

IAC-23-D4.2.4

## The Global Expert Group on Sustainable Lunar Activities: Recommended Framework and Key Elements for Peaceful and Sustainable Lunar Activities

Giuseppe Reibaldi<sup>a\*</sup>, Dumitru-Dorin Prunariu<sup>b</sup>, Ian Christensen<sup>c</sup>, Yu XU<sup>d</sup>, Sahba El-Shawa<sup>e</sup>

<sup>a</sup> Moon Village Association (MVA), Austria, [giuseppe.reibaldi@gmail.com](mailto:giuseppe.reibaldi@gmail.com)

<sup>b</sup> Commission d'Astronautique de l'Academie Roumaine, Romania, [dorin52@gmail.com](mailto:dorin52@gmail.com)

<sup>c</sup> Secure World Foundation, United States, [ichristensen@swfound.org](mailto:ichristensen@swfound.org)

<sup>d</sup> Ministry of Foreign Affairs, China, [xu\\_yu@mfa.gov.cn](mailto:xu_yu@mfa.gov.cn)

<sup>e</sup> Jordan Space Research Initiative (JSRI), Jordan, [sahba.elshawa@moonvillageassociation.org](mailto:sahba.elshawa@moonvillageassociation.org)

\* Corresponding Author

### Abstract

This paper summarises the outcomes, status, and future activities of the Global Expert Group on Sustainable Lunar Activities (GEGSLA) proposed and hosted by the Moon Village Association (MVA). In February 2021, the Moon Village Association took the initiative of creating a multistakeholder forum for the discussion of critical issues for lunar coordination: the Global Expert Group on Sustainable Lunar Activities (GEGSLA). GEGSLA carried out its first phase work until December 2022 and came to the adoption of the Recommended Framework and Key Elements for Peaceful and Sustainable Lunar Activities, which was published at MVA website and presented to the 60th Session of the UNCOUOS Scientific and Technical Subcommittee. This Framework Document is considered a starting point to initiate a conversation on lunar coordination, and it was agreed upon by consensus by GEGSLA Members, which, while acting in their individual capacities, are stakeholders in lunar activities, including representatives from space agency/government, industry, international organisation, academia and civil society.

The Framework Document comprises two parts: “Principles” and “Key Elements for Sustainable Lunar Activities”, which includes chapters on Information Sharing, Safe Operations and Lunar Environmental Protection, Interoperability, Lunar Governance, Benefits for Humanity, Sustained Lunar Economy, and Human Interaction. It is supplemented by two additional documents: Annex 1, “Guidelines for lunar activity implementation and operations”, and Annex 2, “A List of future issues for sustainable lunar activities.”

In 2023, GEGSLA started a new operational phase with the goal of promoting verification and implementation of the Framework Document as well as exchanging information on ongoing and planned lunar missions. This paper has, therefore, the goal of promoting GEGSLA outcome documents and encouraging participation in its activities to support its mission of creating a common level playing field for coordinated, sustainable, and peaceful lunar activities.

**Keywords:** GEGLSA, Sustainable Lunar Activities, Lunar Governance Framework, Moon Village Association

### Acronyms

GEGSLA	Global Expert Group on Sustainable Lunar Activities
MVA	Moon Village Association
SDGs	Sustainable Development Goals
SoF	Summit of the Future
UNOOSA	United Nations Office for Outer Space Affairs

year. Many of these missions were directed to the Lunar South Pole Region. The current lack of coordination mechanisms for lunar activities presents a serious challenge to future missions and could lead to misunderstandings, safety challenges and even the potential for dangerous conflicts, especially in light of the increased global interest in specific areas like the lunar South Pole. The need to preserve the peaceful uses of space, together with the desire to begin a new era of sustainable space exploration, urges the development of a common level playing field for upcoming lunar activities. A number of issues must be addressed to ensure sustainable lunar exploration and settlement in and around the Moon, including, for example, mitigating the creation of debris in lunar orbit, defining standards to enable interoperability, and regulating access to natural resources. In 2020, the Moon Village Association (MVA), took an initiative to address these

