC) participant. To further enhance understanding, a discussion summary (aided by AI) is included, which succinctly highlights the key tensions and points of deliberation that emerged during the scenario discussions. This additional context aims to provide a more nuanced and complete picture of the complex issues addressed throughout the workshop.

## Scenario 1: PRC Wows World With 3D-Printed Moon Structures

Scenario Supplemental Data Provided: None

### Issues and Considerations

For this exercise, the National Space Council (NSpC) was assembled under a Republican administration. Below are the summaries of each NSpC participant's contributions to the debate on how best to respond to the scenario, along with points of conflict:

#### *Vice President*

**Concerns:** How will this be framed from a media perspective?

#### *Secretary of Defense*

**Assessment:** Partnering with the private sector will be necessary. First, we would expect other countries' defense ministries to ask what the accurate perspective is. Second, public opinion will be fraught with concern as previously stated, but we should be cautious of being too reactive. Third, the U.S. Space Force and the Department of Defense do not have a policy decision for broader responsibility for Cislunar space and the Moon. Fourth, the previous administration did not foster the correct relations between the public and private sectors.

**Concerns:** A lot of disjointed proposals instead of a united approach because we lack a comprehensive approach. Close allies would come to the Defense Department and ask if what the PRC is saying is true. The assumption that the department doesn't want to collaborate with the private sector is inaccurate. The prior administration made critical mistakes with not enough public-private partnerships to ensure U.S. national security interests were secured.

**Recommendations:** There is an opportunity for public-private cooperation across the board. Reassure our closest allies about the level of our technology. With respect to human spaceflight we may be behind, but the U.S. is strong in additive manufacturing and likely ahead in capabilities on orbit. We should consider how we can work with our close allies to increase the state-of-the-art tech. Explain to the public and Congress why this is important to the average American citizen. States "won't win the next election if no actions are taken at all."

#### *Director of National Intelligence*

**Assessment:** Less worried about Taiwan and more worried about the situation on the Moon, particularly where the U.S. is conducting Lunar activities and will be able to pre-position devices.

**Concerns:** India and other countries are considering working with the PRC while others are concerned that their involvement with the U.S. may cause long-term problems (the specific worry is export control regimes). Worried that the United States's falling behind the PRC in this regard may lead to long-term repercussions, and other countries may consider siding with China for their future space endeavors. Why didn't NASA develop these resources? The commercial side seems more invested.

**Recommendations:** Will take a bit to declassify, but we may be able to prove that the PRC is polluting the Moon’s environment. We should make clear that U.S. Moon efforts have not been polluting the Moon’s environment, unlike the PRC.

***Secretary of Commerce***

**Concerns:** Any meeting in the public with allies to respond to this event would be viewed as reactive. A closed-door meeting is possible, but a big convening would play into the PRC’s hand.

**Recommendation:** Level set, control narrative, and explain we have been actively funding research on Lunar regolith for a decade. We should work behind the scenes with Brazil and other countries that are flirting with China’s program. We should issue press releases that highlight work students are doing at universities, showing young people involved with this tech and science at Drake, Washington State, University of Texas, Austin—these activities are very exploratory and provocative. Reach out to allies and ensure money goes toward Artemis and to allies’ space tech programs.

***Secretary of State***

**Concerns:** We need to take the lead and galvanize the public. The Chinese have been building up their access to U.S. allies. Allies and partners will see this as the U.S. falling behind in areas of security, and this event will impact military capabilities of the Chinese Communist Party (CCP). Worried the CCP will conquer the Moon before the U.S. could return and those countries will gravitate toward China rather than the U.S.

**Recommendation:** The Artemis Accords were developed so long ago, one option could be to reconvene the Artemis Accords members and recommit and update the agreements made, allowing us to hear their concerns and showing a united front. Could even include the private sector as potentially the key to the future. Could also pursue economic trade zones on the Moon as it would align nicely with U.S. historical economic policies. Need to emphasize the need for public-private partnerships.

***NASA Administrator***

**Assessment:** Start blaming the prior administration. After successful flight tests of Starship, demonstrate how to turn Starship into a Lunar base in 180 days (<https://starship1.univer.se/>). Whether the CCP has a tech lead or not, we can do more than just 3D-printed structures, soft land three to four times, land a rover, demonstrating our capability. We should spend some money and prove we can keep up.

**Recommendation:** Acknowledge what the CCP has done is noteworthy, but not something that is too impressive. Plan to show that what we’re doing is much more impressive. Should be a whole-of-government effort to build something more impressive so that other countries don’t even question which side will win.

***Lunar and Asteroid Mining Subject Matter Expert***

**Assessment:** The book *Astrotopia* took aim at U.S. billionaires’ plundering and pillaging; China is now pillaging, and the biggest tool we have to take on this communist threat is free enterprise. Needs to be more than just NASA building a palace on the Moon. Needs to include the private sector.

**Concerns:** We can't take on a state program with a state program. Need to take the position that we are supporting individual peoples on the Moon.

**Recommendation:** Challenge China in the United Nations that they can't claim the territory on the Moon as a state, maintain the high ground gained here, refer to 2024 submission United Nations Office for Outer Space Affairs (UNOOSA), reaffirm state appropriation as inappropriate, call out to build state facilities, islands on the Moon. While should encourage individual commercialization on the Moon—universal declaration of human rights, individuals have the right to own property, and encourage private facilities across the Moon. Establish zones of non-interference, orbital capabilities, private companies using same manufacturing approaches in orbit, encouraged through subsidization.

#### *Assistant to the President for Domestic Policy*

**Questions:** How did we fall behind? Press and public will ask where the money we've been spending has gone and why NASA hasn't developed these technologies first. Why has the U.S. Space Force left us vulnerable? How can we catch up?

**Assessment:** Arguments will be made that the commercial side is more innovative, but massive investment from the Defense Department and NASA is necessary.

**Concerns:** No one has raised the point that we have a lot of companies in the U.S. that would push back on any policy that would impact their bottom line (for those heavily invested in China). Concerned about the upcoming election. The opposition candidate is isolationist, and the forecasting deficit is haunting. There will be a crisis on the fiscal side. Situation is similar to the late 1930s under Franklin Roosevelt—we should take care of ourselves rather than others. Our polling numbers are not good at the moment.

**Recommendation:** Put almost everything on a war footing, emphasize our values are worth fighting for, and get everyone on the economic side working toward this focus (including the campaign focus).

#### *Director of the Office of Science and Technology Policy*

**Concerns:** Disagree with the secretary of defense. This is an emergency. We try to enter partnerships, but countries are increasingly resistant. See why. We tried to partner with South Asian countries, but they leaned toward China.

**Recommendation:** We have a portfolio of tech in the U.S., so we should emphasize the areas of tech we are ahead in and then show the world where we are ahead (e.g., server farms for artificial intelligence, biomedicine). Artemis base camp will be used for these purposes to better the world and mitigate flight of our experts to other countries. We need to overshadow what the PRC has done and have a bigger goal. Involve economic opportunity with our partners. Should announce a big effort on the Moon in economic nature and involve allies.

#### *Chinese Communist Party Subject Matter Expert*

**Assessment:** You will see China pushing on other countries to sign with them and trying to take advantage of this situation to undermine the U.S. They will be inviting U.S. companies and students into China.

**Concern:** A certain amount of decoupling will be required. Large U.S. corporations and financial services are still active in China and pressuring administrations to continue that activity.

**Recommendation:** The U.S. can't declare a free trade zone if they're not up there on the Moon trading. Must DO something—you have to demonstrate something; build something in space, do that tomorrow.

#### *White House Press Secretary / External Press Agitator*

**Assessment:** Be prepared for very negative news coverage, and do not overestimate how sensationalist these kinds of stories become. Narrative may become that the U.S. is being supplanted by China and controlling the Lunar economy—a failure of U.S. leadership. We have to try and get ahead of that as much as possible by emphasizing Lunar exploration and the big picture. Talk to the media and give more information. Acknowledge China is making progress, but discuss other challenges and reemphasize U.S. commitments.

**Recommendation:** We should brief the news media and put out a talking point memo to emphasize the points that everyone has made in public affairs: The U.S. has capabilities and can catch up quickly while bringing along allies. Need to frame this as a new chapter in space exploration, expressing confidence in our technology. Explain where our current U.S. tech is at, rather than making this a political issue and risking it getting bogged down.

#### *Presidential Policy Advisor*

**Assessment:** It will be a campaign year, and we are dealing with significant political disagreements. Sitting with a president who may not be in the best position. Fighting upstream against our own party, let alone public opinion and Congress. National strategy sounds good, but we need to care about the next election. Economic trade zone is a good idea.

