NATIONAL CISLUNAR SCIENCE & TECHNOLOGY ACTION PLAN

A Product of the

CISLUNAR TECHNOLOGY STRATEGY

INTERAGENCY WORKING GROUP

of the

NATIONAL SCIENCE AND TECHNOLOGY COUNCIL

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About the Subcommittee on Cislunar Science & Technology

The NSTC established the Subcommittee on Cislunar Science & Technology to support new interagency collaboration on Cislunar priorities. Further, the Cislunar Technology Strategy Interagency Working Group was organized within the Subcommittee to coordinate science and technology policy, strategy, and federal research and development pertaining to Cislunar space. This group aims to coordinate activities, address emerging challenges and opportunities, and advance U.S. leadership and cooperation in Cislunar space.

About this Document

This document establishes actions in support of the National Cislunar Science & Technology Strategy, advancing U.S. government scientific, exploration, and economic development activities in Cislunar space. This Cislunar Science and Technology Action Plan directly supports the United States Space Priorities Framework, which states that the United States will “advance a robust Cislunar ecosystem.” This plan is consistent with interagency and international efforts including the Artemis Accords, work of the United Nations Committee on Peaceful Uses of Outer Space, the International Telecommunication Union Radio Regulations, and other ongoing multilateral discussions, and supports the Outer Space Treaty of 1967, the Rescue Agreement, and other international treaties.

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Abbreviations and Acronyms

C&PNT Communication and Position, Navigation, and Timing

DOC Department of Commerce

DOD Department of Defense

DOE Department of Energy

DOS Department of State

GEO Geosynchronous Orbit

IGY International Geophysical Year

ILY International Lunar Year

LEO Low Earth Orbit

NASA National Aeronautics and Space Administration

NIST National Institute of Standards and Technology

NOAA National Oceanic and Atmospheric Administration

NSF National Science Foundation

NSTC National Science and Technology Council

ODNI Office of the Director of National Intelligence

OMB Office of Management and Budget

OSC Office of Space Commerce

OSTP Office of Science and Technology Policy

OUSD Office of the Under Secretary of Defense

R&E Research and Engineering

SSA Space Situational Awareness

STEM Science, Technology, Engineering and Mathematics

USGS United States Geological Survey

Introduction

The United States is in an exciting era of possibility and opportunity in Cislunar[1] space where tremendous promise exists to advance science, physics, and understanding of the universe. Scientific endeavors in Cislunar space foster international cooperation and inspire new opportunities for economic growth for everyone on Earth.

Human activity in Cislunar space will continue to grow in the next decade. Space is being democratized, with multiple countries and private entities planning to engage with this new realm of human activity. Some of these entities have expressed a credible intent to begin activities on an ongoing or enduring basis. Spacefaring nations will set important new precedents over the coming years, and it is important those precedents represent the responsible, peaceful, and sustainable use of this region of space and maintain transparency within the international community.

In November 2022, OSTP published the National Cislunar Science & Technology Strategy[2] (herein referred to as "the Strategy"), which set forth a vision and the first science and technology objectives for realizing U.S. leadership in Cislunar space, including the Moon. The Strategy recognizes the diverse priorities and opportunities for science and technology organizations across the U.S. government and identifies four strategic objectives:

1. **Support research and development to enable long-term growth in Cislunar space.** American technological endeavors begin with a positive, expansive vision of the future, led by a diverse science and engineering workforce.
2. **Expand international science and technology cooperation in Cislunar space.** Science is an international enterprise, and scientists have long demonstrated the ability to work across boundaries for the common good.
3. **Extend Space Situational Awareness (SSA) capabilities into Cislunar space.** SSA is essential to safe and successful spacecraft operations in all orbits, including in Cislunar space.
4. **Implement Cislunar communications and positioning, navigation, and timing (C&PNT) capabilities with scalable and interoperable approaches.** Capabilities for U.S. government Cislunar operations must be scalable and interoperable with systems operated by private and international actors.

The Strategy established a whole-of-government approach to Cislunar space in which key elements—such as the Artemis program—are strengthened by a diverse set of collaborators, including international and commercial partners, that form the broadest space coalition in history.

The United States should drive toward achieving visible and discrete accomplishments in support of the Strategy objectives. In April of 2024, the United States government released the first Policy on

[1] For the purposes of this document, Cislunar space is defined as the three-dimensional volume of space beyond Earth's geosynchronous orbit that is mainly under the gravitational influence of the Earth and/or the Moon. Cislunar space includes the Earth-Moon Lagrange point regions, trajectories utilizing those regions, and the Lunar surface.

