20 March 2023

English only

Committee on the Peaceful Uses of Outer Space
Legal Subcommittee
Sixty-Second session
Vienna, 20–31 March 2023
Item 10 of the provisional agenda*
General exchange of views on potential legal models for activities in the exploration, exploitation, and utilization of space resources

Moon Village Association – Input to the Working Group on Legal Aspects of Space Resource Activities

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* A/AC.105/C.2/L.323.

Moon Village Association Input for the UN COPUOS LSC Working Group on Legal Aspects of Space Resource Activities [1]

The Moon Village Association (MVA) was created in 2017 as a non-governmental organisation (NGO) based in Vienna, Austria. MVA acts as a permanent global informal forum for stakeholders like governments, industry, academia and the public interested in the development of the Moon Village. The MVA fosters cooperation among existing or planned public or private global Moon exploration programs. It comprises more than 600 participants in MVA activities and 33 institutional members from more than 50 countries, representing a diverse array of technical, scientific, cultural and interdisciplinary fields.

As an organisation with permanent observer status in COPUOS, on July 1st, 2022, the Moon Village Association received from UNOOSA an "Invitation to provide information on the mandate and purpose of the Working Group on Legal Aspects of Space Resource Activities under the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space".

I. Opening remarks

On April 12, 1961, humanity left its home planet for the first time. It had matured as a species to the point where it could survive outside its natural habitat. Humanity's exploratory nature did not take long to project higher flights. The species needed to prove itself capable of stepping into a new world, and it did. On July 20, 1969, humanity

[1] These inputs were developed by the Moon Village Association Adaptive Governance Working Group in collaboration with the Space Law and Policy Research Group from the Catholic University of Santos (UNISANTOS), in Brazil. The members that contributed to this document were Suyan Cristina Malhadas, Christophe Bosquillon, Rodrigo Vesule Fernandes, Vinicius Aloia, Thaís Zandoná, Jéssyka Nunes, Natalia Rosa Oliveira, Marina Huidobro, Olavo de O. Bittencourt Neto, Ian Grosner, Daniel Freire e Almeida, Gabriela Soldano Garcez, Dennis O'Brien, Giuseppe Reibaldi, Mark Sundahl, Giuliana Rotola and Itir Toksoz.

took the giant leap it was looking for and landed on the Moon. More than five decades later, the human species is now not only preparing to travel to other worlds, but to stay there. It no longer wants just to survive, but to live and develop there. However, the challenges involved are not only technical, but also of identity. Who will go on this journey: humankind, or just some of us?

The Outer Space Treaty (OST) envisioned a future where this journey was carried out for the benefit and interest of all.

Sounds like a wise vision.

In the distant past, when the human species had the oceans as its last frontier, it embarked on long journeys searching for new lands. However, rarely did expeditions and their ships carry *"envoys of humankind"*, but only the expectations and ambitions of a few. Upon landing on a new continent, the lack of a collective sense of humanity allowed for the rights of local groups to be suppressed for the benefit of the conquering group. Without an international order, the rules enforced by dominant powers legalised the expropriation of rights and wealth of those who did not have the means to express their voices.

More than five centuries later, despite the deep sense of conscience, discomfort and regret regarding the way in which such expeditions were conducted and what followed them, humanity still perceives the effects of inequality provoked and perpetuated by such actions. The social geography of the Earth is a heritage that still separates descendants of conquerors and conquered.

Perhaps the different path we want to take five centuries from now is being coined today, by the hands of this Working Group.

Not only will the use of space resources enable the sustainability of missions, but it also has the potential to change the global economy on a massive scale. Although access to outer space is free for everyone, even today only a few are able to operate there due to the high costs involved and limited access to strategic technology. If only those few can take direct advantage of the wealth generated by space resource activities, international economic and social inequalities will be increasingly accentuated.

Given this scenario, it is the sense of this Working Group that benefit sharing as a desirable feature in the context of international and space law, is in the process of maturing into a more consequential working theme, whose consideration should be deemed mandatory at relevant legal and operational levels, in the same vein as all relevant factors reviewed in this recommendation should be considered mandatory.

This said, it is also the sense of this Working Group that no benefit sharing first principles and specific mechanisms may manifest unless access issues have been resolved in close concertation with key operators and strongly invested stakeholders.

Specific mechanisms need to be considered simultaneously to legal and operational clarification, in the context of space resources utilisation, of non-exclusionary forms of priority and property rights intended to enable investment and operations to proceed.

While remaining aware of the fact that without economic sustainability there is neither sustainability nor access to and sharing of benefits, it is nonetheless the sense of this Working Group that, without a broad and inclusive debate on measures to mitigate future inequalities that may result from lack of sufficient consideration of access and benefit sharing issues, it would become considerably more difficult to assert international legitimacy in defining above specific legal and operational mechanisms.

All countries, especially the developing ones, whether emerging spacefaring nations or not, should be involved to share their own perspectives of what is a benefit, and how they see themselves as part of this new journey. May everyone have a voice, so that together we can figure the best path for humanity.

We know the past. We know the present. This time, may we outline the future as a species and not just as individuals.