**Concerns:** Must consider the elections this year.

**Recommendation:** Could create as much noise as possible regarding the Moon. Maybe making an economic free trade zone. Ensure the Chinese don't move into Taiwan and risk our supply of semiconductor chips. Get some more stuff on the Moon to show we are keeping up.

## Discussion

One of the primary tensions highlighted during the discussion was the balancing act between the necessity for a swift response and the risk of appearing overly reactive to China's achievements. While some NSpC members viewed the situation as an emergency requiring immediate action, others, like the Secretary of Defense, urged caution and warned against being too reactive. The Vice President expressed concern about how the media would frame the situation, while the Press Secretary emphasized the importance of controlling the narrative and acknowledging China's progress while highlighting U.S. commitments and capabilities.

The council members also grappled with the role of the private sector in countering China's state-led program. The Secretary of Defense and the NASA Administrator both advocated for leveraging the capabilities of American commercial space firms. They highlighted the past administration's failures in fostering effective public-private collaborations and stressed the need for a unified approach to leverage the private sector's innovations. This stance was supported by the Lunar and Asteroid Mining Subject Matter Expert, who emphasized that free enterprise should be the cornerstone of the U.S. response, arguing that the U.S. could not counter a state-led program with another state program. However, this approach raised concerns about the need for decoupling from U.S. corporations active in China.

Several controversial options were put forward during the meeting. The Secretary of State suggested reconvening and updating the Artemis Accords to show a united front among allies and partners, while also proposing the establishment of economic trade zones on the Moon to align with U.S. economic policies and involve allies. The Assistant to the President for Domestic Policy recommended putting the country on a “war footing” to emphasize the importance of U.S. values and focus on the Lunar challenge. The Director of National Intelligence proposed declassifying information to prove that China is polluting the Lunar environment while highlighting U.S. efforts to maintain a clean presence.

Throughout the discussion, council members acknowledged the need to reassure allies, demonstrate U.S. capabilities through tangible actions on the Moon, and set ambitious goals to overshadow China’s achievements. NSpC participants expressed concerns about nations like Brazil, Nigeria, and Argentina showing renewed interest in China’s International Lunar Research Station. They warned that this could lead to long-term strategic repercussions if the U.S. failed to present a compelling alternative. The NASA Administrator suggested showcasing the ability to turn Starship into a Lunar base within 180 days, while the Secretary of Commerce recommended highlighting the work of students at universities to demonstrate the U.S.’s ongoing commitment to Lunar exploration and technology development.

However, the meeting also brought to light the political challenges faced by the administration, particularly in light of the upcoming elections and public opinion. The Presidential Policy Advisor emphasized the need to consider the electoral implications of any actions taken and suggested creating noise around the Moon issue, such as establishing an economic free trade zone, to boost the administration’s standing. The Assistant to the President for Domestic Policy also raised concerns about the administration’s polling numbers and the potential pushback from companies heavily invested in China.

## **Scenario 2: China Beats the U.S. Back to the Moon**

Scenario Supplemental Data Provided: None.

### Issues and Considerations

For this exercise, the National Space Council (NSpC) was assembled under a Republican administration. Below are the summaries of each NSpC participant’s contributions to the debate on how best to respond to the scenario, along with points of conflict:

#### *Vice President*

**Assessment:** There is a need to reassure U.S. allies and discern the intent of the new constellation.

**Concerns:** Whether the situation is an immediate threat or not, the strength of the response has implications for the White House.

#### *Secretary of Defense*

**Assessment:** We need to think strategically because we are at risk of underestimating the consequences of the PRC Moon landing. From the Chinese perspective: First, there is significant domestic political will within China, and this landing fosters national pride reinforcing the party and value of socioeconomic rule of the CCP, reinvigorating

demographic headwinds as a competitor. Second, there are broad geopolitical ramifications as the CCP can tout this as an accomplishment of the party and its form of governance, broad implications of reshaping the international order sphere of influence, which carry security implications for the United States. Third, this is another Sputnik moment; we cannot underestimate what it will cost in terms of American self-image. Maybe we are no longer the leader in space—what does this mean? Don't put a military face on this issue as it would not go over well.

**Concerns:** Who controls the high point will influence overall competition in Cislunar space, and what the CCP cares about is its position on Earth, all about the politics on Earth. Are the Chinese using special orbits in Cislunar space that can be used against terrestrial targets on Earth that affect U.S. national security?

**Recommendation:** It is important that the intelligence community is providing us with accurate and actionable intelligence for what the PRC is doing on the Moon. Don't think we should put a military face on this project. However, if we do not fortify our ability to defend our interest in space, we cannot further our interests going forward. Explain to the public why space is economically viable and that the U.S. Space Force is not providing for us everywhere. U.S. interests are at stake, and discuss the role of the Defense Department and mission in Cislunar. Need to make clear the President's expectations in the Unified Command Plan, which defines planning and expectations, Operations, Training, and Evaluation (OTE), to support those operations, reflected in budgets and priorities. We cannot accomplish the technological advancements we want to without going to the Moon. Congratulate China—let them know they caught up 50-plus years later.

*Director of National Intelligence*  
(Unavailable)

*Secretary of Commerce*

**Assessment:** This is an opportunity to reset goals for space.

**Question:** As China continues to set up positions in Cislunar space, how much is the U.S. willing to spend to recalibrate its space objectives, and what is the cost? Should we spend \$2 billion more, and how do we rationalize the increase? Should we be focusing on a Moon-Mars vision?

**Recommendation:** Trade follows the flag. If we are not projecting out our ability to defend in space, companies aren't going to take the risk to make a presence there. We need to push defense out further. Then commerce and Congress will follow.

*Secretary of State*

**Assessment:** U.S. should be out front and the clear leader in space. It's disappointing that the U.S. is ceding ground to China. The President needs to have a conversation with the team at NASA to ensure it doesn't happen again. Space is the next frontier, and we need to go to the international community involved to develop norms and policies to govern space. We cannot allow China to continue space progress without adhering to norms.

**Recommendation:** A Republican administration normally does not advocate international forums. When you consider international organizations governing every other domain—oceans, the Arctic—there are agreements and rules governing what is permitted. Existing treaties and agreements that might govern the new frontier may not be the right agreements.

They should be negotiated and do not need to include everyone, just the countries involved in space. Decide what rights govern the territory of the Moon, what satellite systems should be placed there. We need new treaties and to determine what it means for existing international organizations. Be firm with China, follow rules, or they won't be allowed in the new organizations.

### *NASA Administrator*

**Assessment:** The Administrator should resign in disgrace as this would be a Sputnik moment (said jokingly). It's been 10 months since inauguration and only recently confirmed so it makes political sense to clean up the mess of the former administrator—this is an opportunity to reset our goals in space.

**Recommendation:** The U.S. does not need to draft any more treaties as U.S. public law resources extracted in space belong to those companies under the Obama administration. The U.S. should capitalize on this law and encourage new Lewis and Clark-type companies in space—create a free enterprise zone, tax holiday to orbital activities. The U.S. should have public-private partnerships that are not just confined to the Moon, but exploration and space-based solar power should be encouraged. Three months after Sputnik, the U.S. had first satellite in orbit and created NASA the following year. During the Sputnik moment, Eisenhower made things happen on a timeline of months. We now need a step-by-step action plan to get back on track to dominate Cislunar space. We need a concrete short-term deliverable—SpaceX, whatever you planned to do in four years, let's achieve in 12 months. Additionally, we need a NASA–Defense Department partnership with department personnel present to defend our interests. U.S. Space Force should have human beings in space. We need to reverse Eisenhower's decision to separate civil and defense space. It is important to convince the public about why it is economically vital and no substitute to operating on the Moon.

### *Lunar and Asteroid Mining Subject Matter Expert*

**Assessment:** China isn't scared of NASA; it's scared of our private sector (Musk, Bezos). We cannot vest the accelerative power of U.S. government purchase as investment in NASA alone. The Defense Department plays a potentially huge role. In the world of space startups, the fast-track investments and contracting of U.S. Space Force and SpaceWERX has had a major effect, while NASA is still seen as ponderous and much more programmatically self-serving.

