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**Committee on the Peaceful
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Scientific and Technical Subcommittee
Sixty-first session
Vienna, 29 January – 9 February 2024

Reports of the Moon Village Association

This document contains reports of the Moon Village Association on Global Expert Group on Sustainable Lunar Activities – Status/Plan; and on the International Moon Day 2023 and outlook for 2024, received from the Moon Village Association on 25 January 2024. The information was reproduced in the form that it was received.



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Report of the Moon Village Association on the Global Expert Group on Sustainable Lunar Activities – Status/Plan

Paper submitted by the Moon Village Association

I. Introduction and Background

1. This report summarizes the definition, status, and planning of the Global Expert Group on Sustainable Lunar Activities (GEGSLA) proposed and hosted by the Moon Village Association (MVA). MVA, being a permanent observer of UN COPUOS, has regularly informed all UN COPUOS committees of the progress of its activities.

II. The Global Expert Group for Sustainable Lunar Activities (GEGSLA)

2. The work of the GEGSLA builds on the foundations laid by several recent key documents, including the MVA Best Practices, the Hague Building Blocks for the Development of an International Framework on Space Resource Activities, and the United Nations Guidelines for the Long-term Sustainability of Outer Space Activities, but aims to extend those principles to provide more detailed recommendations and practical guidance.
3. Hence, GEGSLA will provide distinct and new directions for international cooperation to encourage the sustainability of lunar activities. The aim of the Group is to increase coordination mechanisms and individuate the present and future challenges of lunar missions, especially considering the increased global interest in specific areas like the lunar south pole.
4. The primary goal of GEGSLA meetings is to stimulate informal discussions to prepare documents to be brought to the attention of UN COPUOS for further discussion and deliberation. The Group started its work with the kick-off meeting in early 2021, creating the basis for increasing global coordination for a new era of sustainable space exploration.
5. The Group was chaired by Dr. Dumitru-Dorin Prunariu (Romania). Its members included 37 experts from the following countries: Australia, Austria, Brazil, Canada, China, Cyprus, Egypt, France, Germany, India, Israel, Kenya, Luxembourg, Mexico, Netherlands, Nigeria, Romania, Russian Federation, Saudi Arabia, Türkiye, Ukraine, United Kingdom of Great Britain and Northern Ireland, and the United States of America.
6. The Group included about 200 observers from more than 40 countries.
7. The Group completed its activities in December 2022 with the following deliverables:

- (a) *A Recommended Framework and Key Elements for Peaceful and Sustainable Lunar Activities*; attached to this CRP and delivered to all Delegations in a printed format.
- (b) Annex 1 “*Guidelines for lunar activity implementation and operations addressing information-sharing; safe operations and lunar environmental protection; compatibility and interoperability; and lunar governance*” and Annex 2 “*A List of future issues for sustainable lunar activities.*” Both documents can be downloaded at: <https://moonvillageassociation.org/gegsla/documents/>.

MVA has already presented, in 2023, the Recommended Framework at the 60th Scientific and Technical Subcommittee in the Conference Room Paper [A/AC.105/C.1/2023/CRP.20*] as well as at the 62nd Legal Subcommittee in the Conference Room Paper [A/AC.105/C.2/2023/CRP.31] and the 66th Committee on the Peaceful Use of Space [A/AC.105/2023/CRP.9].

- 8. The interest in lunar activities, discussed and coordinated by MVA and GEGSLA since few years, has been confirmed by newly setup NGO, e.i. Lunar Policy Platform, see *Lunar Policy Priorities for Safe and Sustainable Lunar Activities*, November 2023, available [online](#). Other NGOs: For All Moonkind, Open Lunar, SGAC, COSPAR, IAA and IAU are also involved in lunar activities and GEGSLA is acting as platform to involve them.

III. GEGSLA Operational Phase

- 1. The Operational Phase started in January 2023 and is ongoing. Its goals are to promote consideration and implementation of the Recommended Framework produced by the Group, with a special focus on discussions conducted within the UN COPUOS as well as an in-depth assessment of few specific issues as defined in the following paragraphs.
- 2. There is no distinction between Members and Observers. There are only Participants in the Group. The Group consist of major stakeholders in lunar activities, including representatives from space agencies/government, industry, international organizations, academia, and civil society. Participants are over 200 former Members and Observers of the Group and will act on a personal basis. Any views expressed at the meetings or by the Group do not represent the position of organizations to which the participants may belong. Moreover, the Group already includes new participants from large scientific organizations like COSPAR, and more participants are invited to join.
- 3. In 2023, GEGSLA held 4 plenary meetings and has created the following Working Groups to investigate in depth some aspect of the Framework document:

WG1: Lunar Environmental Protection

WG2: Lunar Technical Coordination

WG3: Lunar Multi-stakeholder Coordination.

Each Working Group is composed of about 15 technical experts from around the world.

The Status Report of each WG, including some preliminary conclusion, can be found in the Annex.

4. The Framework Document is considered a starting point to urgently initiate a conversation on lunar coordination between Delegations. The preliminary conclusion of the Working Groups, and in particular of the WG3, is that it would be important to establish a permanent consultation body within the UN system, to de-risk future lunar activities, hopefully within 2024, in order to insure sustainable lunar activities
5. Details of the Project Plan for 2024 can be found on the relevant GEGSLA webpage of the MVA website: <https://moonvillageassociation.org/gegsla/about/>.