II. The inputs

This document contains a summary of the views of the MVA with respect to the mandate and scope of the UN COPUOS LSC Working Group. Annex I provides a more comprehensive analysis on the topics, while Annex II presents the Final Report of the *MVA Registration Project*.

a) Governance instruments: The MVA fully endorses the results of the Hague International Space Resources Governance Working Group, consisting of the **Building Blocks for the Development of an International Framework on Space Resource Activities**, and the Commentary containing background information, published in 2020. We also believe that the **Best Practices for Sustainable Lunar Activities**, developed by the MVA and released in 2020 provide relevant material for the debate on space resource activities.[2] The MVA also supports the contributions from the **EAGLE Report**, produced by the Space Generation Advisory Council in 2021.

b) The type of space resources that fall within the mandate and scope of the Working Group.

[2] Available at: https://moonvillageassociation.org/download/best-practices-for-sustainable-lunar-activities-issue-1/

The MVA understands that adopting a restrictive delimitation of space resources, as proposed by the Hague Working Group[3], will reduce complexity and facilitate the identification and/or definition of regulatory parameters for space resource activities.

c) The type of activities that fall within the mandate and scope of the Working Group.

The MVA supports the definitions provided by the Hague Working Group for utilisation of space resources and space resource activity. Accordingly, we understand that the type of activities that fall within the mandate and scope of the UN COPUOS Working Group would be those related with **searching, recovering and extracting space resources**, as well as the construction and operation of correlated systems, including processing and transportation.

A comprehensive analysis on the **legal possibility of space resource utilisation for commercial purposes** is critical for the development of lunar activities. The MVA believes that the UN COPUOS Working Group has a significant opportunity to address this immediate issue within its mandate.

Furthermore, the MVA emphasises the provisions on safe access to resources for all, as enshrined in Articles I and II of the OST and endorses that **all space resource activity should be conducted in such a manner so that others can safely access the same resource**.

d) The views of the MVA regarding the **existing legal framework for space resource activities** are expressed in Annex I.

e) The MVA believes that **clarification on core concepts is needed to provide common grounds for an enabling environment for the peaceful and sustainable development of space resource activities.** The MVA remains mindful of the fact that no sustainable activities may manifest without mitigating regulatory concerns by operators while optimising incentives for strongly invested stakeholders. The MVA identifies the **relevant factors for the development of a set of initial recommended principles for such activities,** as transparency and information sharing, balancing the **freedom of access** and **non-appropriation** principles whenever the institution of **priority rights, safety zones and/or exclusion zones** is considered, and identifying the socio-environmental principles that effectively accommodate **sustainability** concerns within a recommended framework for space resource activities. MVA also advocates that no **standards or practices** for space resource activities should require technology that is subject to export controls or is otherwise inaccessible to developing countries. In addition, the MVA strongly supports the groundwork

[3] Building Block 2.1: *"Space resource: an extractable and/or recoverable abiotic resource in situ in outer space"*. The Hague International Space Resources Governance Working Group. **Building Blocks for the Development of an International Framework on Space Resource Activities**, 2019.

provided by Building Block 13 and is conducting the ***Benefit Sharing Project (BSP)*** to identify the benefits expected to arise from the use and exploration of the Moon, and develop concrete mechanisms that can be adopted to ensure that lunar activities are beneficial for the whole society and have a profound impact on mitigating socio-economic gaps.

f) Particular emphasis on **benefit sharing purpose and mechanisms**. In the process of discussing the relevant factors for the development of a set of initial recommended principles for such activities as reviewed in above section e), the MVA has further reviewed what is expected from lunar activities with developing countries and emerging spacefaring nations. Based on the insights gathered, the MVA believes that moving forward with space resource activities warrants that the subject of sharing benefits should be comprehensively addressed at the onset. Operationally, the MVA also believes that specific benefit sharing mechanisms should be developed in coordination among all relevant stakeholders. *While an international framework should set out the rules for sharing benefits among stakeholders, considering all current international space law treaties and instruments, lunar stakeholders should be encouraged to identify which benefits to share and factor sharing of such benefits into the early stages of project planning while acknowledging that not all benefits will be immediately available, and many may arise in the process of lunar activities. Partnerships, joint-ventures and agreements between established and emerging space nations can enable the sharing of scientific and technical benefits, while well-resourced lunar stakeholders should be encouraged to contribute to the relevant capacity building of developing countries and emerging space nations by undertaking programmes, creating partnerships and other appropriate means. Space nations with lunar projects should be encouraged to invite astronauts from emerging space nations and provide training to them by mutual agreement, considering the fact benefit sharing can take the form of allowing access to infrastructure, such as launch pads, processes and resources by agreement to enable participation by stakeholders from developing countries and emerging space nations*[4]*.*

g) **Additional background and information paper** by the MVA comprise a brief update on the activities of the *Global Expert Group on Sustainable Lunar Activities* - ***GEGSLA*** (at Annex I), and the Final Report of the *Registration Project* conducted by the MVA (at Annex II).

h) The MVA makes itself available for consultations concerning the *Registration Project's* results and the *Benefit Sharing Project*, should the UN COPUOS Working Group on Legal Aspects of Space Resource Activities so wish.

[4] Global Expert Group on Sustainable Lunar Activities, *Recommended Framework and Key Elements for Peaceful and Sustainable Lunar Activities*, 2022.

ANNEX I
Additional analysis[5]

A) The type of space resources that fall within the mandate and scope of the Working Group.

Lato sensu, the term space resources can include any asset of an extraterrestrial origin that can be utilised by humans. A very broad interpretation of what space resources are supposed to mean could encompass not only minerals and water subject to extraction from the Moon and other celestial bodies, but also environments in space, including the use of gravity, vacuum, solar radiation, and orbit positions. However, such a broad interpretation gives rise to an extensive range of operational and legal problems that are different in nature from those involved in extraction and mining activities, thus increasing complexity and adding potential points of contention.