[2] National Science and Technology Council, 2022, "National Cislunar Science and Technology Strategy," https://www.whitehouse.gov/wp-content/uploads/2022/11/11-2022-NSTC-National-Cislunar-ST-Strategy.pdf

Celestial Time Standardization,[3] directing federal agencies to work through existing standards bodies and establish Coordinated Lunar Time. In December of 2024, the United States released the first Policy on Standardization of Lunar Reference Systems, directing federal agencies to lead a coordinated approach to reference systems at the Moon.[4] Defining a unified time standard and reference systems is foundational to all future endeavors in and around the Moon and set a basis for future Cislunar activity.

The Cislunar Science and Technology Action Plan (herein referred to as “the Plan”) builds on these policies and the Strategy by identifying specific goals for U.S. departments and agencies over the next five years. The objectives of the Strategy and actions in the Plan are inherently interdependent, with multiple government and other stakeholders—aimed at creating a sustainable and coordinated approach to Cislunar activities.

Federal departments and agencies should implement these actions in accordance with a core principle of the Strategy: that a key long-term interest of the United States in Cislunar space is to lead in shaping future “rules of the road” and international governance for outer space activities, consistent with the U.S. Space Priorities Framework and National Security Strategy.

The Plan also highlights the support role of the U.S. national security enterprise in Cislunar space and a continued United States commitment to The Outer Space Treaty, reaffirming the importance of international cooperation in the peaceful exploration and use of outer space, including the Moon and other celestial bodies—and the importance of developing norms of responsible behavior in space and promoting the rule of law in this new area of human endeavor.

[3] National Science and Technology Council, 2024, “Policy on Celestial Time Standardization,” https://www.whitehouse.gov/wp-content/uploads/2024/04/Celestial-Time-Standardization-Policy.pdf

[4] National Science and Technology Council, 2024, “Policy on Standardization of Lunar Reference Systems,” https://www.whitehouse.gov/wp-content/uploads/2024/12/Lunar-Reference-System-Policy.pdf

Actions

As we begin our next steps into space, the United States will work collaboratively with allies, international partners, and private entities to set the pace and direction of growing Cislunar activities—to foster scientific discovery, economic development, and international cooperation that reflects our shared values. To that end, the following actions support objectives highlighted in the Strategy. These actions will be facilitated by ongoing meetings of the Cislunar Science and Technology Subcommittee for interagency coordination and collaboration.

1. Support Research and Development to Enable Long-Term Growth in Cislunar Space

The Strategy recognizes the Moon as a driver of scientific advances and potential economic growth, offering opportunities for discoveries and breakthroughs in space science and technology. Cislunar space is a unique and valuable place for collaborative technology development across U.S. departments and agencies, academic and nonprofit institutions, commercial industry, and in partnership with other nations.

The Strategy identifies three sub-objectives as guide stars to advance and coordinate research and development: (1) Enable Enduring Human Presence, (2) Advance Cislunar Science, and (3) Support our Workforce.

Active and engaged collaboration across U.S. departments and agencies, inclusive of their nongovernmental partners, serves to increase diversity of thought, streamline use of resources, and identify roles and responsibilities of each organization. While a single organization may be the lead for any particular activity, technology development should be coordinated across multiple departments and agencies, and more broadly in the private sector.

1.1 Enable Enduring Human Presence

Develop and demonstrate capabilities and emerging technologies that enable an enduring human and robotic presence in Cislunar space

1.1.1 Coordinate development of Lunar orbital and surface technologies that support an enduring human and robotic presence on and around the Lunar surface. Technology areas of interest include, but are not limited to, radiation protection, radio frequency propagation in the Lunar environment, engineering implications of regolith geology, orbital dynamics and the spaceflight environment in various Sun-Earth orbital configurations, evaluating disposal options for orbiting space vehicles and surface systems, and cost-effective and reliable energy sources. (Lead: NASA, Support: DOD, DOE, USGS)

1.1.2 Strengthen foundational and framework map products and begin assessing the natural resources of the Moon, with support from geological, hydrological, biological, astronomical, and remote sensing expertise (Lead: NASA and USGS, Support: DOD and NSF)

1.1.3 Advance research, development, and demonstration of capabilities using materials sourced from the Moon. (Lead: NASA, Support: NSF)