Annex

Status Report Working Group 1: Lunar Environmental Protection

I. Introduction

1. Working Group 1 has the following objectives:
 - i. Offer clarification on the meaning of "harmful contamination" of the lunar environment as specified in Article IX of the OST and consider the extent to which this concept needs to be developed to include other forms of harmful interference
 - ii. Assess aspects and locations of the lunar environment which merit protection from harmful contamination and other interference in order to preserve scientific, cultural and/or aesthetic value
 - iii. Make recommendations which may be helpful in protecting these environments
2. To date, the Working Group has held three meetings and has made preliminary progress in understanding current usage of the term 'harmful contamination', and in assessing the value of applying principles in existing international environmental law to the lunar environment.

II. Definition of "harmful contamination"

3. The term 'harmful contamination' is not defined in the Outer Space Treaty (OST). The WG is seeking to clarify how this expression is typically understood by States Parties to the OST and other space actors. The WG heard expert testimony from Niklas Hedman, former Acting Director of UNOOSA, that the background to the wording in Article IX of the OST was primarily concerned about preventing interference with the activities of other States Parties (i.e., through the principles of 'Due Regard' and 'Harmful Interference'). This is consistent with the interpretation provided by the Cologne Commentary on Space Law: "The definition of harmful contamination appears to be a broad concept, covering all possible kinds, forms or instances of harmful interference in outer space, deliberate or unintentional alike. 'Harmful' retains its ordinary meaning, namely causing or capable of causing significant harm. Thus, Article IX implies that 'any contamination which would result in harm to a State's experiments or programs is to be avoided.'"
4. Thus, current understanding of 'harmful contamination' does not appear to include any requirement to protect the lunar environment in and of itself. In addition, current interpretations have generally relied for guidance on the COSPAR Planetary Protection Policy (PPP), which only provides guidelines for the prevention of biological contamination.
5. The Moon Agreement takes a more comprehensive position in Article 7, which identifies harmful contamination as the introduction of "extra-environmental matter or otherwise" where "otherwise" could potentially include forms of contamination other than biological. Article 7 requires that lunar operators to "take measures to prevent the disruption of the existing balance of its environment".
6. The WG considers that it would be desirable to reach agreement on a broader definition of 'harmful contamination' which extends protection to aspects of the lunar environment itself (e.g., the protection of areas of scientific, cultural and/or aesthetic value), as well as wider forms of possible contamination (e.g. physical, chemical, and radiological contamination, in addition to the biological contamination covered by the PPP).

7. One possibility would be to expand relevant areas of international environmental law to include aspects of the lunar environment.

III. Relevance of international environmental law

8. The WG notes that, according to Article III of the OST, space activities must comply with international law, and this therefore includes relevant aspects of international environmental law. To this end, the WG established a sub-group to consider the principles of international environmental law that can be applied and adapted to human activities on the Moon. Several such principles were identified, including:

- i. Precaution
- ii. Prevention
- iii. Long-term sustainability
- iv. Intergenerational solidarity
- v. Publicity and transparency

9. A key tool in preventing environmental harm on Earth is the implementation of Environmental Impact Assessments (EIA), the importance of which was stressed at the United Nations Conference on Environment and Development (UNCED, Principle 17). The WG considers it desirable that the requirement for EIAs be extended to human activities on the Moon.
10. The WG recognizes that there is more work to do to clarify the relevance of existing environmental law to outer space. As well as legal principles, there are international charters, conventions and codes of ethics relating to environmental management which may have relevant principles or practices. There is also the need to facilitate future discussions about the exploitation and use of space resources. Difficulties in implementation might be eased if environmental protection measures were incorporated in national space legislation before incorporation in international instruments. The geostationary orbit serves as an example of a “limited natural resource”, and its management (e.g. via the ITU) might be a model for comparison with regard to space resources.

IV. Next steps

11. In the coming months, WG1 will move on to consider how best to implement the recommendations made in the GEGSLA Framework Document regarding lunar environmental protection, and consider what, if any, modifications to it may be desirable. In particular, we will identify examples of sites of special scientific, cultural, and/or aesthetic interest on the Moon as case studies to investigate how these values might best be protected.
12. WG1 will discuss the proposal of WG3 to create an International Committee on Lunar Operations, partially modelled on the International Committee on Global Navigation Satellite Systems (<https://www.unoosa.org/oosa/en/ourwork/icg/icg.html>), which may also be helpful in achieving the goals laid out in section 3 above.
13. WG1 will make use of existing fora and international meetings to interact with the community and refine our recommendations. We will provide a final report by the fall of 2024.