**Recommendation:** We should offer China to work on a unified Lunar base and enable Lunar COTS/CCDEV (commercial orbital transportation services/commercial crew development) for the private sector to build facilities: Artemis Home, Artemis-Chang'e—for all the nations to work on. CCDEV with habitats, Artemis Home, private-sector built infrastructure for SpaceX and government employees, tax incentives to overbuild in terms of customers, resources. Continue focus on Moon-to-Mars development. All support people in Artemis Home, encourage the private sector to unleash itself at the same time, and offer a public state, truly international. Additionally, if we can't win the game, change the game. We should announce a "High Frontier Program," a COTS/CCDEV, guaranteed purchase of propellant in orbit, subsidize development of asteroid resources, and make the game much bigger than the Moon. Commerce incentives, trump them into a bigger game.



***Assistant to the President for Domestic Policy***

**Assessment:** China has a one-dimensional program. The U.S. has a multidimensional program, which is a strength.

**Recommendation:** Go out and gather information from U.S. private companies and all agencies and determine what they can bring to the table in the next one or two years as a multifaceted effort.

***Director of the Office of Science and Technology Policy***

**Assessment:** Taikonauts landing on the Moon before the U.S. returns is a big blow to the public because the vision of the U.S. being leaders in space is a cornerstone of our identity. However, it goes beyond our identity because it's about political signaling, developing new technology by doing—if we are not on the Moon developing extraction and manufacturing, then China's rate of development will be faster. It's critical to get on board and keep pace by putting effort into the Artemis program.

**Recommendation:** In the short term, space is about education and science, then it's about defense in the midterm, but in the long term, space is about economic activity—we must convince the public that space is vital to our economic advancement and that there is no substitute for developing tech on the Moon.

***Chinese Communist Party Subject Matter Expert***

**Assessment:** China has a tendency to emphasize certain programs in a spiral development process. Where China puts emphasis it will probably succeed, though that does not mean it will succeed everywhere or the spiral development process always works. China will likely tie into its Belt and Road Initiative, as business partners and investment in some cases, offer loans to get into the program and bind them into repayments, use propaganda to justify their primacy in space.

**Concerns:** Private industry torn, as companies are already over there cooperating, satellite use, launch services, try to keep a foothold in China if making money there—that's what private business does. Upon landing on the Moon and establishing a base and other landers, the Chinese will treat the Moon as if it was all their territory like they did in the South China Sea. It will be a giant game of Wei-Chi or Go on the Moon as the Chinese amass territorial control. If China can link two zones on the Moon, they will own that portion. If the U.S. does not get to the Moon, they will get no territory. Similarly, if the U.S. does not establish rules with partners, the Moon will look like the South China Sea.

**Recommendation:** The U.S. should get beyond the Moon early and trump them in Cislunar space (though by then Tianwen-2 may have landed on an asteroid and mined it—may not trump them there). The U.S. really needs to put together some kind of coalition, natural partners, like India/Japan/Australia/U.K. that will likely not partner with China. If Artemis can compete quickly, then natural partners and others will be allied.

***White House Press Secretary / External Press Agitator***

**Assessment:** Public will view this as China making progress while the U.S. does nothing. Hard to shut that narrative down, but maybe agencies can get together and have a strategic review and look at the goals and opportunities. Followed by announcing next steps and affirming commitment to space exploration. It's important to be mindful of how the U.S. communicates what went wrong and can specifically point to Defense Department warnings

from 2023–2024, which cautioned about avoiding these strategic surprises, and no one heeded the warnings.

**Concerns:** How was the U.S. caught flat-footed, and how was another Sputnik moment allowed to happen? The U.S. public will want some accountability, and there will need to be some personnel changes to show the U.S. is serious. The media is asking when will the U.S. stop being at war with China and start working together with China since it is a premier space power?

**Recommendations:** The coverage is savage—colonizing the Moon while America sleeps—can’t necessarily counter or shut down, but it’s an opportunity to acknowledge time for major policy changes, announce a comprehensive strategic review, a comprehensive reassessment of Artemis, goals for international opportunities, follow up and announce next steps and U.S. commitments to science and tech for economic benefits. The U.S. should use this as an opportunity to reset goals and present this as a positive in response.

### *Presidential Policy Advisor*

**Assessment:** The U.S. is getting hammered in the press for letting our guard down, and we are going to have to confront China head-on as this event makes the missile gap look like child’s play in perception and reality. There is a sense of a space battlefield where the Chinese have established a presence on the Moon, put rovers on Mars, and are advancing their overall strategic position not just on the Moon but in Cislunar space and beyond.

**Concern:** China has been analyzing Helium-3, which can be applied to nuclear power so we cannot ignore the national security implications as there are strategic locations of Helium-3 deposits on the Moon.

**Recommendation:** We need to expand our focus as well and cannot ignore the national and economic security issues with this event. Rather, we should develop a timeline measured in months, not years, and bring together the key players (including policymakers on Capitol Hill) to accelerate plans on the Moon and beyond—especially as the International Space Station sunsets.

## Discussion

The Vice President opened the discussion by stressing the importance of maintaining the U.S.’s technical leadership in space. Concerns were raised about the public’s perception of these events, the financial implications of competing with China, and the role that allies might play in this new space race.

One of the primary points of contention was how to balance public-private partnerships with government-led initiatives. The consensus was that the U.S. cannot rely solely on NASA or military programs to regain its footing. Instead, leveraging the innovative capabilities of the private sector was seen as crucial. This included suggestions for creating economic incentives, such as tax holidays and commercial orbital transportation services (COTS), to encourage private companies to invest in Lunar and space exploration.

Economic strategy and the role of defense were also hotly debated. While some participants argued for a stronger military presence to protect U.S. interests in space, others cautioned against militarizing the issue, suggesting that economic and technological leadership would be more effective. The suggestion to create economic trade zones on the Moon and to demonstrate rapid advancements through programs like SpaceX’s Starship were highlighted as ways to reassert American dominance and attract commercial interest.

Geopolitical implications also loomed large in the discussion. There was a shared anxiety about China’s potential to reshape global power dynamics through its Lunar presence, particularly if it succeeded in establishing a semipermanent base. The need to form and strengthen international alliances was emphasized, with some advocating for new treaties and norms to govern space activities, ensuring that China does not set the rules unilaterally. The idea of expanding the Artemis Accords and involving more international partners was proposed as a means to counterbalance China’s influence.

Tensions arose as the discussion turned to security matters, with the Defense Secretary urging caution over China’s potential military intentions on the Moon. The CCP expert echoed these worries, likening China’s approach to its strategic creep in the South China Sea. Others maintained a more optimistic economic view, insisting that space activities were critical for driving long-term technological progress.

Despite the differing perspectives, a few common threads emerged. Many pushed for accelerated timelines measured in months rather than years to regain momentum. Others called for expanded international partnerships and coalitions to establish norms governing space activities before China dictated them unilaterally. The importance of effective public messaging also featured, with ideas ranging from comprehensive strategic reviews to reframing space endeavors as vital economic necessities.

### **Scenario 3: Can a Private Company Claim the Moon?**

#### Scenario Supplemental Data Provided:

- The company founders are American citizens who are sympathetic to advancing U.S. interests but have a pro-libertarian bent. They think they can do what the U.S. is unable to do.
- If the U.S. does not validate the claim, the Director of National Intelligence has knowledge that the PRC was thinking of making a claim in the same strategic region.
- The players requested the specific island state, which for the purposes of the fictional exercise was said to be Vanuatu.

#### Issues and Considerations

For this exercise, the National Space Council (NSpC) was assembled under a Republican administration. Below are the summaries of each NSpC participant’s contributions to the debate on how best to respond to the scenario, along with points of conflict:

##### ***Vice President***

**Assessment:** U.S. strategic leadership in space is critical. It’s an opportunity for the U.S. to shape norms and gain first-mover advantage in the new era of Lunar exploration and development. However, the establishment of independent extraterrestrial citizens raises significant issues.

**Concerns:** There is a risk of losing strategic Lunar locations to other countries, particularly China, and the implications of companies like Starlight Ventures declaring extraterrestrial self-sovereignty are concerning.

**Recommendations:** The U.S. should streamline the licensing regime to provide more specifics on where and how it wants commercial space activities to operate, using this case to

establish longitudinal foundations and norms. The U.S. should advocate for a new treaty that includes international coordination and reassure companies that it will defend them if they follow agreed-upon norms of behavior.

### *Secretary of Defense*

**Assessment:** The private sector often pushes boundaries when policy regulations lag, creating an opportunity for the U.S. to shape the uncharted territory of Lunar activities. There is a need to balance private-sector initiatives with national interests. Exploration and expansion on the Moon should not have a military face to it.

**Concerns:** The U.S. must consider whether allowing nations to carve up the Moon is the right approach and how to manage licensing, bandwidth, and liability issues for launching states and potential Lunar manufacturing.