1.1.4 Advance research and development of robotic exploration and operational capabilities, including robotic rovers and robots for habitat assembly, regolith processing, or any other high priority activity on or around the Moon that can be more efficiently, cost-effectively or safely done by robots. (Lead: NASA, Support: DOC and DOD)

1.1.5 Advance design and development of high-performance atomic clocks and oscillators, including technology that enables use in space environments—such as frequency combs and microwave links—to enable robust communication infrastructure, research in fundamental sciences and astronomy, and position, navigation, and timing systems in Cislunar environments. (Lead: DOC(NIST), DOD, NASA, Support: USGS)

Conduct research to better understand and mitigate the negative effects on humans and machines caused by the space environment

1.1.6 Conduct research and gather data on the effects and appropriate mitigations of ongoing natural and artificial hazards to humans and machines in Cislunar space, including radiation, space-weather events, microgravity, partial gravity, micrometeoroids, debris due to rocket plume impingement on regolith, and Lunar dust. (Lead: NASA, Support: DOD, DOE, NOAA, NSF, USGS)

1.1.7 Advance research, development, and demonstration of capabilities for more continuous physiological monitoring to enable the long-term health and wellbeing of humans in space. (Lead: NASA)

Support social science research related to crewed exploration and permanent inhabitation of space

1.1.8 Research the impact of isolation on humans and means of fostering isolated communities to thrive. (Lead: NASA, Support: Other departments and agencies as relevant)

1.2 Advance Cislunar Science

Raise awareness of Cislunar science topics

1.2.1 Continue a concerted effort to be transparent, coordinating across the many ongoing Cislunar research programs within the U.S. government and with the public. Human activities on the Moon remain uniquely inspiring and can catalyze science, technology, engineering, and mathematics (STEM) education as well as research and development in novel areas. (Lead: NASA and NSF, Support: All departments and agencies)

Maintain a Cislunar-focused summary of science objectives that comprehensively identifies the highest priority scientific opportunities in Cislunar space

1.2.2 Build and maintain a set of prioritized Cislunar research objectives to include ongoing work. This process should include consideration of existing scientific decadal surveys and commercial development as well as be coordinated, as appropriate, with international collaborators to consider broader space science interests. (Lead: NASA and NSF, Support: All departments and agencies performing Cislunar research and development)

1.2.3 Coordinate across the U.S. government to prioritize research needs as identified to support establishment and definition of Lunar Reference Systems, Coordinated Lunar Time, and associated standards. (Lead: DOD and NASA, Support: DOC(NIST), DOS, USGS)

Develop and enhance technologies to enable near-side, far-side, and polar Lunar science

1.2.4 Advance technologies and develop associated practices and guidelines to preserve the Lunar environment for future scientific activities, including radio astronomy from the radio-quiet, far side of the Moon and exploration of Lunar polar regions. Activities may include but are not limited to identification of the scientifically valuable regions of the electromagnetic spectrum, research on spectrum management techniques, or development of electromagnetic interference-clean spacecraft designs. (Lead: NASA and NSF, Support: DOD, DOS, USGS)

1.2.5 Advance technologies to enable characterization of the presence, form, and extent of Lunar resources. (Lead: NASA, Support: DOS, NSF, USGS)

1.2.6 Develop technology to mitigate environmental impacts to Cislunar space that might harmfully limit future use. This research and development might include but is not limited to technologies that limit orbital and Lunar surface debris, Lunar surface ejecta from landing/ascent operations, and chemical or radioactive contamination that could compromise the scientific potential of Cislunar space, its future habitability, or resource utilization. (Lead: NASA)

1.3 Support our Workforce

Develop and support programs to train and retain diverse future generations of the space workforce

1.3.1 Address the gaps identified by the U.S. Space STEM Task Force Roadmap[5] and other relevant reports. (Lead: DOD, NASA, and NSF, Support: USGS)

1.3.2 Collaborate with the public and private sector, including universities and non-profits, to address the need for trained personnel in specialized STEM fields. Consideration should be given to formal and informal learning environments, providing access to underrepresented groups, and career progression opportunities. (Lead: DOD, NASA, NSF, Support: All departments and agencies)

2. Expand International Science and Technology Cooperation in Cislunar Space

Innovation in Cislunar space is an international endeavor. The United States continues to build diverse coalitions, such as the signatories to the Artemis Accords, that are dedicated to carrying out space exploration activities in a responsible, peaceful, sustainable and transparent manner. These coalitions offer a framework for partnership and allow opportunities for international collaboration toward scientific opportunity.