V. WG Participants

Co-Chairs

Jean-Claude Worms, COSPAR, France

Ian Crawford, Birkbeck University of London, UK

Members

Alice Gorman, Flinders University, Australia

Anne-Sophie Martin, Institute for International Legal Studies (ISGI-CNR), Italy

Aya Farag, Faculty of navigation science and space technology, Egypt

David Kendall, Outer Space Institute, Canada

Edvaldo Silva, CESMAC University Centre, Brazil

Farah Diya Yasmine, Space Generation Advisory Council, Indonesia

Flavia Alvim de Carvalho, EJUSP and PUC Minas, Brasil

Frank Koch, Orbit Recycling, Germany

Marc Fournier, SNCF / La Paillasse, France

Naresh Kannan, University of Rostock, Germany, United Kingdom

Oscar Mario Fernandez, Space Ranger, Queen Bee Machine, SGAC, MVA Costa Rica

Status Report Working Group 2: Lunar Technical Coordination

I. Introduction

1. The Lunar Technical Coordination Working Group was assembled earlier in 2023, with the initial set of members selected in August. The key objectives of the group are to:

- i. Facilitate information sharing between organizations performing missions on the lunar surface or planning lunar surface missions.
- ii. Communicate GEGSLA Recommend Framework to lunar stakeholder community and receive feedback, particularly for chapters 5,6 and 7.
- iii. Determine the highest priorities for the definition and agreement of best practices to ensure efficient and safe lunar activities, while protecting the lunar environment.
- iv. Work toward those best practices being implemented by organizations operating on the lunar surface.
- v. Coordinate technical standards to further the goal of compatibility and interoperability.

2. Working group accomplishments since being formed include planning and hosting a GEGSLA operational meeting to gain input and feedback from industry, identifying the set of other lunar coordination groups and discussion on how GEGSLA can engage, and providing feedback from an international industry perspective on relevant reports, such as the LunaNet Interoperability Specification. This report includes a summary of the results from a GEGSLA Operational Meeting that was coordinated by the Lunar Technical Coordination working group to obtain feedback from the community, feedback by the working group on the Artemis Accords, recommendations for GEGSLA on to engage with other coordination groups, and plans for activity in 2024.

II. Operational Meeting Summary and Recommendations

3. The operational meeting on the 6th of September was devoted to the industry feedback on “Recommended Framework and Key Elements for Peaceful and Sustainable Lunar Activities”, Chapter 5, 6, 7.

- Chapter 5: Information Sharing
- Chapter 6: Safe Operations and Lunar Environmental Protection
- Chapter 7: Interoperability

4. During the operational meeting several representatives of the space industry were invited to participate in the discussion that touched upon the following questions:

- a. Do you see recommendations presented in the Chapter 5,6 and 7 as valuable to your business? Do you plan to follow them?
- b. Is there an existing organization or process that would be trusted to administer agreed principles, including information sharing, safety zones, and interoperability standards?

- c. Where do you draw the line between information you can share to support safety and situational awareness and information that is proprietary because it reveals intellectual property on your operations?
- d. Do you see protecting Lunar natural heritage as an impact to your business plans?
- e. Are you engaged with the community in developing interoperability standards? If so, what group is coordinating?

5. The list of industry representatives:

- Professor Wang Wei, CLEP Deep Space Exploration Lab (DSEL), China
- Marchel Holle, ispace, Japan
- Jennifer Lopez, Astrobotic, USA
- Carlos Mariscal, Dereum Labs, Mexico
- Timothy Cichan, Lockheed Martin, USA

6. The representatives mentioned a struggle between business interests and information sharing. Nevertheless, the landscape is highly competitive, so a number of providers are going to address the issue of information sharing in the coming years. There is a need for a balance. From one side the community aims to engage with information sharing to enable resilient facilities, to foster international collaboration, and to share lessons learned and create a sustainable presence on the lunar surface. From another side industry needs to figure out how to address international concerns from a domestic entity within the U.S. (e.g. export controls). As an example of information sharing, Lockheed Martin does currently have agreements with other companies through national contracts. It was mentioned that the question of information sharing is critical when coordinating among multiple stakeholders.

7. Does an international forum fill this gap and can it help build trust beyond national borders and share information with international players? From an Artemis Accords perspective it does mention these topics, but the mechanisms have not been set up yet. As an example of current sharing practices, U.S. companies coordinate with the local Federal Communications Commission (FCC), who then works with the International Telecommunication Union (ITU) to coordinate internationally. This is what is expected for lunar surface activities, with national and international frameworks and coordinating bodies that don't currently exist for coordination besides for radio frequencies and the ITU. GEGSLA can play a role in fostering and building trust, but it will also take time. The community should think of information sharing not as a burden but as a benefit. In the GEGSLA Recommended Framework, section 5.4 defines the types of information: safety zones, scientific, etc. These are the high-level pieces of information which are very valuable to release as we all learn together how to operate on the lunar surface. For example, the data on surface plume interactions and understanding how much harmful interference is created is vital, and without having multiple missions interacting, we won't know the thresholds or guidelines for landing locations. It is also vital to understand what kind of database of information is needed in line with current policies (e.g. surface area, company, country) so that potential for harmful interference is discussed between parities. One participant proposed to borrow ideas from the law of the sea, i.e. a priority right.