**Recommendations:** The U.S. government should assert responsibility and authority over the U.S.-originated entities like Starlight Ventures, reinforcing Outer Space Treaty principles of nonappropriation while enabling appropriate commercial activities (U.S. is not a party to the Moon Treaty). Alternative governance models like seabed or Antarctica treaties should be considered, with the U.S. Space Force playing a role in Lunar domain awareness, but ensuring freedom of operations in Cislunar space and Lunar orbit are not yet a Defense Department responsibility.

### *Director of National Intelligence*

**Assessment:** The situation presents both opportunities and threats, as economic and security pressures could influence the alliances of private companies. The question to the President is not which entity we control but which function we need to ensure exists. The intelligence community will have a take on which countries would be trustworthy or not. That will dictate how to build a coalition.

**Concerns:** The potential purchase (or co-option) of private companies under economic/security stress, the lack of clarity regarding citizenship and manufacturing in space, and the fracturing of humanity into competing camps are significant risks.

**Recommendations:** Gather intelligence on the company principals' backgrounds, motives, and pressure points, considering the possibility of renouncing citizenship and claiming "extraterrestrial sovereignty." Focus on identifying the key functions that need to exist in space, engaging with nations trying to court these companies, and maintaining control through declared nationality or extraterrestrial self-sovereignty.

### *Secretary of Commerce*

**Assessment:** Starlight Ventures' claim likely violates Article II of the Outer Space Treaty, and small nations like Vanuatu should not be allowed to circumvent international treaties. The U.S. signed off on the launch and is compelled to uphold treaty obligations.

**Concerns:** Allowing nonsignatory nations to circumvent the Outer Space Treaty sets a bad precedent, and the claimed safety zone cannot be too expansive. Vanuatu's economic dependence on imports can be leveraged to pressure the nation.

**Recommendations:** Take punitive economic actions against Vanuatu and cooperate with Starlight Ventures to significantly restrict their claim to a small safety and operational zone (500 meters or a kilometer). Fire the responsible Federal Aviation Administration (FAA) official who approved their plan as a sacrificial lamb. If Lunar territory is divided, require

designated landing pads as the smallest possible zones and ensure that the U.S. maintains control over companies it licenses for space activities. Pads are the way to go for designated landing areas, and they should be U.S. licensed and operated.

### *Secretary of State*

**Assessment:** The U.S. faces a complex dilemma, either allowing the company to proceed or constraining it and risking Lunar access to China. International cooperation and governance are necessary, and partnering with the company as a governance test case may be the best path forward.

**Concerns:** Who governs the Moon, how do we govern actors, and how are violations enforced? Unilateral sanctions, the main enforcement mechanism for Lunar violations, are ill defined, and it's unclear if Chinese control of a private company via Vanuatu poses a direct U.S. security threat. The risk of China taking strategic Lunar positions and the lack of clarity on Lunar governance and enforcement are significant concerns. If China threatens the nation or company, would the U.S. Space Force do freedom of navigation operations?

**Recommendations:** Work with allies to convene experts and establish rules for commercial Lunar activity, using multinational penalties to influence behavior. Determine U.S. options and recourse if a nation or company violates agreed rules. Partner with allies to create an alternative to Chinese dominance, and convene a roundtable of experts to develop a comprehensive policy.

### *NASA Administrator*

**Assessment:** This situation presents an opportunity for U.S. leadership, as the company is under U.S. nominal authority despite the sovereignty claim. The U.S. could treat it like a Hudson Bay Company model, with some government stake, aiming to be at the forefront of Lunar exploration and development.

**Concerns:** The U.S. needs to be first in line with the biggest funding for Lunar access, and intelligence is needed on company principals who could come under economic or security pressure from other nations. The lack of information on the intentions and capabilities of companies like Starlight Ventures and the potential for other nations to court these companies are significant concerns.

**Recommendations:** Treat the commercial claim like a U.S. "island" akin to the South China Sea, ensuring U.S. leadership via the licensing regime. Consider granting the U.S. government some shares in the company and having U.S. "flagged warships" to back up U.S. Lunar interests. Ensure the U.S. is the primary partner for significant Lunar projects, and advocate for U.S.-led initiatives and strategic points of control on the Moon.

### *Lunar and Asteroid Mining Subject Matter Expert*

**Assessment:** This event is like 3D chess. The move by Starlight Ventures is a positive and strategically significant development by likely crypto libertarian-minded entrepreneurs, despite the Vanuatu configuration to circumvent the Outer Space Treaty. The financial intricacies of the treaty are a concern.

**Concerns:** Potential illicit financing via Vanuatu and the FAA's possible failure in due diligence when approving the company's application are concerns. The potential for crypto libertarians and their financial maneuvers in Vanuatu and the impact of declaring and enforcing domestic zones on the Moon are also worrisome.

**Recommendations:** The head of the FAA should be chastised. The U.S. should politically position itself on the side of Vanuatu and the company CEO, rolling out initiatives that frame it as defending the right of “little guys” to access space, not a “socialist Antarctica model.” The U.S. should recognize the company’s right to a 500 meter operations zone while holding it responsible for any debris. The U.S. Space Force can serve as a “constabulary” to protect Vanuatu’s rights, ensuring rule of law in space. Use the scenario as a starting point for developing private entitlement and control on the Moon, supporting the idea of small, controlled domestic zones with clear responsibilities.

***Assistant to the President for Domestic Policy***

**Assessment:** The scenario involves many complex legal and practical matters the President would need to sign off on, such as astronaut health standards and authority to arrest for Lunar crimes. Clear rules and enforcement mechanisms are required for private companies to operate in space.

**Concerns:** It’s unclear who is in charge of complex issues like suspicious deaths on the Moon, and “Wild West” comparisons in the media are damaging, undermining perceptions of U.S. government authority.

**Recommendations:** The President needs to authorize private companies sending people to the Moon to perform certain functions. An interagency effort is needed to flesh out the complexities and provide the President with options.

***Director of the Office of Science and Technology Policy***

**Assessment:** The Starlight Ventures CEO is likely ideologically motivated and deliberately forcing the U.S. government’s hand on Lunar governance. Lunar territory division is inevitable, as governments historically operate within economically defined zones, creating a need for a structured governance framework. Enforcement is the problem. You can’t enforce without force.

**Concerns:** NASA arbitrarily chose 2-kilometer (km) keep-out zones that are likely too small, and even 10–50 km may be insufficient (dust goes global on a Moon landing and travels at 3 km/s). Without the ability to exclude others from an area, the U.S. will see adversaries parking intelligence platforms inside our operations zones. The enforcement of laws and norms in space and the potential for territory division on the Moon are significant concerns.

**Recommendations:** Lunar law enforcement by states or international bodies will be required within economic zones of influence, with the U.S. Space Force stepping up to provide enforcement, as the military did for the western frontier. Mandate that landing pads be positioned in the middle of each claimed zone to reduce dust spread. The U.S. should embrace the road of Lunar territory division and create a legal framework for economic activities on the Moon, developing enforcement mechanisms that potentially involve a space force or international body.

***Chinese Communist Party Subject Matter Expert***

**Assessment:** The U.S. needs to act quickly and get commercial companies on the Moon declaring zones before losing Lunar access to Chinese companies.

**Concerns:** Time is of the essence, and China may be able to more easily pressure Vanuatu than the U.S., given its relative proximity. There is significant risk of losing strategic space to Chinese companies.

**Recommendations:** Look at relevant mission authorization legislation, and consider defense partnerships or allies to bolster Lunar access. Act quickly before China can gain a foothold, applying Chinese “salami slicing” territorial strategies. Develop partnerships with private companies and allies to secure strategic Lunar locations, and consider the legal and operational framework for space activities.

***White House Press Secretary / External Press Agitator***

**Assessment:** The U.S. public is very focused on this topic, and the government seems unprepared to address private space company governance, as seen with Elon Musk’s Starlink in Ukraine, undermining perceptions of U.S. authority. A good time to rethink governance and the international role and complexity of commercial space. Companies are very powerful, and there are a lot of loopholes in the law.

**Concerns:** The U.S. has given unclear messages on its control over private space actors, which the media spins negatively, and the Wild West comparisons are damaging.

**Recommendations:** The U.S. government needs to project clarity and publish a definitive fact sheet, providing a clear statement of U.S. authority, even if it is still evolving. Develop clear communication strategies to articulate U.S. policies, and emphasize the U.S. leadership role in the new era of space exploration.