### 1. Introduction

The near future will see a multitude of lunar missions through the efforts of both space agencies and commercial stakeholders. Only in 2023 we had already 4 lunar missions (i.e. Hakuto (private organization, Japan), Luna 25 (Russian Federation), Chandrayaan-3 (India), and The Smart Lander for Investigating Moon (SLIM) (Japan)) and 2 more are planned for later in the

critical issues with the goal of de-risking future lunar missions and increasing global cooperation for lunar exploration and settlement. Therefore, the MVA decided to set up a neutral forum for multi-stakeholder discussions on lunar exploration: the Global Expert Group on Sustainable Lunar Activities or (GEGSLA) [1,2,3]. The Group is composed of members from Space Agencies, Governments, Industry, International Organizations, NGOs, Universities and Research Centers. The civil society was also involved via a public consultation. The activities of the Group started in February 2021 and were completed by the end 2022 with the publication of the report: “Recommended Framework and Key Elements for Peaceful and Sustainable Lunar Activities”. The report will be presented in the next chapter.

The report has been distributed, at large in 2023, including the UN Committee on Peaceful Use of Outer Space (UNCOPUOS) and its Scientific and technical Subcommittee and Legal Subcommittee, and all major international space fora. It is also freely available via the MVA website. MVA, and other GEGSLA stakeholders, are fostering discussion about Lunar Governance issues at the UN based on this report. Side events have been organized at each of the UN events to this end, in cooperation with other NGOs.

This underlines the importance of continuation of GEGSLA to support implementation of the Recommended Framework as well as discussions on lunar issues and exchange relevant information about the different lunar projects ongoing.

Considering the importance of the GEGSLA activities and following recommendations by its members, from January 2023, GEGSLA has started an operational phase. The first meeting took place on January 31st. and the second on May 16th. The third meeting was held on September 6th and focused on industry lunar programs and their position related to the Recommended Framework as well as to international lunar coordination in general. Working Groups have been set up to focus the discussions around major topics and to extend the coordination beyond the participants.

The topics are: “Lunar Environmental Protection” for WG1, “Lunar Technical Coordination” for WG2 and “Lunar Multistakeholder Coordination” for WG3. Details of the Working Groups can be found on the relevant GEGSLA webpage of the MVA website.

The goals of the operational phase are to promote consideration and implementation of the Recommended Framework produced by the Group, with a special focus on discussions started within UNCOPUOS as well as exchange information on ongoing lunar missions. In this

phase, there is no distinction between Members and Observers. Over 200 representatives from space agencies/governments, industry, international organizations, academia, and civil society are now participants of the Group, acting in a personal capacity. and they Moreover, the Group already includes participants from large scientific organizations like COSPAR, and more participants are invited to join. More details on GEGSLA and how to join, see: <https://moonvillageassociation.org/gegsla/about/>