8. The operations of the missions will inform the lessons learned, which can benefit the community. The benefit also comes back to the company and contributes to the goal of creating a dynamic cislunar environment with many different actors. It was voiced that the chapter recommendations are reasonable

and should be implemented. When it comes to operations of a large company, and especially to doing something new, they would support it being a framework that is not overly restrictive but at the same time addresses these points. GEGSLA recommendations need to become codified into a process, and that process is what will be implemented at an organizational, national, and international level: policy that must be followed. The point of incentives was also highlighted. It is important to motivate entities to share information, and the sharing of scientific information should always be encouraged.

9. The discussion also touched upon the role of industry in an international coordination body. Can they play a role in getting the industry or government to adopt these norms? Industry feedback is important, especially with commercial ventures like ispace where missions are approved or licensed. The DSEL representative raised concerns regarding some definitions: section 6.4.1. doesn't define who represents the scientific community, and section 6.4 refers to sites of special scientific interest, although there is no common definition for such sites. Also, there is a need to set up the priorities, e.g. one participant proposed to include the topic of lunar surface/orbital debris mitigation into discussions.

10. Summarizing the conversation, we need to learn during early missions what we're finding to be able to make informed decisions on what to share. Currently there is no strong interest from the community to move too quickly into defining requirements. There is a need for a set process and coordination group, and industry would be open for collaboration. GEGSLA should take a look at using Article 11 index and ITU infrastructure. It is important to note that recommendations in the GEGSLA Framework may not have as much specificity as they could have, but more specificity makes it harder for a consensus to be reached in a multi-year multi-stakeholder process. Finally, this type of feedback can be used to create a more robust mechanism. Overall, these suggestions help guide the operationalization phase of chapters 4, 5, and 6 of the Recommended Framework. There was no feedback that recommended a change to the operationalization phase plan.

III. Feedback and Recommendations on the Artemis Accords (Sections 1-13)

11. The NASA Artemis Accords encompasses thirteen sections delineated as a set of principles and guidelines for international cooperation in space exploration. The Artemis Accords commit signatories to principles that include recognizing mutual interests in peaceful outer space exploration, fostering global cooperation, building on the legacy of the Apollo program to establish sustainable human exploration, emphasizing compliance with existing space treaties, acknowledging a collective interest in preserving outer space heritage, and striving for a global consensus through forums like the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS).

12. UN COPUOS serves as a forum within the United Nations that discusses international cooperation in the peaceful use and exploration of outer space. COPUOS can potentially serve as a global platform to discuss and resolve the overlaps and conflicts between the Artemis Accords, Outer Space Treaty, and Moon Treaty. Through diplomatic negotiations and consensus-building, member states can work together to harmonize these agreements and establish common principles for responsible space exploration and use.

13. Recommendations and feedback from a GEGSLA Lunar Technical Coordination working group perspective are:

- 1. Purpose and Scope (Section 1):** The purpose and scope are clearly defined, emphasizing safety, sustainability, and adherence to existing treaties, however, the accords don't explicitly define the need for ongoing coordination with international partners to enhance collaboration and inclusivity.
- 2. Implementation (Section 2):** Provides mechanisms for implementation through various instruments but does not specify a clear dispute resolution mechanism or regulatory body for conflicts arising during cooperative activities.
- 3. Peaceful Purposes (Section 3):** Affirms commitment to peaceful purposes, aligning with international law, and is succinctly organized, but doesn't include a glossary of specific terminology that must be adopted to avoid actions that may be perceived as threatening by other nations.
- 4. Transparency (Section 4):** Commits to transparency in national space policies, and coincides with the core principles of government space interactions. Regular reporting to COPUOS would enhance global transparency and cooperation.
- 5. Interoperability (Section 5):** Acknowledges the importance of interoperable infrastructure, but doesn't describe with more specific details on how interoperability standards will be developed and updated.
- 6. Emergency Assistance (Section 6):** Commits to rendering assistance in line with the Rescue and Return Agreement, but doesn't specify coordination mechanisms for global assistance during lunar missions in the event of malfunctions, or testing issues that could impact space as a globally protected resource.
- 7. Registration of Space Objects (Section 7):** Commits to determine registration responsibilities for cooperative activities but doesn't clearly outline the process for consultation with non-Party nations to the Registration Convention.
- 8. Release of Scientific Data (Section 8):** Emphasizes coordination on public release of information, but does not currently explicitly outline procedures for resolving potential conflicts regarding proprietary information.
- 9. Preserving Outer Space Heritage (Section 9):** Commits to preserving historic sites but doesn't establish a collaborative framework for determining standards and practices for preservation as part of the UN's sustainable development goals.
- 10. Space Resources (Section 10):** Emphasizes responsible extraction of space resources, but define the language, terms, and provisions on international cooperation in the extraction and utilization of space resources.
- 11. Deconfliction of Space Activities (Section 11):** Addresses issues of due regard and harmful interference. Specific mechanisms for dispute resolution are not defined.
- 12. Orbital Debris (Section 12):** Commits to mitigating orbital debris but doesn't include more specifics on concrete measures for minimizing orbital debris generation.
- 13. Final Provisions (Section 13):** Outlines the commitment to periodic reviews, but doesn't include a provision for periodic multilateral meetings to foster international cooperation.

14. Overall, the Artemis Accords provide a comprehensive framework, and addressing the identified gaps as the process is defined in more detail would strengthen global collaboration and address potential areas of concern. Additionally, continuous engagement with international partners and organizations, such as UN COPUOS, is crucial for the success of the Accords.