Considering it, the MVA understands that the UN Working Group should adopt a *stricto sensu* interpretation of space resources, encompassing only extractable resources from the moon and other celestial bodies. On this matter, the MVA recalls the delimitation proposed by the Hague Working Group: *"2.1 Space resource: an extractable and/or recoverable abiotic resource in situ in outer space"*.[6]

[5] Analysis developed by the Moon Village Association Adaptive Governance Working Group in collaboration with the Space Law and Policy Research Group from the Catholic University of Santos (UNISANTOS), in Brazil. The members that contributed to this document were Suyan Cristina Malhadas, Christophe Bosquillon, Rodrigo Vesule Fernandes, Vinicius Aloia, Thaís Zandoná, Jéssyka Nunes, Natalia Rosa Oliveira, Marina Huidobro, Olavo de O. Bittencourt Neto, Ian Grosner, Daniel Freire e Almeida, Gabriela Soldano Garcez, Dennis O'Brien, Giuseppe Reibaldi, Mark Sundahl, Giuliana Rotola and Itir Toksoz.

[6] The Hague International Space Resources Governance Working Group. **Building Blocks for the Development of an International Framework on Space Resource Activities**, 2019.

A more restrictive delimitation as proposed by the Hague Working Group, which comprises mineral and volatile materials, including water, and excludes satellite orbits, radio spectrum as well as energy from the sun, except when collected from unique and scarce locations (Building Blocks, footnote 2), will reduce complexity and facilitate the debate to identify and/or define regulatory parameters for space resource activities.

The UN COPUOS Working Group should also consider whether the land itself should be included in the definition of resources, as many of the locations will be scarce, from peaks of eternal sunlight to concentrations of volatile materials to ideal/protected locations for settlements and recalling that some land/locations also need protection due to their scientific/historic/cultural value.

B) The type of activities that fall within the mandate and scope of the Working Group.

The MVA supports the definitions provided by the Hague Working Group: "*2.2 Utilization of space resources: the recovery of space resources and the extraction of raw mineral or volatile materials therefrom; 2.3 Space resource activity: an activity conducted in outer space for the purpose of searching for space resources, the recovery of those resources and the extraction of raw mineral or volatile materials therefrom, including the construction and operation of associated extraction, recovery, processing and transportation systems*".[7] Accordingly, we propose that the type of activities that fall within the mandate and scope of the UN COPUOS Working Group are all those related with **searching, recovering and extracting space resources**, as well as the construction and operation of correlated systems, including processing and transportation.

Within its mandate, the UN COPUOS Working Group is encouraged to promote a comprehensive analysis on the **possibility of space resource utilisation for commercial purposes**.

Furthermore, the MVA emphasises the provisions on safe access to resources for all, as enshrined in Articles I and II of the OST and endorses that **all space resource activity should be conducted in such a manner so that others can safely access the same resource**.

[7] *Ibid.*

As science and technology evolve, new types of space resource activities can be developed. A future scenario may require a more comprehensive definition which allows addressing in advance, from a legal perspective, new contentious matters that will emerge, to avoid conflicts. Guided by the principle of adaptive governance, the MVA proposes that such demands are dealt with in due time, if necessary.[8]

C) The views of the MVA regarding the existing legal framework for space resource activities.

C.1. Outer Space Treaty. The OST forms the foundation of international space law. It provides the basic principles and obligations States must adhere to in the use and exploration of outer space. However, the OST has no serious considerations of commercial use and exploration of space resources.

Article I (2) OST states that all States, without discrimination of any kind, are free to explore and use outer space, including the Moon and other celestial bodies. Based on extensive State practice and following over 50 years of human activity in outer space, It can generally be accepted that the freedom to use outer space includes economic utilisation and the making of profit. However, it is rather controversial whether the term "use" can be interpreted as encompassing exploitation of space resources. Paragraph 2 states that States should have access to all areas of celestial bodies, on a basis of equality. This freedom, however, cannot amount to any claim of property, which seems to confirm the *res communis* character of outer space. However, it is difficult to imagine mining a celestial body without asserting some level of exclusive rights[9] over it, at least temporarily - as the mining activity would not allow, in practice, "free access to all areas of celestial bodies" by all States. Additionally, the main attribute of property is its excluding character: the rights of the owner exclude others of similar disposal rights over the good, which may be difficult to harmonise with the provision in Article I when space resources are considered.

Another fundamental principle within the existing legal framework is the prohibition of "national appropriation" of outer space. Article II OST proclaims that "*outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.*" The non-appropriation of outer space

[8] Even though outside the suggested scope of this LSC WG, we note additional legal issues concerning lunar activities, that may require international attention in the near future: (a) access to solar energy (b) access to peaks of eternal light and permanently shadowed areas; (c) use of lunar orbit; (d) mechanisms for shared use of lunar routes with better access to resources supply and installations.

[9] Some solutions have been proposed to circumvent this problem: priority rights, safety zones, etc., but all run into the problem of reconciling the freedom of exploration and use, with free access to outer space and non-appropriation.

represents a core principle of space law and it was one of the first principles agreed to during the negotiation phase of the OST.