## **2. Overview of The GEGSLA Recommended Framework and Key Elements for Peaceful and Sustainable Lunar Activities**

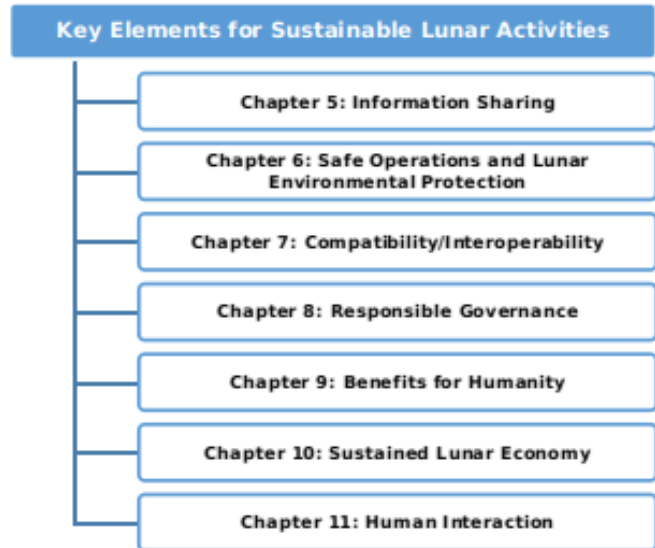
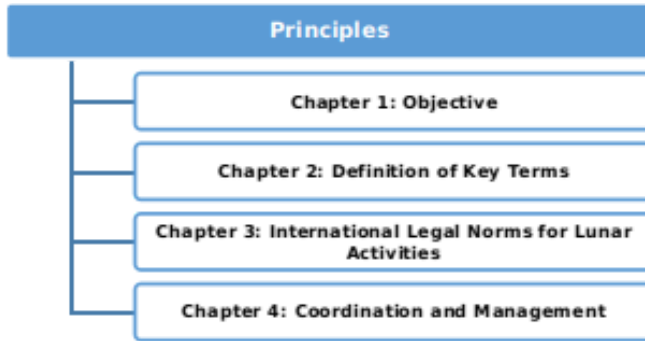
GEGSLA is chaired by Dr.Dumitru-Dorin Prunariu (Romania) with the support of a Secretariat. The relevant information of the team can be found at: <https://moonvillageassociation.org/gegsla/gegsla-team/>. More than 200 experts from 40 countries have participated

GEGSLA developed the Recommended Framework and Key Elements for Peaceful and Sustainable Lunar Activities as both a guide for well-balanced lunar projects and as a benchmark against which to gauge the success of those activities in achieving sustainability. In Eleven chapters (four focused on overarching principles and seven focused on key elements for sustainable lunar activities), as shown in Figure X, the Recommended Framework seeks to:

- show how to implement safe and sustainable lunar activities through norm-setting, coordination, and management;
- build on principles established in international space law, relevant UN outer space treaties, soft law documents, and multilateral agreements;
- extend existing principles into a framework to effectively facilitate dialogue and cooperation among multiple lunar stakeholders; and
- help to provide transparency, accountability, and certainty for all lunar stakeholders, present and future.

The figure below shows the Structure of the Recommended Framework.

The Recommended Framework sets out principles, practices and approaches for the governance and execution of lunar activities covering a range of topics including: coordination and management; information sharing; safe operations and lunar environmental protection; compatibility and interoperability; benefits



for humanity; sustaining the lunar economy; and human interactions

In developing the material contained in the Recommended Framework, GEGSLA sought to provide recommendations for designing, overseeing and executing lunar activities through practical recommendation for verifiable sustainable practices.

GEGSLA also recognizes the need for adaptive governance as lunar activities progress. Accordingly, The Recommended Framework and Key Elements are not a proscriptive set of principles to regulate all potential types of lunar activity. It is a living document which focuses on lunar activities that are likely to occur in the near and medium terms, within a vision of the long-term expansion of human activities in lunar orbit and on the lunar surface. To that end GEGSLA has produced additional technical annexes and reference materials, beyond the Recommended Framework itself. Due to time constraint, these annexes and reference materials are not considered consensus outcomes of the Group.

The complete text of the Framework document can be found on the MVA website: <https://moonvillageassociation.org/gegsla/documents/gegsla-recommended-framework/>.

Translation of the Recommended Framework and Key Elements into different languages is ongoing, the Chinese version is already available. The Technical Annexes can be found here: <https://moonvillageassociation.org/gegsla/documents/gegsla-reference-documents/#>

Additional supplementary material can be found here: <https://moonvillageassociation.org/gegsla/documents/gegsla-reference-documents/>

### 3. Implication of the Framework Document for UN Lunar Governance

In addition to providing guidelines to lunar stakeholders for planning their lunar-related projects and activities, the Recommended Framework and Key Elements also contributes to the ongoing discussion under the auspices of the UN on promoting international space governance. It defines lunar governance as a dynamic, interactive process with multi-stakeholder involvement, and proposes an adaptive framework to achieve lunar governance. To operationalize such a framework, it highlights fundamental principles to follow and recommends balancing different values and aligning multiple goals through information sharing, coordination and innovation. It also suggests a progressive approach towards establishing full scale lunar governance, starting with the lunar environment and sustainable lunar activities as priorities.