***Presidential Policy Advisor***

**Assessment:** The new leader in India, as part of the “Global South,” will likely oppose moves seen as repeating Western colonial imperialism. The CEO plays well in the media as fitting the U.S. entrepreneur tradition, and public feedback is mixed. The company’s actions could set a strategic precedent, generating positive feedback on U.S. entrepreneurial spirit.

**Concerns:** The U.S. lacks sufficient data to decide the best Lunar policy approach, and an Antarctica model would face ideological opposition. Many complex legal and authorization issues remain unresolved, and the potential backlash from various domestic and international actors is a concern, along with the complexity of the existing licensing regime.

**Recommendations:** Quickly establish an interagency “SWAT team” to develop Lunar policy options that serve the President’s needs. Consider a new initiative, such as a “Washington Compact” for space, potentially under United Nations or Hague auspices, to formulate crisp policy options for the President to address the crisis. Consider a new international initiative led by the departments of State and Commerce to promote Artemis and demonstrate U.S. proactiveness. Also develop a framework to regulate space activities with an enforcement mechanism.

**Discussion**

The Vice President and several council members emphasized the importance of maintaining a first-mover advantage in Lunar exploration and development. The council members grappled with the challenge of balancing U.S. strategic leadership in space with the potential consequences of allowing private companies to operate unchecked, particularly in light of Starlight Ventures’ claim of extraterrestrial self-sovereignty. The risk of losing strategic Lunar locations to other countries, especially China, and the implications of nonsignatory nations like Vanuatu circumventing the Outer Space Treaty were significant concerns.

The lack of clarity regarding Lunar governance, enforcement mechanisms, and the potential for territory division on the Moon, as well as the complexities surrounding citizenship,

manufacturing, and legal issues in space, were also major points of discussion. Another key tension that emerged during the meeting was the U.S. government’s apparent unpreparedness to address private space company governance and the public perception of its authority in the face of rapidly evolving space exploration dynamics.

Economic and security pressures on private companies emerged as a critical issue. There were concerns about the potential for companies like Starlight Ventures to come under economic or security stress, which could lead to strategic vulnerabilities. This included the risk of such companies being co-opted by other nations, potentially compromising U.S. interests. The importance of gathering intelligence on the backgrounds and motives of company principals was underscored, alongside the need to identify and ensure the essential functions required in space.

Several notable ideas and recommendations were put forward during the meeting. These included streamlining the U.S. licensing regime to provide more specifics on commercial space activities, using this case to establish norms and advocate for a new treaty that includes international coordination. Asserting U.S. responsibility and authority over U.S.-originated entities like Starlight Ventures while enabling appropriate commercial activities and considering alternative governance models like seabed or Antarctica treaties was also suggested. Working with allies to convene experts and establish rules for commercial Lunar activity, using multinational penalties to influence behavior and create an alternative to Chinese dominance, was also proposed.

Some council members suggested treating the commercial claim like a U.S. “island” and considering granting the U.S. government some shares in the company, ensuring U.S. leadership via the licensing regime and strategic points of control on the Moon. Developing a legal framework for economic activities on the Moon, with enforcement mechanisms potentially involving a space force or international body, and mandating landing pad positioning to reduce dust spread were also put forward as potential solutions.

#### **Scenario 4: Are China’s Moon Safety Zones a Massive Lunar Land Grab?**

Scenario Supplemental Data Provided: None.

#### Issues and Considerations

For this exercise, the National Space Council (NSpC) was assembled under a Democratic Republican administration. Below are the summaries of each NSpC participant’s contributions to the debate on how best to respond to the scenario, along with points of conflict:

##### *Vice President*

**Assessment:** Businesses will make up their own minds on where they go, so the U.S. government should be concerned about its public perception and investor confidence. There are joint commercial allied interests here.

**Concerns:** There may be potential to support or bail out affected companies and possible stock market volatility.

**Recommendation:** We need to demonstrate freedom of movement at any cost, and avoid a strong military presence. If needed, we should backstop through a moment of volatility and keep businesses from stepping out—establish clear market thresholds for potential market



intervention if stock prices drop. Consider leaking what the Chinese are doing and how irresponsible they are.

### *Secretary of Defense*

**Assessment:** In a Democratic administration, we are hard pressed to reach our goals and are stretched thin. Ongoing contingencies and defense commitments make it so that we are leery of taking on broader goals on the Lunar surface.

**Concerns:** The optics of having boots in camo on the Moon are not great; it will undercut our position in terms of the principles we've espoused for a long time for peaceful uses of outer space. U.S. Space Force is not currently set up as an expeditionary force for the Moon.

**Recommendation:** Conduct deniable operations instead of making it publicly known—coordinate closely with other government agencies to present a united front. Develop a strategy for the U.S. Space Force, and convince the American people of why it matters. Evaluate the necessity of military involvement in Lunar operations.

### *Director of National Intelligence*

**Assessment:** China's actions reflect their broader strategy of setting new norms and exploiting existing ones to their advantage. Moreover, other countries do not respect U.S. law, so we should push to protect and defend our own interests within our normative framework, or set our own precedent. We are mad at the state actor and not just the extraterrestrial products.

**Concerns:** China's actions mirror their approach in the South China Sea, and there are strategic implications of allowing Beijing to control the key Lunar territories. There is danger of having proxy conflicts, so we should consider how to challenge China's claims effectively.

**Recommendation:** It is important to assess the state actor's vulnerabilities to asymmetric countermeasures that undermine their claim. For example, it might be possible to make occupation untenable or negate the value of particular terrain such as "throwing shade" such as stationing solar collectors so that they might shade out the claimed areas.

### *Secretary of Commerce*

**Assessment:** China's establishment of a safety zone will heavily and acutely impact American companies and investors. We depend on these companies for commercial access. Not just American companies but also Indian and Japanese territorial claims are now in jeopardy.

**Concerns:** There could be 30–40 space companies valued at \$3 billion by this time, many of which are publicly traded. Volatility in the markets could cause serious problems for them due to this development. There are also legal challenges related to territorial claims on the Moon and freedom of navigation—similar to those in the South China Sea.

**Recommendation:** We should declare a pause on the trading of relevant American companies to protect them, with a specific circuit breaker to trigger the pause, and we should communicate clearly with the investors to reduce the chance of market panic. We should bring a joint claim with India and Japan to UNOOSA to recognize that this behavior is inappropriate. Identify other newer, smaller space nations that also have a territorial claim on the Moon impacted by this and empower them. Run a freedom of navigation operation, and

threaten sanctions on natural resources extracted from the newly announced and disputed zone.

### *Secretary of State*

**Assessment:** The claiming of space for Lunar safety zones is very reminiscent of China’s Belt and Road Initiative infiltration of ports and infrastructure on Earth—which no administration took seriously. The operations that we take on the Moon will positively impact cities on Earth, especially with global warming and environmental research from the Moon.

**Concerns:** We must be cautious about how we push back on these safety zones, using arguments that stand up to international law. People shouldn’t be allowed to run wild on the Moon.

**Recommendation:** First, joint action with allies—highlight the parallels to the Belt and Road Initiative to garner international support. Second, strong show of force by the U.S. Third, message to the public that climate and tech will benefit from space. Fourth, argue that China’s claims don’t stand up to international law—sanction offenders in safety zones.

### *NASA Administrator*

**Assessment:** Civil and military interests need to be balanced on the Moon.

**Concerns:** We must be very careful with what analogies we use in our national security decision-making. We cannot compare this to the Cold War, where we were facing a communist economy that was relatively weak compared to ours. We must be cautious that nonmilitary actions will lead to military escalation.

**Recommendation:** We need a civil-military cooperation with a strong, international, U.S.-led entity enforcing American law where we currently cannot enforce it. Reexamine assumptions about the U.S. Space Force’s role and make policy recommendations on its future use by 2030–2031. Collaborate with other agencies to create a unified response.

### *Lunar and Asteroid Mining Subject Matter Expert*

**Assessment:** The Lunar Resources Consortium demands the U.S. government takes China to court. UNOOSA’s interpretation of the Outer Space Treaty says nations cannot own territory on the Moon and that private-sector “utilization” is within the treaty and takes precedence. Resource-based private enterprise does not care about the ownership of the land or clean-up, but about extraction of resources. China may allow extraction without territorial claims.

**Concerns:** Backstopping here isn’t enough, as the precedent is huge. The entire trajectory of in-situ resource utilization depends on the precedent set here. The precedent set will impact the entire trajectory of space resource utilization. Existing industry subsidies and billions in investments are at risk.