While the OST bans States from claiming national sovereignty over outer space and other celestial bodies by any means, it is not clear whether the prohibition in Article II applies to resources contained within celestial bodies, capable of being extracted. Second, the OST does not mention the size or the form of an object to be considered a celestial body. Smaller asteroids, which could nonetheless contain precious resources, might end up being mined “out of existence”, and their resources exhausted. In the opinion of Steven Freeland, even though it could be argued that this exploitation of a small celestial body out of existence “might not constitute an act of appropriation within the scope of Article II, it may still be unlawful under the current legal regime”.

Therefore, some scholars argue that private commercial use of space resources would be inconsistent with Article II OST and have rejected the legality of commercial mining of space resources, arguing that it is unlawful and unfeasible to separate resources from the celestial body that contains them. On the other hand, most authors argue in favour of the legality of commercial exploitation and utilisation of space resources. In the lack of a clear ban by the OST on the matter, it could be concluded that the utilisation of space resources is therefore permitted, as sovereign States may act in any way they wish so long as they do not contravene an explicit prohibition. Furthermore, this permissive interpretation finds support in the principle of freedom to use outer space laid down in Article I (2) OST, although, as noted, the precise definition and delimitation of the term “use” is unclear and not defined in the OST.

The OST does not lay down specific rules to govern the exploitation of space resources. The OST only establishes general principles, such as the freedom of exploration and use of outer space and the non-appropriative nature of space. These principles, however, are not detailed enough to guarantee the safe and orderly development of commercial mining activities. The fact that the Moon Agreement (MA) is not generally adopted by States makes the OST in practice the most important regulator of lunar resource activities. It is possible to argue in favour of the legality of commercial use of space resources based solely on the OST, but not without controversy. The status of many provisions of the OST remain substantially unclear and need to be extended with rules addressing foreseeable situations and legal problems which may arise during exploitative activities.

C.2. Moon Agreement. One of the main purposes for the adoption of the MA was the possibility of mining and utilising space resources, especially after the success of the NASA Apollo missions. As the OST failed to address

exploitation, the MA was established to clarify the legal status of space resources. Currently it is the only treaty dealing with the exploration, use and exploitation of the resources of the Moon and other celestial bodies, both for scientific and non-scientific purposes. First, the MA restates many of the provisions of the OST, with little or no amplification. As a result, it suffers from similar problems. Similar to the OST, there is no list of definitions in the MA and no new terminology is introduced. Nevertheless, it is the only treaty to define its scope of application. In Article 1, the MA establishes that the provisions shall apply to the Moon, including lunar orbits and trajectories, and other celestial bodies within the Solar System. In principle, the MA does apply to asteroids, comets, planets and their moons. This clarification is important in view of commercial mining of space resources. Article 11, however, is the most innovative and contentious of the provisions of the MA. It is often considered as the primary reason the MA was rejected by both space and non-spacefaring nations alike. While the OST does not make any specific reference to space resources, Article 11 (1) MA declares “the moon and its natural resources” to be “the common heritage of mankind” (CHM). This means that any exploitation of such resources in space must be carried out only under that concept. However, there is no formal definition of the CHM principle under present international law. Article 11 (1) MA specifies that the CHM “finds its expression in the provisions of this Agreement”. This indicates that the interpretation of the concept should be made by taking into consideration only the MA, without reference to the principles and rules laid down by any other treaty, including UNCLOS. However, countries have opposing views regarding the interpretation and implementation of the CHM concept.

Article 11 (3) MA leaves open the question whether it is possible to acquire property rights over space resources once they have been extracted from their original location. Here, the provision extends Article II OST when it refers to “natural resources in place”, which seems to suggest that once natural resources are no longer in place they can be appropriated. In fact, most scholars agree that once the natural resources contained within celestial bodies have been removed from their original location, they can become the property of whoever extracted them. On the other hand, some authors fear that the words “in place” could potentially be used to circumvent the prohibition against national appropriation. If the prohibition applies insofar the resource remains “in place'', states would then be able to theoretically extract so much that resources left on a celestial body lose all value.

Also, the MA requires an “equitable”, not an equal sharing of benefits. As the MA does not define “equitable” or “benefits”, developing and developed countries have a divergent interpretation of their meaning. It comes as no surprise that this ambiguity and lack of clarity prevents space operators, especially private operators, from investing in space exploitation. Also, since

the adoption of the MA, authors have debated whether the MA introduced a moratorium on the exploration and commercial exploitation of the Moon's natural resources. The CHM principle only implies a moratorium on the exploitation of lunar resources as Article 11(5) presupposes that a regime must predate the exploitation. If there is not a legal moratorium, it is claimed by some that there is at least a *de facto* moratorium, as potential investors are understandably reluctant to make the large investments required if there is a possibility that their efforts will later be nullified by an unacceptable regime. Most authors, however, have agreed that the MA cannot be interpreted as creating any kind of a moratorium before the establishment of an international regime in accordance with Article 11. If a moratorium was intended, it would have been explicitly provided for in the treaty. Nevertheless, as long as States fear a moratorium and the issue remains unsolved, they will most likely not sign the MA.