IV. Engagement with Other Coordination Groups

15. The GEGSLA Working Group 2 (WG 2) mission's is to discuss methods to streamline and harmonize technical standards, protocols, and best practices for lunar exploration activities, ensuring a cohesive and safe approach to the Moon's utilization.

16. In recent years, the renewed focus on lunar exploration and utilization has led to the formation of several groups dedicated to coordinating activities in space and on the lunar surface. These groups work towards establishing and harmonizing standards, practices, and visions for the future of space enterprise, each with a unique focus. A non-exhaustive list of some of these consortia include:

A. AIAA Cislunar Economic Taskforce

17. The American Institute of Aeronautics and Astronautics (AIAA) has established a Cislunar Economic Task Force, focusing on developing a thriving ecosystem in the cislunar space region. This initiative aims to set a clear vision for the future of space enterprise and encourages the use of commercial solutions. The strategy includes harmonizing various stakeholder actions in critical areas like interoperability requirements, standards, norms, risk acceptance, domain awareness, in-space testbeds, and common infrastructure. Additionally, it emphasizes the importance of STEM education. A key objective of the task force is to attract partners and allies who share similar goals, ensuring that investments are harmonized to maximize impact and maintain leadership by the U.S., its allies, and partners. The task force also aims to identify essential areas that are crucial for meeting the objectives of exploration, scientific research, national security, and commercial interests.

B. Consortium for Execution of Rendezvous and Servicing Operations (CONFERS)

18. CONFERS, initiated by DARPA in October 2017, evolved into an independent global trade association in December 2022, holding a 501(c)(6) status. It's a platform for international stakeholders in satellite servicing, including companies, educational institutions, and government agencies. The consortium's primary objectives are to promote satellite servicing activities, develop industry-led standards for a safe and sustainable space economy, and engage with global governmental bodies on satellite servicing policies. Structurally, CONFERS is governed by a nine-member Board of Directors and an Executive Committee, with three specialized Working Groups. It focuses on developing multiple standards for satellite servicing and hosts annual events for knowledge sharing and collaboration among its diverse membership, comprising 63 members globally. For more information, visit their website at www.satelliteconfers.org.

C. Consortium for Space Mobility and ISAM Capabilities (COSMIC)

19. COSMIC is focused on integrating In-Space Servicing, Assembly, and Manufacturing (ISAM) into space missions routinely. Its key objectives include the advancement of ISAM technologies, fostering

U.S. leadership in the ISAM sector, and encouraging the adoption of ISAM in both commercial and governmental space missions. COSMIC's structure encompasses a Steering Committee, a management entity, caucuses, and specialized working groups. Supported by NASA and managed by The Aerospace Corporation, COSMIC produces annual technology assessments and strategic documents to support the ISAM community. Membership is open to U.S.-based organizations and individuals post its kickoff. With a long-term vision set on normalizing ISAM in space missions, COSMIC provides metrics to track the progress toward this innovative goal. More information is available on their website at <https://cosmicspace.org/>.

D. Lunar Surface Innovation Consortium (LSIC)

20. LSIC, under the stewardship of the Johns Hopkins Applied Physics Laboratory, has a clear objective to enhance U.S. leadership in lunar exploration. By tapping into the nation's creativity and resources, LSIC operates in collaboration with NASA's Space Technology Mission Directorate and is an integral part of the Lunar Surface Innovation Initiative (LSII). Its key activities involve engaging with a diverse array of industry, academia, and governmental entities to innovate and develop technologies tailored for operations on the lunar surface. The impact of LSIC is twofold: it boosts technological capabilities for lunar exploration and nurtures a collaborative ecosystem for space innovation. For more information or to get in touch, one can visit the LSIC website.

E. Lunar Operating Guidelines for Infrastructure Consortium (LOGIC)

21. The Lunar Operating Guidelines for Infrastructure Consortium (LOGIC), established by DARPA and managed by the Johns Hopkins Applied Physics Laboratory (APL), is designed to address the complexities of developing infrastructure on the Moon. Its primary aim is to create a robust lunar economy by facilitating collaboration between government, industry, academia, and international stakeholders. LOGIC's work is focused on setting technical interoperability standards in various areas crucial for lunar development. These include power distribution, communications, navigation, lunar surface surveying, and cislunar air and space traffic control. By fostering regular collaboration within communities working on lunar technologies, LOGIC intends to support a diverse industrial base and ensure efficient upgrades, maintenance, and repairability for commercial lunar services.

F. LunA-10

22. LunA-10 is a DARPA initiative aimed at developing a cohesive lunar infrastructure to support the forthcoming cislunar economy, emphasizing the transition from isolated systems to a network of shareable, scalable infrastructure. This framework seeks to engage stakeholders to identify opportunities for scientific and commercial activities on the Moon. It focuses on key areas such as transit, energy, and communications, aiming to scale infrastructure in a way that mirrors the internet's evolution. The process encourages contributions from companies ready to offer or use lunar services, aligning with NASA's broader exploration goals. Selected projects will progress from abstracts to detailed white papers and presentations, culminating in a final report.