**Recommendation:** We should take China to international court to block them from “owning territory.” We will put some U.S. Space Force starships on standby to see China back down from this completely, and then we will take advantage of the crisis to shift the Overton window and push the solidity of our capability to do resource mining. The U.S. Space Force should immediately transit this claimed area with some regularity. Promote the narrative of Lunar resource extraction supporting a green economy.

### *Assistant to the President for Domestic Policy*

**Assessment:** We must come up with a way of describing the Moon as an international zone and be prepared to make an investment to have the opportunity for partnerships in space.

**Concerns:** We need to ensure we are on the right side of history and don't alienate parts of the international community by closing off Lunar access—we don't want the Moon to be perceived as an environment for colonial powers.

**Recommendation:** Frame the Moon as an international zone open to any nation prepared to invest. On the Earth-centric side, put a ban on the sale of any Chinese products that come from the Lunar zone's items—the enforcement mechanism for economic issues is already in place. Push for this to be an international action.

***Director of the Office of Science and Technology Policy***

**Assessment:** There is nothing in the solar system more valuable than the Peaks of Eternal Light; they will produce economic activity multiple times that of Earth's. We need to address this firmly, quickly, and smartly. Not all locations are equal. Mobility between sunlight and volatiles. A very fast study to assess the value of different parts of the peaks, which we are more interested in protecting.

**Concerns:** Throwing shade is not in line with noninterference in the Outer Space Treaty. Many people are against mining the Moon because it violates the sanctity of celestial bodies and could affect scientific research (for example, rocket exhaust freezing into poles corrupting data). We must ensure that mining operations comply with preserving the data there—will China take part in the collaboration to preserve the science and rules-based order on the Moon?

**Recommendation:** We need to use the Peaks of Eternal Light as a stepping stone to develop space commerce. Make a fast study to assess the value of parts of the peaks and make a value judgment on which one we're more interested in protecting. Frame Lunar activity as essential to solving climate and environmental issues on Earth. Take part in international collaboration to preserve scientific research and respect rules-based order.

***Chinese Communist Party Subject Matter Expert***

**Assessment:** This mirrors how China handles the South China Sea and its pattern of using ambiguous territorial claims to its advantage.

**Concerns:** How can the U.S. enforce international norms and address China's potential nefarious behavior on the Moon? How can the U.S. avoid another South China Sea situation?

**Recommendation:** Any effort to challenge China's claim will need to involve NASA and the Defense Department, and must be able to respond adequately if challenged. We could send several military-NASA astronauts to put up a challenge, as the Outer Space Treaty is fairly clear that scientific research by a government or corporation can include military personnel. Develop strategies to ensure freedom of navigation and access to key Lunar areas. Explore ways to challenge China's claims through international cooperation. Establish a tangible U.S. presence to demonstrate access and impose strict penalties, sanctions, and investment restrictions on China.

***White House Press Secretary / External Press Agitator***

**Assessment:** The media and public are stepping back and acknowledging that the public may not care about this too much. It affects stock market investors, not the average person. People

will look at it and say that China is investing in global infrastructure—portraying this as a threat can be a difficult sell.

**Concerns:** Where is the clear red line? The U.S. Space Force is just a show of force, but it needs to prevent the narrative that China can push our boundaries until they own the entire Moon. The administration risks looking weak if not seen as standing up to China.

**Recommendation:** Something could be done to emphasize the economic and strategic importance to society at large; push the narrative that we need a predictable environment for Lunar operations. Prepare messaging that resonates with both investors and the general public and clarify what U.S. actions would be triggered by China crossing specified lines.

### *Presidential Policy Advisor*

**Assessment:** The PRC has thrown down the gauntlet on this issue. The administration must respond quickly and firmly so as not to be seen as weak. The precedent will impact U.S. interests across space.

**Concerns:** China doesn't take our threats and concerns seriously. Allowing China to dictate the terms is dangerous. The President and Vice President cannot come across as weaklings and be accused of being paper tigers. The progressive wing of the base is skeptical of militarization and using public funds to backstop private business interests. Key political donors are heavily invested in space ventures.

**Recommendation:** We should establish our tangible presence and freedom of movement, and prepare the populace for some blowback. Frame this as an economic frontier that is so vital to the U.S., and one in which we need to protect the equities of international communities. Threatening throwing shade, even if we won't bring it to fruition, will make China consider what will happen if it is done to them. We need to make sure the President and Vice President have a host of increasing escalatory measures including multilateral sanctions.

## Discussion

The NSpC grappled with the economic impact of China's actions, as American companies and investors heavily involved in Lunar operations could face significant losses. The potential for market volatility and the need to protect and support affected businesses emerged as a key concern. Some officials suggested bold measures, such as temporary trading pauses, market intervention, and economic sanctions against China, to mitigate the financial fallout.

Beyond the economic sphere, China's Lunar safety zones were seen as part of a broader strategy to exploit existing norms and establish new ones in their favor. Drawing parallels to China's approach in the South China Sea, officials expressed apprehension about allowing Beijing to control critical Lunar territories, particularly the valuable Peaks of Eternal Light.

The council emphasized the importance of international cooperation in addressing the situation. With the territorial claims of key allies like India and Japan also affected by China's safety zones, joint action and international support were considered crucial. Some officials suggested taking China to international court, arguing that their claims violate the Outer Space Treaty. However, the legal challenges surrounding Lunar territorial disputes remain complex and largely untested.

The role of the military in responding to China's actions emerged as another point of tension. While some officials advocated for a strong military presence to challenge China's claims, others cautioned against the optics of a heavy-handed approach. The deployment of the

U.S. Space Force, which is not currently equipped for Lunar operations, was met with skepticism. Covert operations and a reevaluation of the Space Force’s role were proposed as alternatives to overt military action.

Alternatively, one member suggested an innovative “Operation Throw-Shade” approach to negate the value of China’s claimed terrain through technological means, as a nonmilitary approach to addressing China’s exploitation. Officials acknowledged the challenge of garnering public support for Lunar operations, particularly among progressive groups wary of militarization and the use of public funds to support private interests. To counter this, some suggested emphasizing the economic and strategic importance of the Moon, as well as its potential to support climate and environmental research on Earth. Developing a narrative that resonates with both investors and the general public was seen as key to building support for a strong response to China’s actions.

### **Scenario 5: China’s Lunar Factory Crushes U.S. Ambitions**

#### Scenario Supplemental Data Provided:

- The Director of National Intelligence was provided with data that they had seen designs from R&D departments of weapons that could be launched from the mass driver, and that its dual-use significance had been discussed in military fora. They could not assess with any confidence if such designs had been approved or entered production. They could assess with some confidence that the PRC was stockpiling materials on the Moon, which would enable those systems. [This data was meant to be suitably vague—it is normal for military R&D to consider military applications and for the military to discuss them even if there is no decision to go that direction; and there are multiple used for stockpiling materials.]

#### Assumption

Participants did not believe China could realistically accomplish the feats outlined in the scenario by 2031, more likely sometime between 2035 and 2045.

#### Issues and Considerations

For this exercise, the National Space Council (NSpC) was assembled under a Democratic administration. Below are the summaries of each NSpC participant’s contributions to the debate on how best to respond to the scenario, along with points of conflict:

##### *Vice President*

**Assessment:** The key lever to pull on is economic sanctions, but we might be facing a weakening of our strongest tool due to China’s resilience given their rapid advancements.

**Concerns:** Deeply concerned this is turning into an arms race in space, which is against our political stance. Loss of public trust in institutions.

**Recommendation:** Take bipartisan actions across diplomatic, informational, military, and economic (DIME) domains. Take overt actions to drive the private sector. Decide whether to make the weapons discussion public or keep it classified. We need to share some kind of plan

with our allies, clarify what we are trying to protect and advance, and develop a coordinated response.

### *Secretary of Defense*

**Assessment:** The scale of China’s achievements is likely two decades too early, and if the intelligence community’s assessment is valid, the nature of the threat cannot be ignored. Rather than hoping we can deter, the Defense Department should recommend concrete deliberate actions sufficient to dissuade or deter. We have interests in making sure the PRC doesn’t violate the Outer Space Treaty.

**Concerns:** The potential use of mass driver for military applications is an outright violation of the Outer Space Treaty, and there are multiple lines of operations we should consider in terms of direct and indirect diplomacy. Risk of economic and commercial disruption. This will cost billions or trillions, but we have a responsibility to protect the Constitution and our way of life—equivalent to a serious threat comparable to Soviet-era weapons developments (launch delivery system).