C.3. National Approach. The US is the first country to adopt a national regulatory framework for space mining activities. In November 2015, President Barack Obama signed into law the US Commercial Space Launch Competitiveness Act (CSLCA), or Public Law 114 -90. The underlying goal of the CSLCA is to provide legal clarity as to whether commercial actors would be entitled to property rights of space resources and therefore assure potential space investors in the US that they would be able to reap the financial benefits of their investments. The CSLCA has caused a series of reactions and discussions among the international community, especially in relation to a possible violation of Article II OST. However, as noted, the OST does not deal with the appropriation of space resources directly, which can be considered as strong evidence that it does not prohibit it. Also, authors opposing the law focus on the assertion that insofar States are prohibited from claiming sovereignty over celestial bodies, they are unable to authorise their nationals to own space resources contained within celestial bodies. The debate reached the 2016 Session of the Scientific and Technical Subcommittee (STSC) of the COPUOS, where Russia submitted a Conference Room Paper (CRP) stating that "[t]he United States vividly demonstrated a connection between diminishing the Committee's role and powers, on the one hand, and manifestations of total disrespect for international law order, on the other, by adopting the Commercial Space Launch Competitiveness Act on 25 November 2015." During the Legal Subcommittee (LSC) of the same year, Belgium reacted by announcing its intention to draft legislation by declaring that it was concerned about the global economic imbalance that space resource exploration could entail. The country stated that "it would prefer an international approach", concluding that "space resources cannot be appropriated by extension of national jurisdiction".

As a result, Belgium suggested the introduction of a new agenda item for the LSC of 2017. In 2017, opinions against the legality of the CSLCA were still focused on a possible violation of the principle of non-appropriation and that the regulation on the use of space resources should not be determined unilaterally, but multilaterally. The debate around the lawfulness of the CSLCA did not prevent other States from finding inspiration in the American unilateral approach in its attempt to create more stable and predictable regulatory conditions to facilitate a pro-growth environment for the development of the commercial exploitation of space resources.

The most notable example of this is Luxembourg. However, the Space Resources Act of 2017, similar to the CSLCA, raises questions regarding its conformity with international law. Indeed, experts denounce the fact that it would be contrary to the principle outlined in Article II OST. Nevertheless, the US and Luxembourg argue that the principle of non-national appropriation would apply to outer space as a territory, and not to the resources it contains. Notwithstanding, the Government of Luxembourg states that it is committed to engaging the governments of other countries to establish an international legal framework within the context of the UN for the exploration and commercial utilisation of resources from NEAs. Furthermore, Luxembourg has concluded bilateral cooperation agreements with many countries in the field of space activities. These agreements include *"the exchange of information on all the issues related to the exploration and commercial utilisation of space resources, including legal, regulatory, technological, economic, and other aspects."*

Other most notable countries having enacted a national space legislation directed at space resources utilisation are Japan and the United Arab Emirates.

Japan is the one with the most focused legislation: the Japanese Diet passed the Space Resources Act (the "Act") on 15 June 2021 and the Act came into force on December 23, 2021. The Act allows Japanese persons, including private entities, to explore, extract and use various space resources such as water, minerals and other natural resources existing in outer space, including on the Moon and other celestial bodies. The Act allows a person who conducts business activities related to the exploration and development of space resources to acquire the ownership of space resources that have been mined, etc. in accordance with the business activity plan pertaining to the licence by possessing the space resources with the intention to own.

The space sector in the UAE is governed by Federal Law No. 12 of 2019 on the Regulation of the Space Sector. The UAE space law is broader, as it aims to create a regulatory environment to achieve the objectives of the UAE's National Space Policy, in addition to the following goals: not only stimulating investment and encouraging private sector participation in the space sector activities, but also implementing safety, security and environmental measures relating to

space activities, and supporting the UAE's commitment to implement the provisions of international conventions and treaties related to outer space. The Article 4 of the law mentions the space activities that the law regulates as follows: launch, re-enter, remove or dispose a space object from the orbit, operate space objects and satellite communication activities, provide logistical support services in outer space, manage space data activities, and collect or trade meteorites that fall in the UAE. While goals are primarily oriented toward Earth orbit activity, the UAE remains positioned as a potential operator in planetary bodies resources utilisation, including and not limited to space data activities. The overall purpose is to strengthen the UAE's status and role regionally and globally, about which the UAE has adopted a "National Space Strategy 2030".

D) The relevant factors for the development of a set of initial recommended principles for such activities.

D.1. Sharing of benefits arising out of lunar resource activities is paramount to accomplish the purposes of the OST, expressed in the common benefit clause (Art. I). The MVA strongly supports the groundwork provided by Building Block 13. In 2022, the MVA launched the ***Benefit Sharing Project (BSP)***. The *BSP* is working to identify the benefits that the use and exploration of the Moon are expected to create, and develop **concrete mechanisms** that can be adopted to ensure that lunar activities are beneficial for the whole society, and socio-economic gaps are mitigated as humanity goes back to the Moon.[10] We understand that benefit sharing is an important tool to implement the UN 2030 Agenda for Sustainable Development and the Sustainable Development Goals, and the *BSP* is expected to provide useful inputs by the end of 2023. The project comprises more than 40 members from all continents, with a majority of women and people from developing countries, as well as representatives from younger generations, as tackling issues of global impact require diversity of perspectives. Before completing the project, the MVA will also organise a series of joint webinars with other institutions to discuss the theme.