The Strategy highlights two emerging opportunities: an International Lunar Year; and global development of technical foundations that enable best practices for safe and sustainable Cislunar operations.

International science years leverage the best of science and diplomacy to enable sustained international coordination and collaboration on shared scientific goals. For example, the International Geophysical Year (IGY) was one of the first major international science efforts, occurring during the Cold War, with the aim of bringing scientists together from around the world to study the Earth, including the Arctic and Antarctic. IGY was an international exchange of scientists designed to be inclusive and focusing on scientific collaboration largely outside of geopolitics. An International Lunar Year (ILY) might foster research and development goals that are fundamentally international activities—such as coordinated Moon-based research.

Cooperative technology developments and new demonstrations can also establish best practices. Such development may lead to new international partnerships that empower emerging space faring nations with new opportunities for growth. U.S. agencies are working to develop and propose best

[5] National Science and Technology Council, September 2022, "Interagency Roadmap to Support Space-Related STEM Education and Workforce" https://www.whitehouse.gov/wp-content/uploads/2022/09/09-2022-Interagency-Roadmap-to-Support-Space-Related-STEM-Education-and-Workforce.pdf

practices for safe Cislunar operations across a range of domains including debris mitigation, minimizing the hazard of Lunar landing ejecta, end-of-life operations, mishap reporting, collision avoidance, crew search and rescue, radio frequency interference, and other aspects associated with safety of flight.

2.1 International Lunar Year

2.1.1 Working with international partners, prepare a proposal to be submitted in the UN General Assembly by 2026 to have an officially designated International Lunar Year by close of the decade. (Lead: DOS, Support: NASA and NSF)

2.1.2 Outreach to the international scientific community on the value of the ILY, identifying a common vision, securing endorsements, and proposing recommended programming (for example, public outreach, accompanying events, scientific collaborations, and international coordination mechanisms). This outreach should consider empowering emerging space faring nations to increase opportunities for their participation in the global scientific community. (Lead: DOS, Support: NASA and NSF)

2.1.3 Include U.S. Cislunar scientific goals, as appropriate, into ILY activities, identifying the most promising research and development activities for international collaboration and including input from departments and agencies, academic institutions, commercial, and other stakeholders. (Lead: DOS, Support: DOD and NASA)

2.2 Develop Technical Foundations of Best Practices for Safe Cislunar Spaceflight Operations

2.2.1 Actively coordinate engagements to identify, promote, and perform international research and development of technologies with Cislunar applications. This should occur in multiple fora, including the UN Committee on the Peaceful Uses of Outer Space, the International Telecommunications Union, the International Astronomical Union, the Committee on Space Research, the Consultative Committee for Space Data Standards, the International Association of Geodesy, and the International Committee on Global Navigation Satellite Systems. (Lead: DoS, Support: DOD and NASA)

2.2.2 Implement and grow the Artemis Accords, with the specific intent of cooperation on Cislunar technical foundations. The Artemis Accords bring together signatories from around the world committed to principles that enhance the safety, sustainability, and transparency of civil space exploration and use. This unique international community might serve to advance technical foundations in support of safe Cislunar activities. (Lead: DOS and NASA)

2.2.3 Assess future needs for Cislunar coordination and consultation. As Cislunar operations expand among multiple nations and commercial partners, the need may arise for more comprehensive mechanisms for coordination. (Lead: DOS and NASA, Support: DOD, NSF, USGS)

2.2.4 Work towards timely development and adoption of standard Lunar Reference Systems and the instantiation of Coordinated Lunar Time through existing standards organizations. (Lead: DOS and NASA, Support: DOC, DOD, USGS)

3. Extend U.S. Space Situational Awareness Capabilities into Cislunar Space

Space Situational Awareness (SSA) is essential for safe spacecraft operations in all orbits. Timely, accurate, and shared knowledge of trajectories and activities in Cislunar space, including on the Lunar surface, help to avoid interference and conjunctions as well as encourage responsible behaviors and best practices in space.