**Recommendation:** We must make the entire world aware of the PRC’s intentions and request that the President provide direction for a program of the highest priority to protect our allies and friends and world. Name it a doctrine after the President. We need to invest appropriately in our industrial base—our science and technology will broadly benefit, along with artificial intelligence (AI) and machine learning.

### *Director of National Intelligence*

**Assessment:** There is a risk of the PRC using Lunar mass drivers for terrestrial threats. China is proceeding with prototypes, but the full extent of their progress is uncertain. There is much speculation about what the Chinese are and aren’t doing, but we do know that this is a willing violation of the Outer Space Treaty.

**Concerns:** The Chinese are planning to use these capabilities as a system of systems weapons complex to hold Earth at risk. Difficulty in providing high-confidence warnings due to the clandestine nature of the threat—risks the U.S. losing sources and methods.

**Recommendation:** We could manage this with independent journals and by writing exposes about what they are doing in space. Coordination between the Defense Intelligence Agency and OSD/DNI will give us an important deterrent tool—policy-industry agility. Enhance intelligence and surveillance on the PRC’s Lunar activities, consider covert actions to neutralize threats, and support U.S. private industry in developing comparable capabilities.

### *Secretary of Commerce*

**Assessment:** The PRC’s advancements could significantly disrupt global energy and economic markets. Fossil fuels and global energy constitute very large companies in our market (\$10 trillion U.S. energy market; \$120 trillion global energy market). In particular, we export food, energy, and intellectual property very well—this will displace the energy market. Steps that we take today could give us many more options in the future.

**Concerns:** The U.S. could face a weakening of its strongest economic sanctions tool. This removes a mechanism of diplomacy that we would normally be able to push on. Need for a coherent strategy to support U.S. companies.

**Recommendation:** Draw attention to the larger competition and frame the situation as a major economic breakthrough in which the U.S. needs to gain the upper hand for its own

economic future in space. Support U.S. companies, energy initiatives, and growth on the Lunar surface. Support R&D and initiatives similar to the CHIPS Act.

### *Secretary of State*

**Assessment:** There has been a failure in diplomacy, as the U.S. was not able to anticipate China’s move in this direction. Need for a robust response involving Congress and allies.

**Concerns:** N/A

**Recommendation:** Take offensive measures by going to Congress for emergency legislation—formulate a CHIPS-type act for space to accelerate our efforts. Consider sanctions and measures to shape and change China’s behavior, such as revoking permanent normal trade relations (PNTR) status, which is needed to get into the World Trade Organization.

### *NASA Administrator*

**Assessment:** The Lunar factory is an inherent offensive capability that we need to have. Though mass drivers have limitations, we should not self-deter from pursuing the technology.

**Concerns:** An overreaction would limit economic development in space.

**Recommendation:** NASA should send money to U.S. companies to build comparable capabilities (potential national security purposes related to mass drivers), not just on the Moon, but in free space as a deterrent. Increase R&D for commercial and potential national security purposes.

### *Lunar and Asteroid Mining Subject Matter Expert*

**Assessment:** We have gone into the related military issues and ignored the economic energy competition happening here. While mass drivers themselves are not weapons, space-based solar power can be weaponized—we want this capability too.

**Concerns:** Overreacting to the situation could lead to limitations on international commercial development in space, particularly through the International Traffic in Arms Regulations (ITAR).

**Recommendation:** Calling out this technology as a “weapon” to shut it down and protect U.S. energy industry solutions is not a bad thing. Demanding on-site international monitors for all Lunar mass drivers might be a “global” solution. We could neutralize this by supporting U.S. private industry to build its own Lunar factory.

### *Assistant to the President for Domestic Policy*

**Assessment:** The timeline for China’s achievements seems too truncated, even with significant investments.

**Concerns:** A divided Congress makes it difficult to show consensus and impact the global system.

**Recommendation:** This could become a good story for Congress of a strong civilian economy. It would enable us to pursue military interests far more easily.

### *Director of the Office of Science and Technology Policy*

**Assessment:** Mass drivers are not an ideal weapon as they take several days to reach and allow for plenty of time to deflect them. They’re not inherently steerable, whereas a

projectile is steerable after being shot. The ability to produce large amounts of energy in space, develop growth server farms, and exploit the advancement of AI for space is not something we would like to give up—these are all reliant on developing space-based solar power.

**Concerns:** Potential for the PRC’s energy production capabilities to be weaponized.

**Recommendation:** We can counter the threat with a monitoring system and with inspections. If needed, it’s not that difficult to knock out the energy grid on the Moon using electromagnetic pulses.

### *Chinese Communist Party Subject Matter Expert*

**Assessment:** The PRC’s leadership has been compromised by corruption, impacting the legitimacy of their efforts.

**Concerns:** The intelligence community is the least believable place to solve this.

**Recommendation:** Rather than looking at the intelligence community, we should rely on credible authoritative PRC sources and independent scholars. These references lack timelines for the project.

### *White House Press Secretary / External Press Agitator*

**Assessment:** Much of the news media is still scarred by the weapons of mass destruction (WMD) situation from many years ago and will be demanding proof of the factory showing actual weapons.

**Concerns:** Media will demand proof and be contentious about the PRC’s actions. AI-generated fakes and misinformation pose challenges.

**Recommendation:** Provide factual information to the public. If the word *weapons* is used, ensure there is evidence to support the claims. Transparency is key for public perception.

### *Presidential Policy Advisor*

**Assessment:** The adversary has been gaming U.S. red teams for years. We should seek actions to concretely arm the Press Secretary with near-term proactive steps and catch Beijing off-balance. These aren’t weapons, just purely commercial economic play. Our purpose should be to assess a balanced approach, not to overcompensate for this.

**Concerns:** This administration has lost the high ground, with profound national security and economic implications.

**Recommendation:** Search for concrete initiatives to protect our economic interests and the fundamental core of the issue—make up for lost time by having the Department of Commerce and NASA quickly assess where industry stands and how the government can facilitate them. Push for increased allied presence on the Moon.

## Discussion

One major point of contention was the timeline for China’s achievements. While some participants believed China’s progress was overstated, others expressed concern about the potential for rapid advancements. This disagreement highlighted the difficulty of assessing China’s true capabilities and intentions.

Another area of tension was the severity of the threat posed by China’s Lunar activities. Some participants emphasized the potential for military applications, such as weaponizing mass drivers or using Lunar resources for offensive purposes. This military focus, however, was met



with caution by other members, who warned against overreaction. They argued that framing China’s Lunar factory as an inherent military threat could stifle international commercial development in space, potentially hindering the growth of U.S. private industry—particularly through overly restrictive regulations like ITAR. Furthermore, some argued that mass drivers were impractical as weapons due to their predictable trajectories and long travel times. Instead, they advocated for increased R&D investments and the development of comparable capabilities by U.S. companies, not just on the Moon but in free space as well, to ensure a balanced and economically driven approach to space competition.

Diplomatic and public communication strategies also surfaced as critical areas of concern. On the diplomatic front, disagreements arose over the most effective approach to engage with China and the international community. The Secretary of State proposed aggressive measures, including potential sanctions and the revocation of China’s PNTR status. The White House Press Secretary, by contrast, stressed the importance of transparency in public communications, especially given the lingering mistrust from past intelligence failures like the WMD controversy. The need to provide concrete evidence before making any claims about the weaponization of Lunar infrastructure was seen as essential to maintaining public trust and avoiding unnecessary escalation.

The council also considered long-term strategies to counter China’s influence. The proposal to create a CHIPS-type act for space emerged as a viable solution to accelerate U.S. technological and industrial capabilities. This initiative, alongside the recommendation to involve international monitors for Lunar mass drivers, reflected a desire to combine economic growth with global diplomatic engagement, ensuring that U.S. actions were both effective and internationally supported.

### **Scenario 6: *Lunar Odyssey Stranded: Is Rescue Possible?***

#### Scenario Supplemental Data Provided:

- One of the passengers is a major donor to the President’s campaign.
- The Japanese and U.K. prime ministers are putting pressure on the U.S. to assist their citizens.
- The PRC has offered its assistance.

#### Issues and Considerations

For this exercise, the National Space Council (NSpC) was assembled under a Democratic administration. Below are the summaries of each NSpC participant’s contributions to the debate on how best to respond to the scenario, along with points of conflict:

##### ***Vice President***

**Assessment:** The private sector is able to meet the needs of the rescue (Starship or Blue Origin). The U.S. could do nothing—it is always the one who is being “rescued”—but there is potential to gain political favor by intervening. The U.S. should look into establishing a Coast Guard-like function for space in the mid to long term.