23. GEGSLA can engage with other lunar coordination groups through a multifaceted approach. This includes forming collaborative forums for discussing and aligning standards and best practices. GEGSLA will remain focused on providing the community concrete products such as the Recommended Framework, and activities to promote those recommendations. GEGSLA can also establish information-sharing networks with private lunar companies, facilitating the exchange of technological insights and lessons learned. Joint working groups with representation from major space agencies could be instrumental in integrating agreed standards into global lunar missions.

V. Plans for 2024 Activities

24. The 2024 activities for the Lunar Technical Coordination Working Group are in the planning stage. One key task will be to develop a plan to enhance integration with international lunar coordination efforts. Proposed elements of the plan include:

- Inviting other groups to present at future working group meetings
- Having the working group present and/or organize panel at other coordination group events, such as the LSIC spring meeting
- Hold a virtual workshop during International Moon Day (IMD)
- Identify any impediments to international coordination

25. The International Lunar Research Station has been adding members, and now includes China, Russia, Venezuela, South Africa, Azerbaijan, Pakistan, Belarus, and Egypt. The working group plans to develop ideas for how the ILRS and the Artemis program should coordinate to prevent harmful interference.

26. In addition, the Lunar Technical Coordination Working Group supports the proposal of the Lunar Multi-Stakeholder Coordination Working Group for an International Committee on Lunar Operations. With the existence of many coordination groups, an international one should be focused on a few very important issues. Sharing information regarding the ongoing and planned operations and engaging in consultations for purposes of coordination is a key objective, along with identifying the shared needs and concerns of lunar operators. It would be advantageous for industry to have a define method of providing input to the committee, perhaps organized as an advisory group.

VI. WG Participants

Co-Chairs

Timothy Cichan, Lockheed Martin, USA

Marchel Holle, iSpace, Japan

Members

Arvind Ramana, Australian Space Agency, Australia

Carlos Mariscal, Dereum Labs, Mexico

Clara Richard, ICAD/DSI/SGAC, Spain/UK

Ekaterina Seltikova, Technical Unit Research for a Thriving Lunar Ecosystem, SGAC France
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Madison Feehan, Space Copy / NASA, Canada
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Prof. Dr. Bernd J. HOEFER, A9C Capital WLL, Bahrain / DiMOS Operations GmbH, Germany
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Shreya Santra, Department of Aerospace Engineering, Tohoku University, Japan
Tufan Kayaci, Turkish Space Agency (TUA), Turkiye

Status Report Working Group 3: Lunar Multi-Stakeholder Coordination

Proposal for an International Committee on Lunar Operations (ICLO)

I. Introduction

1. With hundreds of lunar missions planned over the next decade, many issues that had before been only speculative are now crossing the threshold to reality. Some of the challenges faced by lunar operators, both public and private, include landing site selection and coordination, the avoidance of environmental harm and harmful interference, potential areas of cooperation, the management of natural resources, and the protection of sites of significant scientific and cultural interest.

2. In this multistakeholder environment, the simple act of sharing information can assist in addressing these issues. Information-sharing also brings the benefit of transparency which can lead to building trust among actors operating concurrently in close proximity to one another. An International Committee on Lunar Operations (ICLO) could provide many benefits to those states, companies and other stakeholders intending, or aspiring, to engage in lunar activity, as well as to the broader international community that benefits indirectly from lunar exploration.

3. This proposal is part of the effort to operationalize the Recommended Framework and Key Elements for Peaceful and Sustainable Lunar Activities published in 2022 by the Global Expert Group on Sustainable Lunar Activities (GEGSLA). In Chapter 5, the Recommended Framework recognizes that information sharing is “at the core of ensuring peaceful and sustainable lunar activities.”

4. The creation of the ICLO would be a significant step forward in the implementation of the principles of information-sharing contained in Articles V, VIII, X and, in particular, Article XI of Outer Space Treaty. At the same time, the ICLO would in no way interfere with the current implementation of Article XI through the Index of Submissions by States under Article XI of the Outer Space Treaty maintained by the Office for Outer Space Affairs. Similarly, the ICLO would not affect the existing practice of registering space objects under either Resolution 1721 B (XVI) or the Convention on Registration of Objects Launched into Outer Space. Instead, the purpose of the ICLO is to open a new channel for exchanging operational information that is not typically shared through the Register of Objects Launched into Space or the Article XI Index. As lunar operations expand, there will be a need for strengthening the implementation of the Outer Space Treaty and other existing UN space law instruments as their provisions are operationalized. The information gathered and shared by the ICLO will be a great value in providing the operational context of treaty applications.

5. This proposal draws mainly on the example of the International Committee on Global Navigation Satellite Systems (ICG) which benefits GNSS operators by providing a platform for sharing information and consultation. That said, examples and lessons from other entities are also instructive. Naturally, the issues confronting operators engaged in a variety of lunar activities will differ from those faced by GNSS providers and users. In fact, lunar operators will face a far greater number of challenges, which only magnifies the need for a coordinating mechanism.