D.2. Transparency and information sharing are essential to avoid conflict. In 2021, the MVA and the Global Space Law Center at Cleveland State University

[10] Designed to be a neutral international platform that hosts a multi-stakeholder debate on some of the socio-economic dimensions for the sustainability of lunar activities, the Benefit Sharing Project's primary objective is to analyse the context in which lunar activities will evolve and assess possibilities for two major inclusiveness factors: making sure that not only dominant space powers, but a much larger array of emerging space powers and companies, and in particular developing economies, are part and parcel of a planetary Moon activities ecosystem; and guaranteeing that all members of the global society have access to the benefits of those activities.

conducted the ***Registration Project***, whose results may be of relevance for the purposes of the LSC WG. Annex II contains the *Final Report of the Registration Project*.[11]

D.3. Any institution of **priority rights, safety zones and/or exclusion zones** must be carefully balanced with the freedom of access and non-appropriation principles (Art. I & II OST). The Hague Building Blocks offer valuable groundwork on priority rights and safety zones (BBs 7, 11.3 & 11.4). Additional factors for consideration: will lunar resource activities require a dedicated institution to maintain a registry of large scale operations, administer demands and conflicting interests related to the establishment of priority/safety/exclusion zones, and avoid other potentially conflicting situations? Is it desirable and feasible to create an international organisation for such a purpose? Are there any international institutions that would be entitled to carry out these functions? Regions of critical interest for human activities on the Moon, such as landing sites, peaks of eternal light and permanently shadowed areas, should be reserved for shared use and, therefore, excluded from priority/exclusion zone claims?

These are possibly the most urgent issues to solve. Perhaps through a legal and operational/physical international "sandbox" on the Moon, where countries and operators can manage cycles of trial and error. It's also highly dependent on technology readiness levels, including and not limited to the data side.

D.4. Sustainability is a central concern and must be addressed from a broad perspective, encompassing its economic, social and environmental dimensions, through an intergenerational approach. Protection of lunar natural and cultural heritage is critical. Latest reports reveal that upcoming generations have strong environmental concerns on Earth and in outer space, as well as concerns regarding the purposes of space initiatives. Accordingly, the MVA understands that the legitimacy of space endeavours amongst the general public also depends on properly addressing such concerns from a legal perspective. Socio-environmental principles that must guide the establishment of a legal framework include, but are not limited to:

[11] The *Registration Project* was launched with the purpose of providing a neutral international platform for (1) assessing the existing mechanisms for sharing information regarding space activity and (2) making recommendations for a harmonised method of sharing information about lunar activities. The membership of the project was comprised of a diverse international group of twenty-seven experts drawn from business, engineering, law and policy.The Final Report contains the final recommendations of the Project and is also available at https://moonvillageassociation.org/download/registration-poject-final-report-april-2022.

- OST principles (common benefit; freedom of access, use and exploration; cooperation; non-appropriation; mutual assistance, due regard to the corresponding interests of all other States Parties to the Treaty, avoidance of harmful contamination);
- lunar environmental protection principles on the MA, that go beyond provisions in the OST (Art. 7 MA);
- peace, development and environmental protection are interdependent and indivisible (Principle 25, The Rio Declaration on Environment and Development, 1992);
- precautionary principle (Principle 15, The Rio Declaration on Environment and Development, 1992);[12]
- cooperation for decreasing social disparities (Principle 5, Rio Declaration);[13]
- special consideration for developing and environmentally vulnerable countries (Principle 6, Rio Declaration);[14]

D.5. Other MA provisions also provide guidance for cooperation, coordination and transparency purposes (*"Due regard shall be paid to the interests of present and future generations as well as to the need to promote higher standards of living and conditions of economic and social progress and development in accordance with the Charter of the United Nations."* - Article 4 MA; information sharing - Article 5 MA; non-interference and consultations - Article 8.3), which are fundamental elements for a peaceful conduct of space resource activities on the Moon.

D.6. No **standards or practices** for space resource activities, including interoperability, should require technology that is subject to export controls or is otherwise inaccessible to developing countries.

[12] Principle 15: *"In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."*

[13] Principle 5: *"All States and all people shall cooperate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world."*

[14] Principle 6: *"The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International actions in the field of environment and development should also address the interests and needs of all countries."*

D.7. In the context of above OST and MA legal analysis, **the need to clarify core concepts to gain wider acceptance is paramount.** Clarification can provide common grounds to promote an enabling environment for the peaceful and sustainable development of space resource activities. Clarification on the legal possibility of space resource appropriation for commercial purposes is expected to provide legal certainty for planning and investments concerning private activities. Other core concepts that require clarification are the definition of "common heritage of (hu)mankind", the appropriation of resources removed from "in place", and the "equitable" sharing of the benefits of resource utilisation, in the MA. Therefore, if the LSC Working Group on Legal Aspects of Space Resource Activity would clarify the issues revolving around the definition of such core concepts, then, countries might be more likely to consider adopting any "additional international governance instrument" that the Working Group might propose within its mandate. And the issue of a resource "moratorium" preceding any such instrument would then become moot. Strategically, now is the time to scope the issues and deal with the obstacles that constitute actual hindrances either for investors and operators in good financial standing, or for the international community of relevant stakeholders, rather than refraining from contentious issues at risk of repeating mistakes of the last five centuries.

D.8. International treaties and legal instruments, together with national laws and regulations, are the first two layers that support governance of the use of resources for commercial purposes. But there might be a third layer to be considered: **establishing international best operational practices, norms, and standards** among investors, operators, and relevant financial and commercial stakeholders. These are meant to prevent or at least minimise the occurrence of friction and potential breach of international and national laws and regulations among relevant stakeholders. Developing best operational practices, norms, and standards from the ground up, possibly as part and parcel of orderly licensing processes, **based on the findings of an overarching international coordination platform and process**, can be a way to organise relevant international stakeholders along sustainable paths for the use of resources for commercial purposes. Technically, data can assist to monitor legal and governance outcomes, and enable corrective feedback whenever a breach of compliance in progress is detected and attributed. However, so far, such an overarching international coordination platform and process (under responsible States senior policy makers authority but at operators and relevant stakeholders working level) between individual States or grouping of States, appears to be non-existent. This strategic vacuum fails to tackle the urgency of the need to clarify and establish the rules of the game. Because the vacuum of a lack of coordination dealing with the commercial use of resources is a really

urgent matter, the full leadership of the LSC Working Group on addressing the legal issues of space resources utilisation is extensively supported.