**Concerns:** There are risks of having the government involved in rescue efforts.

**Recommendation:** Ensure the private sector will be good stewards for a search-and-rescue ecosystem, developing a culture of safety by clarifying the roles of various organizations and the standard interfaces between them. Develop an analogue to port management. Lead an international effort spearheaded by NASA for immediate response.

### *Secretary of Defense*

**Assessment:** Develop level-headed, pragmatic, and practicable policies and principles. The Defense Department isn't in the business of rescuing and recovery of civilians, save for emergencies regarding its own downed pilots. Doing noncombatant evacuation operations around the world when citizens are under threat of foreign attack is a very different thing than going into space to rescue and recover space tourists; this is a matter of policy and principle of whether licensing for tourism has a requirement for insurance and all other potential emergencies, including contingency plans. These are not the responsibilities of the Defense Department or U.S. Space Force, which deals with threats to the national interest.

**Concerns:** What will be the public perception and emotional nature of the situation and the expectation for the Defense Department to support and enable the rescue and recovery effort?

**Recommendation:** The government should recognize how emotional this is, so the Defense Department will do everything it can to support and enable pragmatic rescue and recovery, in collaboration with Department of Homeland Security emergency services. The U.S. must appear in the lead, capable, and competent. We should design a rescue agreement such that any competent entity with the means to help does so.

### *Director of National Intelligence*

**Assessment:** The whole world is obsessed with the idea of China coming to our rescue. When the Coast Guard rescues people from a boat engine fire, they will conduct an inspection for illegal materials and appropriate gear, and push them to paddle back to shore if possible. The stranded spacecraft should be removed as a hazard to navigation in space in a humane way.

**Concerns:** Rich people in space can be a political risk or an opportunity for international coalition building. There is considerable political risk if China comes to the rescue and the whole world becomes obsessed with the situation.

**Recommendation:** Have the NASA Administrator lead a coalition with European Space Agency counterparts to help out the international coalition and harness all U.S. capabilities for situational awareness in orbit.

### *Secretary of Commerce*

**Assessment:** We are rescuing billionaires and footing the bill; no course of action will play well here. The Coast Guard might see this as a search-and-rescue mission, whereas the U.S. Space Force doesn't consider this a Defense Department mission. Even though there is a law of shipwreck terrestrially, there are economic incentives for companies to assist with rescues.

**Concerns:** *Astronaut* is a defined term, and we would be expanding a not-widely-accepted definition, which doesn't play well in a press release. If NASA fails, the optics are not great.

**Recommendation:** Immediate rescue by NASA and international partners in the short term, followed by establishing a U.S. Coast Guard Lunar area directorate. In the long term, we should seek analogues to existing international maritime law in space, such as the law of

salvage. This should allow commercial partners to engage, rather than making the U.S. Coast Guard the only rescue beacon.

***Secretary of State***

**Assessment:** We need to anticipate these disasters and provide humanitarian aid. Ideally, private rescuers can come in when needed.

**Concerns:** There is potential political fallout from not responding.

**Recommendation:** We need to ensure proper insurance for these missions and have private rescue companies ready to respond.

***NASA Administrator***

**Assessment:** There is a global-scale movement to rescue people who are in trouble, and since systems already exist for human space exploration, we do not have to pay for the whole thing.

**Concerns:** N/A

**Recommendation:** Set up an international rescue authority, even if just the U.S. and China have the capability to get there. Implement interoperability, standard fuel interfaces, rendezvous and proximity operations and docking (RPOD); this is a U.S.-led coalition. The rescue should also be a cover for making the U.S. Space Force what it needs to be in the 22nd century. Explore the option of using a crewed Dragon spacecraft from SpaceX for the rescue.

***Lunar and Asteroid Mining Subject Matter Expert***

**Assessment:** Should the U.S. Space Force be just a space force or a space guard as well? Under the United Nations Convention on the Law of the Sea (UNCLOS), all available nearby captains respond to concerns. In space, even if there were taikonauts, all capable players should head toward the place of distress as early as possible.

**Concerns:** For public relations, we need to avoid using the terms “space tourist” and “space tourism.” Use “private citizen explorers,” “private astronauts,” or something of that nature. There’s an artificial demarcation between tourism and astronauts. This crisis will harm future exploration.

**Recommendation:** Contract the Coast Guard to create a “Space Guard” starship for any number of rescues, fully separate from the U.S. Space Force. Call the people getting rescued “spaceflight participants” as an official term.

***Assistant to the President for Domestic Policy***

**Assessment:** Most high-risk activities are all privately insured, so the insurance market should probably play a role.

***Director of the Office of Science and Technology Policy***

**Assessment:** This is a very emotional issue and a first test of our emergency capabilities. We should ensure that aerospace can be viable and make revenue.

**Concerns:** The Department of Commerce is correct—who pays is important. We have to balance immediate rescue efforts with long-term business viability to ensure scalability of space tourism.

**Recommendation:** This is a capability, mostly under the Commerce Department, that we will need going forward, and we should consider the Moon a port; thus, it should include temporary landing pads, with survival, rescue, and repair capabilities. The precedent for developing a universal rescue docking, such as in submarines, should be considered now.

***Chinese Communist Party Subject Matter Expert***

**Assessment:** The majority of high-risk sports are private, such as race cars. There is no government waiting to rescue participants from crashes, so there is an insurance market instead. Insisting on a private rescue service for “travelers” or “tourists” as part of licensing space tourism (pleasure travel) will lead to the development of such an industry.

**Concerns:** There is a lack of a universal rescue docking system in space, similar to what exists for submarines and other human submersibles.

**Recommendation:** Common docking mechanisms need to be considered today, or rescue efforts won’t be effective in the future. There should be international cooperation and standardization of rescue protocols.

***White House Press Secretary / External Press Agitator***

**Assessment:** The White House should help anyone. These stories get emotional very quickly, and this can be similar to the rule of the mariners at sea.

**Concerns:** Is the U.S. Space Force ready to conduct a rescue mission? The public wants to know if the Space Force is equipped and trained for search-and-rescue operations.

**Recommendation:** Put out the message that we encourage brotherhood and space, and that we are all going to help each other.

***Presidential Policy Advisor***

**Assessment:** Every life counts, and the people aboard include one of our biggest donors, so the “do nothing” option is not on the table. The Japanese and U.K. prime ministers are lighting up phone lines with concerns about their citizens.

**Concerns:** Assuming some capabilities, a Moon rescue is still a very complex operation.

**Recommendation:** Inventory our capabilities very quickly and determine the role of the government in this situation. We should take a private contractor approach and use governmental augmentation as a backup. This could be an opportunity for NASA to gateway itself into creating lifeboat-like scenarios and adding onto existing architecture. NASA, the Defense Department, and the intelligence community should augment and support, whereas the role of the private sector is to undertake. Outside of the immediate crisis, we should show that we are taking leadership in evolving the Coast Guard.

**Discussion**

At the heart of the discussion lay the fundamental question of the government’s role in rescuing civilians in space. While the Vice President and the Secretary of Defense emphasized the importance of private-sector involvement, with companies like SpaceX and Blue Origin potentially capable of conducting the rescue, they also acknowledged the emotional nature of the situation and the public’s expectation for the U.S. to lead a competent and effective response. This sentiment was echoed by others stressing the need for the government to demonstrate its willingness to help those in need, drawing parallels to the age-old tradition of mariners assisting one another at sea.

However, the question of financial responsibility for the rescue operation loomed large, with some pointing out the potential burden on taxpayers in footing the bill for rescuing billionaires. This concern was compounded by the lack of proper insurance for space tourism missions, highlighting the need for a more robust regulatory framework to ensure that private companies are adequately prepared to handle emergencies.

International collaboration emerged as a critical theme, with the Director of National Intelligence highlighting the geopolitical risks, particularly if China were to lead the rescue. The director advocated for a U.S.-led coalition, involving entities like NASA and the European Space Agency, to harness all available capabilities. This was echoed by the NASA Administrator, who proposed an international rescue authority to standardize fuel interfaces, docking adapters, and rescue protocols. The emphasis was on creating a framework that would ensure interoperability and effective responses to future space emergencies.

Public perception and emotional impact were recurrent concerns, with some members emphasizing the need for clear communication about the U.S. Space Force's readiness for search-and-rescue operations. Others underscored the importance of saving lives, particularly given that one of the stranded individuals was a significant donor. One participant advocated for a private contractor-led approach, with governmental augmentation as a backup, suggesting that this crisis could serve as an opportunity to enhance NASA's capabilities and leadership in space rescue operations.