6. Like the ICG, the ICLO would operate as a forum for sharing operational information to facilitate and coordinate lunar operations. The sharing of information would be entirely voluntary and subject to the

limitations arising from export controls, intellectual property protection, and other proprietary rights. The ICLO would not engage in making policy, drafting legal instruments, or any other norm-setting activity. ICLO's functions, proceedings, and information would be available to all its Members and broad participation would be encouraged to promote diversity and wide representation. The ICLO would report periodically on its work to the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and would share information collected by the ICLO to support COPUOS activities.

II. Rationale for creating the ICLO

7. The ICLO with a mandate of exchange of operational information would facilitate sustainable lunar operations by providing the following benefits to lunar operators, without prejudice to the ongoing or future activities of the COPUOS and its Subcommittees:

7.1. Cooperation: The ICLO would provide a platform for all spacefaring nations, including emerging spacefaring nations, to participate in discussions and information-sharing related to lunar activities. These discussions may identify opportunities for collaboration at many levels and promote equitable access to the Moon and benefit from lunar activities and their results.

7.2. Sharing best practices and lessons learned: Information gained from all lunar missions, whether ending in success or failure, will be invaluable to all lunar operators as best practices are developed and lessons learned are shared.

7.3. Avoidance of harmful interference: As multiple space agencies and commercial entities engage in lunar missions, there is a risk of interference. As these multiple actors may operate in adjacent or sometimes overlapping areas, means to share information about ongoing (or planned) activities will be critical to prevent harmful interference. The ICLO can also serve as a platform for dialogue, conflict resolution and dispute avoidance.

7.4. Safety: Sharing information through the ICLO will also increase the safety of lunar activities by providing notice of the nature of ongoing and planned activities and through the sharing of best practices for protecting the lunar environment. Moreover, in the event of an emergency situation on the Moon, the ICLO may help as a coordinating body to provide relief to parties affected and to minimize damage.

7.5. Interoperability: The ICLO can play a pivotal role in sharing information regarding technical standards and protocols for lunar operations. Interoperability is of critical importance, for example, with respect to communication protocols, data format, docking mechanisms, and power systems. The benefits would enhance collaboration where common technical standards developed with the support of the ICLO would enable seamless cooperation between missions from different entities and reduce the development and operational costs for lunar missions.

7.6. Protection of the lunar environment. Through information sharing and coordination, lunar operators would explore the Moon in a more orderly manner, and promote ways and means to protect and sustain the lunar environment.

7.7. Technical assistance and capacity building: The number of states interested in space activities, including lunar exploration, continues to grow. The ICLO can serve as a rich resource of technical assistance to these states and help build their capacity in various sectors.

7.8. Sharing of benefits: By sharing scientific data and other achievements at international level, the ICLO would enable more countries, including developing countries, to benefit from lunar exploration.

7.9. Examples of issues faced by lunar operators: The ICLO would assist in resolving a multiplicity of technical and operational issues, some of which are described here:

- **Landing site coordination and lunar dust mitigation:** Sites suitable for landing in the south pole of the Moon are quite limited. As multiple lunar operators plan to send probes to the south pole, ICLO could serve a platform for sharing plans for lunar south pole landing and coordinating selection of landing sites. Furthermore, the lunar dust generated by landing and takeoff operations pose a serious challenge to the adjacent operators and will necessitate the development of best practices of dust mitigation which can be shared through the ICLO.
- **Cislunar traffic:** With multiple missions and stakeholders operating in lunar orbit and on the lunar surface, there is a pressing need to coordinate traffic to avoid collisions and conflicts. The sharing of information regarding the location and timing of cislunar operations can help prevent collisions, reduce risks to spacecraft and astronauts, and streamline operations where efficient traffic management can lead to smoother mission execution.
- **Space resources:** Natural resources on the Moon, such as water ice, will be essential for the support a long-term human presence. As these resources are limited and concentrated in particular areas, sharing information regarding resource activity will be critical for avoiding conflict or harmful interference.
- **Debris mitigation:** Increasing lunar activities may result in the generation of space debris that poses risks to lunar missions. Such debris could be located in lunar orbit as well as on the surface of the Moon. By sharing best practices for debris mitigation, this threat can be minimized. In addition, sharing information regarding the existence and location of debris will help ensure the safety of operations. The work of the ICLO could also assist ongoing debris mitigation efforts, such as those undertaken by the Inter-Agency Space Debris Coordination Committee (IADC).
- **Protection of sites of significant scientific interest and lunar heritage:** The opportunity to share information regarding the nature and location of lunar sites of significant scientific or cultural significance will assist in the identification and protection of such sites.

III. Mandate of the ICLO

8. In light of the preceding, the mandate of the ICLO would be to:

8.1. Provide a forum and process for lunar operators to share information regarding their ongoing and planned operations and engage in consultations for purposes of coordination;

8.2. Benefit lunar operators through the sharing of information and consultations;

- 8.3. Encourage the sharing of information for purposes of, among other things, coordinating operations, facilitating interoperability, improving safety, avoiding interference, protecting the lunar environment, sharing best practices and lessons learned, and building capacity;
- 8.4. Identify the shared needs and concerns of lunar operators;
- 8.5. Carry out the operations of the ICLO for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development; and
- 8.6. Report periodically to the COPUOS regarding the operations of the ICLO.