E) Any other background or information paper, or any other views, that States members may wish to share.

In 2021, the MVA decided to promote the development of a neutral forum for multi-stakeholder discussions on lunar sustainability: The *Global Expert Group on Sustainable Lunar Activities (**GEGSLA**)*. The current lack of coordination mechanisms for lunar activities presents challenges to future missions and could lead to unintentional harmful interference, 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 consideration of approaches that promote future lunar sustainability and recommended practices for upcoming lunar activities. Although space resource activities are not within the scope of the *GEGSLA*, the “Recommended Framework and Key Elements for Peaceful and Sustainable Lunar Activities" - the main product of the expert group - addresses important themes that will likely intersect with the scope and purpose of the UN COPUOS Working Group on Legal Aspects of Space Resource Activities, such as coordination and management, information sharing, safety and environmental protection, interoperability, responsible governance, benefits for humanity, sustained lunar economy and human interaction. *GEGSLA* Recommended Framework, Technical Annexes and Reference Documents constitute a useful toolbox that takes valuable additional steps beyond The Hague toward practical implementation.

The deliverables from the *GEGSLA* will be published and distributed in early 2023. The documents will also be presented to the UN COPUOS assembly. The Expert Group will remain active throughout the operational phase of the Recommended Framework, and makes itself available for consultations, should the UN COPUOS Working Group on Legal Aspects of Space Resource Activities so wish.

The Registration Project

Final Report

Background

The Registration Project was launched in 2021 as a joint venture between the Moon Village Association and the Global Space Law Center at Cleveland State University with the purpose of providing a neutral international platform for (1) assessing the existing mechanisms for sharing information regarding space activity and (2) making recommendations for a harmonized method of sharing information about lunar activities. This Final Report contains the final recommendations of the Project.

The membership of the Registration Project was comprised of a diverse international group of twenty-seven experts drawn from business, engineering, law and policy.[1] The members met for the first time on February 19, 2021 and again on March 26, 2021. A public workshop[2] was held on June 24, 2021 in order to provide all stakeholders an opportunity to share their thoughts. Nine additional space law experts participated in the Public Workshop as special guests.[3] A third closed meeting took place on September 6, 2021 to receive the latest inputs and comments from the members.

The Legal and Policy Implications of Sharing Information

The obligations to share information regarding space activities and to register space objects on a public registry are central pillars of space law. Article XI of the Outer Space Treaty contains the core of the obligation to share information about state activities:

States Parties . . . agree to inform the Secretary-General of the United Nations as

[1] The members of The Registration Project are: Mark J. Sundahl (co-chair), Antonino Salmeri (co-chair), Fabio Tronchetti, V. Gopalakrishnan, Olavo Bittencourt, Virgiliu Pop, Elina Morozova, Olga Stelmakh, Michael Chatzipanagiotis, Michelle Hanlon, Jessy Kate Schingler, Chris Johnson, Guoyu Wang, Justine Kasznica, Scott Parry, Joyeeta Chatterjee, Zac Trolley, Derek Webber, Dennis O'Brien, Giuliana Rotola, Suyan Cristina Malhadas, Aimee Fanter, Hailey Hillsman, Hailee Kepchar, Jeffrey Murphy, Kristina Schiavone, Christophe Bosquillon and Anthony Ghazoul.

[2] The public workshop was hosted by the conveners of the *Moon Dialogs*.

[3] The following experts were invited to join the Public Workshop: Setsuko Aoki, A.C. Charania, Frans von der Dunk, Mike Gold, Christopher Hearsey, Tanja Masson-Zwaan, Idris Motiwala, Michael Newman, and Gabriel Swiney.

well as the public and the international scientific community, to the greatest extent feasible and practicable, of the nature, conduct, locations and results of such activities.

States make submissions by diplomatic note, which are compiled in the *Index of Submissions by States under Article XI of the Outer Space Treaty* maintained by the UN Office for Outer Space Affairs.[4] States are also required to share information regarding any objects "launched into Earth orbit or beyond" under either Resolution 1721 B (XVI)[5] or the Registration Convention.[6]

The obligation to register space objects and share information about space activities has three far-reaching implications in space law and policy:

- Transparency: Sharing information is critical for achieving transparency among states regarding their space activities and their compliance with international law.

- Jurisdiction, Control, and Liability: A state that registers a space object pursuant to the Registration Convention has "jurisdiction and control" of space objects under Article VIII of the OST. As a state of registry, a state also admits that it is a "launching state" under the Liability Convention since only a launching state is capable of registering a space object.[7] This designation brings potential liability since a launching state is liable for damage caused by its space objects.[8]

- Protection of Lunar Operations and the Preservation of Peace: Sharing information regarding lunar activities helps to protect lunar operations because all operators are required under Article IX of the OST to (1) act with "due regard" and (2) avoid potential harmful interference (or else undertake consultations prior to undertaking the activity). This will in turn help to avoid potential conflicts between private operators or between states.

[4] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, entered into force Oct. 10, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 (hereinafter: OST).