Until recently, the number of spacecraft in Cislunar space was very limited. However, in the past several years there has been a continued increase in actual and planned missions to the Lunar surface or vicinity, and this is anticipated to grow over time.[6]

SSA in Cislunar space is technically challenging due to many factors. The volume of Cislunar space is more than 2,000 times larger than the entire region of space within geosynchronous orbit, and the farthest region of Cislunar space is more than twelve times the distance of geosynchronous orbit from Earth. The fundamental functions of Cislunar SSA, detection, tracking, and characterization of objects may require different data representations depending on whether two-body dynamics are sufficient to accurately estimate object trajectories.[7] Cislunar SSA must also provide characterization of the natural environment, such as space weather, human-made interference, and hazardous near-Earth objects. Furthermore, an understanding of activity on the Lunar surface is necessary to enable compatible coexistence between space and surface activities.

3.1 Evaluate SSA Needs, Priorities, and Existing Gaps for extending Capabilities into Cislunar Space

3.1.1 Identify and prioritize research and development needed to support extension of U.S. SSA capabilities into Cislunar space, to include aiding planetary defense, improved debris population modeling, and detection, tracking, and characterization of satellites in the Cislunar volume. This process will be based upon capability needs identified by interagency stakeholders and consider commercial and international development to the maximum extent practicable. (Lead: DOD and NASA, Support: DOC)

3.1.2 Evaluate the efforts and technology gaps of commercial and international contributors to Cislunar SSA, including both sensors and data processing algorithms. This evaluation will serve to streamline U.S. investment in technology to support Cislunar SSA goals. (Lead: DOD, Support: DOC, DOS, NASA)

3.1.3 Identify and prioritize technology in support of the ground network and infrastructure, including processing, data management and exchange, and personnel needed to support and sustain the extension of U.S. SSA capabilities to the Cislunar regime. (Lead: DOD and NASA, Support: DOC)

3.1.4 Advance research and development of Lunar mapping tools and identify additional data needed to support technologies necessary for safety of operations on the Lunar surface. (Lead: NASA and USGS, Support: DOD)

[6] "Lunar Landing and Operations Policy Analysis," NASA Office of Technology, Policy, and Strategy, September 30, 2022

[7] In the Cislunar regime, motion is better represented by three-body dynamics rather than by two-body dynamics with trajectories represented by Two-Line Elements (TLEs). Cislunar SSA trajectories can be fitted to TLEs for short periods of time for the purpose of tasking sensors to collect observations of Cislunar space objects, but the TLEs are not valid for extended periods. Heritage SSA sensors that only accept tasking in TLE formats will need to be upgraded for Cislunar SSA. Due to the chaotic nature of the dynamic system, small perturbations can cause dramatic changes in Cislunar trajectories, causing SSA systems to require frequent observations, or risk custody of objects in these trajectories.

3.2 Develop or Improve Ground-Based and Space-Based Sensors

3.2.1 Assess the capability of existing government SSA sensors to understand if incremental upgrades and/or modifications to sensor software and hardware might significantly improve detection of objects in Cislunar space. (Lead: DOD and NASA)

3.2.2 Conduct a study to identify the best use of satellites in novel orbits, enabled by the gravitational influence of the Moon, to complement existing ground and space-based SSA sensors. (Lead: DOD and NASA)

3.3 Increase Cooperation and Data-Exchanges with Other Users of Cislunar Space

3.3.1 Support, promote, disseminate, and maintain a publicly available, standardized data format, following internationally accepted coordinate system and timing standards, that enables sharing Cislunar trajectory information among all space operators for SSA. (Lead: DOC, Support: DOD, DOS, NASA)

3.3.2 Publish, disseminate, and maintain a publicly available set of astrodynamics routines that enable standardized trajectory uncertainty prediction and propagation, to produce orbital state and object metadata descriptors that are compatible with a standardized SSA data format. (Lead: NASA)

3.3.3 Promote incentives for operators to share ephemeris and planned maneuvers using common or standardized space operations protocols. (Lead: DOC, Support: NASA)

3.3.4 Extend space weather modeling to Cislunar operations to enable forecasting and notification of space weather events that pose hazards to Cislunar operations. Leverage as appropriate the space weather characterization processes currently in use for lower altitude space domains. (Lead: NASA, Support: DOC, DOD, NSF)

3.4 Develop an Integrated Cislunar Object Catalog

3.4.1 Identify the technical resources required to integrate applicable data sources—including data from spacecraft owners and operators, DOD, and NASA, as well as commercial and academic sources—to develop a comprehensive catalog of natural and artificial objects across the Cislunar regimes. (Lead: DOC, DOD, NASA)