The GEGSLA members are confident that the Recommended Framework Document and its subsequent practices by lunar stakeholders will provide a baseline for UNCOPUOS and other entities within the UN family to develop international space governance. In its operational phase beginning from early 2023, GEGSLA establishes working groups to verify and further develop the norms and practices embodied in the Recommended Framework Document with focus on industry, academia and policy-making sectors, and plans to submit a concrete proposal for UNCOPUOS to consider in 2024.

The possibility to create, with the United Nation Office for Outer Space Activities (UNOOSA) as secretariat, an International Committee on Lunar Operations, similar to International Committee on Global Navigation Satellite Systems (ICG) is also investigated.

#### **4. Linking the GEGSLA Framework to the UN SDGs and the Summit of the Future**

The GEGSLA Framework document needs to be considered as an important contributor to the achievement of the UN Sustainable Development Goals as well as a case study for the Summit of the Future, to be organized in 2024 by the UN, for Space Governance.

##### *4.1 Sustainable Development Goals*

The 2030 Agenda for Sustainable Development [4], adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs).

The GEGSLA Framework stands as a pivotal instrument that closely aligns with several of the UN SDGs, reflecting its commitment to fostering responsible lunar endeavours while addressing key global challenges.

##### SDG 8: Decent Work and Economic Growth

The GEGSLA Framework is closely intertwined with SDG 8, striving for decent work and economic growth in the context of lunar activities. For example, Chapter 10: Sustained Lunar Economy contributes to economic development and decent work opportunities, reflecting the essence of SDG 8.

##### SDG 9: Industry, Innovation, and Infrastructure

The GEGSLA Framework significantly resonates with SDG 9, fostering innovation and infrastructural development. Chapter 5: Information Sharing Chapter 6: Safe Operations and Lunar Environmental Protection and Chapter 7: Interoperability advocate for sharing knowledge and ensuring safe practices, contributing to innovation and sustainable infrastructure in lunar activities.

##### SDG 16: Peace, Justice, and Strong Institutions

Several chapters within the GEGSLA Framework directly intersect with SDG 16. Chapter 3: International Legal Norms for Lunar Activities and Chapter 4: Coordination and Management emphasize the establishment of legal frameworks and coordination mechanisms, ensuring peaceful and just conduct of lunar activities. Moreover, Chapter 8: Lunar Governance contributes to building strong institutions

for lunar affairs, enhancing transparency and accountability. This alignment is crucial for maintaining global harmony and preventing conflicts in space exploration, as highlighted by SDG 16.

##### *4.2 Summit of the Future*

The Summit of the Future (SoF), scheduled for September 2024, emerges as a transformative opportunity to strengthen international collaboration and address critical global challenges. Its overarching goal is to bridge gaps in global governance, reaffirm commitments to the SDGs and the United Nations Charter, and pave the way for a more revitalized multilateral system that can positively impact the lives of people worldwide

The rise of private space enterprises, coupled with advancements in technology, has ushered in a new era of space exploration characterized by unprecedented opportunities and challenges. The synergy between the GEGSLA Framework and the forthcoming SoF is a testament to the comprehensive approach to address global challenges and shape a sustainable future. As SoF converges on the principles of international collaboration and responsible governance, the relevance of the GEGSLA Framework becomes more apparent, particularly in its alignment with the UN SDGs and the UN Space 2030 Agenda.

The GEGSLA Framework underscores sustainable practices in lunar activities, emphasizing environmental stewardship, international cooperation, and economic sustainability. These parallel visions with SoF reflect a shared commitment to weaving sustainability into diverse domains, where the GEGSLA Framework intricately mirrors the core themes of SoF.