IV. Conclusion

9. The creation of the ICLO would be a highly beneficial step forward in implementing the principles of information sharing under international space law and promoting coordination and cooperation among states. The ICLO would benefit all current and future operators, both public and private, by providing a platform for sharing information that will assist with, among things, coordinating missions, assuring safe operations, avoiding harmful interference, sharing best practices, and protecting sites of significant scientific and cultural interest.

V. WG Participants

Co-Chairs

Mark Sundahl, Cleveland State University, USA

Yu Xu, Foreign Ministry of China, China

Members

Alper Oren, Department of Aerospace and Aeronautics, Eskisehir Technical University, Turkey

Christophe Bosquillon, Autonomous Space Futures Ltd, Greece

Dennis O'Brien, The Space Treaty Project, USA

Dr. Antonino Salmeri, Lunar Policy Platform, Spain

Gennaro Russo, Italian Institute for the Future, Italy

Irina Chernykh, RUDN University, Russia

Itir Toksöz, Dogus University, Turkey

Kesniel Bravo, Mexican Space Agency, Mexico

Lars Petzold, European Space Policy Institute (ESPI), Austria

Parameswaran Sreekumar, Manipal Academy of Higher Education, India

Setsuko Aoki, Keio University Law School, Japan

Malak Trabelsi, Loeb Vernewell Group, UAE

Lilith Salisbury, Leiden University, Space Court Foundation, SGAC, United Kingdom

Natalia Lemarquis, GMV Innovating Solutions, United Kingdom

Scientific and Technical Subcommittee
Sixty-first session
Vienna, 29 January-9 February 2024

Report of the Moon Village Association on the International Moon Day 2023 and outlook for 2024

Introduction

1. The interest in the exploration and utilisation of the Moon has seen a major surge of efforts globally in the last few years. Several missions have already been launched, and many more are planned in the next few years (i.e. about 100 are planned until 2030). This includes plans for the return of humans to the Moon. This is the reason why the general public needs to be made aware of all these developments and prospective events. In this spirit, in August 2021, MVA recommended (A/AC.105/2021/CRP.14) that COPUOS adopt and propose to the UN General Assembly the recognition of International Moon Days an annual educational, cultural, and scientific event.
2. COPUOS took note of the proposal for the proclamation of the International Moon Day (A/AC.105/2021/CRP.14) and agreed to recommend that the General Assembly, at its seventy-sixth session in 2021, proclaim that International Moon Day be observed annually, on 20 July.
3. At its seventy-sixth session, on 9 December 2021, the UN General Assembly declared “20 July International Moon Day, to observe each year at the international level the anniversary of the first landing by humans on the Moon on 20 July 1969 as part of the Apollo 11 lunar mission, taking into consideration the achievements of all States in the exploration of the Moon, and to raise public awareness about sustainable Moon exploration and utilization.”
4. Starting on July 20, 2022, the International Moon Day has been celebrated annually following the approval of the UN General Assembly. The International Moon Day serves to inform the public about the work undertaken in this area by COPUOS and its member States, with facilitation from the Office for Outer Space Affairs.
5. Because MVA has been an early advocate of the concept of the International Moon Day (IMD) celebration, MVA is taking the initiative to support and contribute to its implementation. However, all Member States, organisations of the United Nations system, other international and regional organisations, as well as civil society, including non-governmental organisations and individuals, are invited to organize events on this date and are encouraged to inform MVA of these events to enhance their visibility and promote future cooperation.
6. In 2023, MVA presented the results of the First International Moon Day celebration of 2022 to the STSC, LSC, and COPUOS with technical presentations. These technical presentations are available on the UNOOSA website.

International Moon Day 2023

7. The theme for 2023 has been “Beginning the New Lunar Journey for Humanity”.
8. The main event was organized on July 20, 2023, in Gwacheon, South Korea, and hosted by the National Science Museum of the Republic of Korea, with sponsorship by Lockheed Martin Corporation.
9. 46 Global events were held in 41 countries. These events included Moon lectures, workshops, webinars, and Telerobotics outreach activities as well as panel discussions. Most global events

took place during the week of July 20th. The year 2023 saw participation from 42 countries, marking a 55% increase compared to 2022.

10. Details of the events are included in the “2023 International Moon Day Annual Report”. This can be downloaded at: <https://internationalmoonday.org/international-moon-day-2023-annual-report/>.

International Moon Day 2024 Outlook

11. The theme for 2024 is “Illuminating the shadows”, as more missions arrive at the Lunar South Pole, so does the mystery unravels and the shadows will be forever illuminated, thus, paving the way for mankind’s exploration and harvest of the Moon.
12. The main event to be held on 20 July 2024 will be in Harbin, China. This will be organized in cooperation with Harbin Institute of Technology and the Chinese Society of Astronautics. This event will involve stakeholders from all over the world, online and in person.
13. Delegations, Members and Permanent Observers are kindly invited to organize events in their countries to foster global cooperation in the lunar exploration. Proposals can be filled in, by replying to the call for global event posted on the IMD website: <https://internationalmoonday.org/call-for-organisers-international-moon-day-imd-2024-g>.
14. The Technical Presentation related to the IMD 2023 results and the outlook for 2024 will be held, under the Agenda item 4, on 1 February 2024 AM.