3.5 Develop Procedures for Publicly Sharing Cislunar SSA Data and Support Spaceflight Safety

3.5.1 Develop best practices for post-mission disposal, debris mitigation, and conjunction assessment and mitigation processes in Cislunar space. (Lead: DOD and NASA, Support: DOC, ODNI, and other agencies as appropriate)

3.5.2 Update the U.S. Orbital Debris Mitigation Standard Practices to incorporate both Cislunar and Lunar-surface considerations and subsequently update derived requirement and guidance documents at the Department and Agency level. (Lead: DOD and NASA, Support: DOC, ODNI, and other agencies as appropriate)

4. Implement Cislunar Communications and Position, Navigation, and Timing Capabilities with Scalable and Interoperable Approaches

The United States government will use scalable, interoperable, and secure approaches for Communication and Position, Navigation, and Timing (C&PNT), the information infrastructure that enables the future use of Cislunar space.

The NASA Artemis campaign, with its near-term mission to return humans to the Moon, enables the foundational elements and architecture for C&PNT in and around the Moon. In line with implementing the Strategy, NASA's Moon to Mars Architecture[8] defines Lunar infrastructure goals and objectives, including:

- Creating an interoperable global Lunar utilization infrastructure where U.S. industry and international partners can maintain continuous robotic and human presence on the Lunar surface for a robust Lunar economy without NASA as the sole user, while accomplishing science objectives and testing for Mars exploration,
- Developing a Lunar surface, orbital, and Moon to Earth communications architecture capable of scaling to support long term science, exploration, and industrial needs, and
- Developing a Lunar position, navigation, and timing architecture capable of scaling to support long term science, exploration, and industrial needs.

NASA will coordinate with stakeholders across the U.S. government, and consider the inputs of international partners, to set the national approach to Cislunar C&PNT infrastructure. This coordination will ensure that the systems and infrastructure deployed for the Artemis program support diverse users and allow for a cooperative and sustainable ecosystem in Cislunar space.

4.1 Establish Foundational Capabilities to Enable a Flexible Cislunar Architecture

4.1.1 Establish an interagency coalition with formal responsibility for the coordination, development, and oversight of the National Cislunar C&PNT Architecture. Cislunar C&PNT requires a long-term, adaptable, and secure approach, and close work with other stakeholder agencies and international partners, providing sustained focus on long-term priorities. (Lead: NASA, Support: DOD)

4.1.2 Identify overlapping and differing needs across multi-agency requirements for Cislunar C&PNT for departments and agencies, recommending to implementing agencies which requirements should be incorporated into the architecture. (Lead: NASA, Support: DOC, DOD, DOS, NSF, USGS)

4.1.3 Provide updates to the Moon to Mars Architecture on a timely basis to inform whole-of-government C&PNT architecture characteristics, needs, use cases and functions. C&PNT architecture planned under NASA's Moon to Mars Strategy is updated annually.[9] (Lead: NASA, Support: DOC, DOD, DOS, NSF, USGS, and other agencies as appropriate)

4.2 Ensure Capabilities are Scalable and Interoperable with Private and International Actors

4.2.1 Develop and implement C&PNT standards, identifying mechanisms to monitor and assess the suitability of standards and the National Cislunar C&PNT Architecture, in particular those features related to security. (Lead: NASA, Support: DOC, DOD, DOS, NSF, USGS, and other agencies as appropriate)

4.2.2 Identify priority C&PNT topics for international consultation or coordination. (Lead: DOS and NASA, Support: DOC, DOD, NSF, USGS, and other agencies as appropriate)

4.2.3 Identify priority technology demonstrations to enable modernized and expanded sensing, ranging and timing technologies, as well as techniques that enable integration of new space-based operations with existing infrastructure. (Lead: DOD and NASA)

[8] NASA's Moon to Mars Architecture defines the elements needed for long-term, human-led scientific discovery in deep space. For more information, see: https://www.nasa.gov/Moontomarsarchitecture/

[9] https://www.nasa.gov/Moontomarsarchitecture-whitepapers/

Conclusion

The United States is committed to the safe, transparent, and sustainable exploration and use of Cislunar space for peaceful purposes. This Plan directs various federal departments and agencies to work with international partners, other government stakeholders, and private entities to work toward developing the Cislunar infrastructure that will be necessary to sustain a global presence in Cislunar space. The Plan should be updated periodically to incorporate changing priorities, the perspectives of our international partners, and to remain aligned with the expanding pace of Cislunar development undertaken by all space faring nations and entities.