[5] International Cooperation in the Peaceful Use of Outer Space, UNGA Res. 1721 B (XVI), 20 Dec. 1961, available online.

[6] Convention on Registration of Objects Launched into Outer Space, entered into force Sep. 15, 1976, 28 U.S.T. 695, 1023 U.N.T.S. The implementation of the Registration Convention was further addressed in UNGA Resolution 59/115 of 10 December 2004 and UNGA Resolution 62/101 of 17 December 2007 which encouraged enhanced registration practices in order to increase the amount of information shared. Both Res 59/115 and Res 62/101 are available online.

[7] Only launching states can register under Article II of the Registration Convention.

[8] Under Articles II and III of the Liability Convention, a launching state is strictly liable for all damage caused on earth or in the air, but is only liable for damage caused in space if the state is shown to be "at fault" for the accident.

These legal and policy implications were critical in the assessment of existing law and practice and, eventually, the drafting of the recommendations of the Registration Project.

Shortcomings of Existing Practice

In advance of forming its recommendations, the Project Members developed a list of shortcomings of existing law and practice of sharing information. The list is divided into two tiers in order to prioritize the most critical issues for the success of impending lunar missions. The first tier includes those critical shortcomings that, if not addressed, pose a serious risk of interference, and potentially conflict, among lunar operators. The second tier includes additional issues that, in time, should be addressed to further promote the peaceful use of the moon.

Tier 1: Critical Shortcomings

1. Existing mechanisms provide for the registration of space objects, not space activities.
2. Existing mechanisms are intended primarily for the registration of objects in Earth orbit and not for missions on celestial bodies.
3. Current registrations provide insufficient information to enable operators to avoid interference and to operate safely with due regard to the corresponding interests of others.
4. Existing mechanisms do not encourage updates regarding changes in the location or function of an object/activity (with the exception of updates regarding deorbiting).
5. Existing mechanisms do not provide for sharing information regarding "safety zones".
6. Registration can be significantly delayed under the Registration Convention due to the requirement to furnish information only "as soon as practicable" coupled with the use of diplomatic notes to furnish the information.
7. States are deterred from undertaking registration due to the correlation with liability.

Tier 2: Additional Shortcomings

1. Existing mechanisms do not provide for the verification of furnished information.
2. Existing mechanisms do not provide for prospective registration for the purpose of providing protection of the planned activity from harmful interference.
3. Existing mechanisms do not foresee the protection of significant cultural/scientific sites.

Recommendations

After reflecting on the critical shortcomings listed in Tier 1 of the previous section, we realized that most of them could be addressed by enhancing existing practices for the notification of lunar activities and the registration of related objects. Throughout the meetings of the Registration Project, Articles IX and XI OST emerged as the most critical provisions in the effort to address

these shortcomings. We believe the operationalization of these provisions in the context of lunar activities could be sufficient to ensure the peaceful, safe and sustainable uses of the moon during this early stage of lunar development. To this end, we make the following recommendations to decision-makers and operators:

1. That all States involved in the exploration and use of the Moon – either as responsible States, launching States or States of Registry – notify the UNSG, preferably prior to the commencement of activity, of the nature, conduct, and location of lunar activities, including their envisaged duration and subsequent results, in accordance with the procedure set forth in Article XI OST.
2. That as part of this notification States also include designated point of contacts and dedicated procedures for any consultation that may be necessary under Article IX OST, as well as a safety impact assessment accounting for both the envisaged harmful consequences and vulnerabilities of the activity, including proposed mitigation measures, together with essential operational information on the communication components and power aspects of the activity.
3. That all States involved in the exploration and use of the Moon undertake appropriate steps to harmonize their practices for the notification of lunar activities and the registration of related space objects.
4. That all States qualifying as launching States for a space object involved in the exploration and use of the Moon promptly register said object in accordance with either Resolution 1721 (XVI) B or the Registration Convention, as applicable to their case, and that they complement said registration by submitting the notification to the Article XI Index as suggested above.
5. That UNOOSA, in compliance with its obligation to disseminate the information received under Article XI OST "immediately and effectively", reorganizes the existing "Index of Submissions by States under Article XI of the Outer Space Treaty" in order to (i) allow for the fully digital transmission of information by means of an internet-based interface and (ii) directly display on the webpage the operator(s), nature, location(s), duration and concerned States (responsible States, launching States, and State of registry) for every notified lunar activity.
6. That a proactive institution within the global space community develops an international database to supplement Article XI OST's Index, in order to include additional information provided by third parties or private entities.
7. That UNCOPUOS Member States begin taking steps to establish a process for identifying and protecting sites of significant cultural and scientific interest on the Moon.
8. That ITU Member States urgently undertake appropriate actions for the establishment of a new radio regulatory region for lunar activity to enable the application of ITU instruments and mechanisms for the allocation of frequencies and the prevention of harmful interference.

A Last Word on Adaptive Governance

The astonishing acceleration in the planning and execution of lunar activities calls for the development of legal and policy solutions ensuring the peaceful, safe, and sustainable use of the moon. The theory of adaptive governance calls for the development of governing rules and institutions in step with the development of technology and activity. The Registration Project delivers the recommendations above as its contribution to the framework of international space law and to the greater effort of promoting the peaceful use of outer space. Eventually, the time will come for revisiting the treaties and producing new binding rules of international space law. When this moment arrives, we recommend to either revisit some provisions related to the notification of lunar activities and the registration of related space objects, or to develop a new regime of *lex specialis* that addresses the issues raised herein.