Within this context, the UN Policy Brief 7 titled "For all Humanity: The Future of Outer Space Governance" becomes increasingly relevant [5]. Released by the United Nations Secretary General, this policy brief outlines the need for a comprehensive framework for the governance of outer space activities. It recognizes the potential of space exploration to contribute to sustainable development while underscoring the importance of responsible conduct and equitable distribution of benefits. The policy brief emphasizes the necessity of international cooperation, transparency, and ethical considerations in shaping the future of space governance.

The Policy Brief echoes themes present in the GEGSLA Framework, aligning with its principles such as international cooperation, environmental protection, and

the equitable distribution of benefits from lunar activities.

The GEGSLA Framework, by aligning with the SDGs and aiding the development of global lunar governance, reinforces its significance in shaping a sustainable future. Its principles and guidelines not only provide a blueprint for responsible lunar activities but also exemplify the collaboration and forward-looking thinking endorsed by SoF. As both initiatives strive to establish a more harmonious world, the integration of space exploration and sustainable development becomes a necessary reality, paving the way for a future that benefits all of humanity.

## 5. Conclusions

The exploration and utilization of the Moon is a unique chance of Humanity for major technical, economical as well as cultural development and it is a major contributor to solve many of the challenges on Earth. The Moon Village Association has been created in 2017, as a Non Governmental Organization (NGO), to foster cooperation for the peaceful exploration and utilization of the Moon. MVA is a global organization with involvement of multi-stakeholders from Governments, Space Agencies, Industry, Academia, International Organizations and the public from more than 60 countries.

To foster dialogue and cooperation, MVA has initiated several activities, for details see: [www.moonvillageassociation.org](http://www.moonvillageassociation.org). In the area of policy, MVA realized soon the need to define “rules of the road” for lunar activities and already in 2020 the “Best Practices for Sustainable Lunar Activities” were published to this end, see: <https://moonvillageassociation.org/press-release-moon-village-association-publishes-best-practices-for-sustainable-lunar-activities-issue-1/>

However, it was felt important to involve the major stakeholders in the development of these rules and this is the root of GEGSLA.

The Framework document, is the result of 2 years of activities of GEGSLA and it is an important contribution offered to the United Nations, and Lunar community at large, to initiate a conversation on international lunar coordination and identify a way forward that is effective and fast considering the urgency of de-risking future lunar activities. The urgency is motivated by the large number of spacecraft going on and around the moon, as we do not wish to repeat mistakes made in Earth Orbit, like debris mitigation, interoperability, etc.

The Framework can be used also as an example of a specific space governance issue, as advocated by the Summit of the Future and could support an acceleration of the international discussion on lunar cooperation. Finally, GEGSLA operational phase is continuing in 2024 and beyond and it will act as technical support for the global discussion about Lunar Cooperation.

## References

- [1] G. Reibaldi, D. Prunariu, G. Rotola, The Global Expert Group on Sustainable Lunar Activities (GEGSLA) contribution to the International Lunar Governance definition, IAC-22,E3,2,3,x73028, International Astronautical Congress, Jerusalem
- [2] G. Reibaldi, D. Prunariu., GLOBAL EXPERT GROUP ON SUSTAINABLE LUNAR ACTIVITIES (GEGSLA) - Contribution to Peaceful Lunar Exploration and Settlement, IAC-21,D4,2,2,x65672, International Astronautical Congress.
- [3] G. Reibaldi, J. Kolar, Moon Village Association contribution to global lunar exploration and utilisation, GLEX-2021,2,3,5,x62614, Global Exploration Summit
- [4] United Nations, 2030 Agenda, <https://sdgs.un.org/2030agenda>
- [5] United Nations, UN Policy Brief 7 titled "For all Humanity: The Future of Outer Space Governance" <https://www.unoosa.org/oosa/en/documents/doc/policy-brief.html>