

Governance of Global Moon Exploration and Settlement Episode 3
Sharing the Benefits of Lunar Activities
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Introduction
Giuseppe Reibaldi, President, Moon Village Association

The Moon Village Association has released in March 2020 the Best Practices for sustainable lunar activities, aimed at reducing the risks caused by the lack of a common level playing field for the future lunar missions. The consultation period to receive comments and feedback is now open and will close in September. The previous episodes of the webinar series had the goal of discussing different aspects of the best practices. The final episode will present the way forward.

Mark J. Sundahl, Director, Global Space Law Center, Cleveland State University

Benefit-sharing is something that almost everyone agrees on as the basis of democratic space activities. And the drafters of the Outer Space Treaty certainly saw it as one of the leading principles when establishing the rules for outer space, so much it is stated in the first article of the outer space treaty. But the question is what precisely this benefit-sharing means. There was an attempt by the United Nations, which in 1996 adopted a Declaration to elaborate upon the content of this obligation, and this topic was also addressed in the Declaration on Remote Sensing principles adopted in the eighties. And the discussion still goes on, as there are still benefits that are not being shared, as in the field of telecommunications. So, what are the limits of benefit-sharing? This principle was addressed in the Moon Village Association Best Practices to open the debate on this and other relevant issues:

Principle 2

“Conduct lunar activities in a manner that takes into account the interests of other actors and benefits all countries and humankind. Both governmental and non-governmental actors involved in lunar activities should provide for benefit-sharing through all feasible means, including for example the promotion of the participation in lunar activities by all countries, and, in particular, developing countries.”

The promotion of participation is an aspect that was reiterated from the Declaration of 1996, and it aims at including in space exploration all countries. It is one of the main goals of the Moon Village Association. How do we share the benefits through all these different actors with all their different levels of technological development? Is it just through participation and coordination, or is there something more? “*With all feasible means*” is intended to avoid the understanding that private companies should share all the benefits coming from their activities and should keep what is needed to continue activities. Still, there are several possible ways to share benefits.

Perspective on benefit in lunar and space resources development
Ian Christensen, Director of Private Sector Programs, Secure World Foundation

The next decade is going to a busy and exciting time for lunar activities, with at least 11 different countries sending missions to the Moon. Lunar governance is a critical topic to begin looking at. A key aspect of this is the sustainability of future lunar operations, concerning the access to space resources, as living in space for long periods of time will require making use of available resources. Both the Moon and asteroids contain

usable deposits of water and other natural resources that can support sustainable human presence and exploration activities.

There are commercial entities that are now looking at resource utilization, in particular water, as business opportunities to support government programs. Water can be processed into rocket fuel, while other resources can be used to support further infrastructure development. Fuel sourced from in-space resources offers the potential to lower the cost of in-space applications and enable broader and more sustained exploration activities.

So, there is a broad consensus in the scientific community that ISRU is a critical capability for exploration. Space resource utilization is a gateway capability for human space exploration and a sustained human presence beyond low Earth orbit.

From the industry side, commercial or private lunar exploration and space resources industry segments are still in a new and in-early stage. Most activity in the near-medium term will be closely associated with government programs and government customers.

In the near-term companies, themselves are also under pressure to demonstrate technical viability and to fly successful technology demonstration missions, and to perform under government contracts. Companies are also responding to investor pressure and the need to show progress towards executing business plans. Commercial entities are profit-motivated, but there are also motivations for expanding humanity's access to space. However, industry concerns about benefit-sharing are defined in purely monetary terms, so are looking at ways of benefit-sharing not necessarily responding to monetary-sharing. Industry actors are now looking for regulatory certainty but are also concerned about too much regulation. There is indeed the need for adaptive governance. Industry actors are interested in broad partnerships but may be uncertain about the best ways to partner with emerging space countries.

Anyway, the scenario concerning the possibility of having activities worth trillions of dollars is mostly aimed at creating excitement on these kinds of activities. However, business understanding is much more indefinite, and it does not portray the real near-term market opportunities. Business and technical plans for returning resources to Earth are very speculative, and the economic assumptions require further analysis. Focusing the attention now on the benefit from space resources and lunar development, we have seen the framework existing within the Outer Space Treaty. The key questions are how we define benefits, how to share them, and the role of developing and emerging space countries.

We can identify reliable and sustainable space resources utilization practices by leveraging experience and examples from other domains (e.g., the Nagoya Protocol on Access and Benefit-sharing). There are also other interesting instruments to look at, like the Hague International Space Resources Governance Working Group - Building Block on Benefit, and the MVA principle 2 on benefit sharing.

The Socio-Economic Panel of The Hague Working Group looked at five analysis topics:

1. Social license to operate
2. International cooperation models
3. Principles for responsible investment
4. Capacity building for space resources
5. Data sharing and lesson learned

Capacity building was a big part of the discussion, to increase participation and engagement by stakeholders who are not directly involved in space resources activities and increasing awareness on this topic.

To conclude, identification and description of global benefits from space resources and lunar development are fundamental for the international legal discussions going on, together with a better understanding of resource access rights. Establishing safe operation practices and principles for lunar activities will be crucial, as well as coordination of various national and international law and policies.

Governance of global Moon exploration and settlement: sharing benefits with developing countries

Fadahunsi-banjo Motolani, Chief Legal Officer at National Space Research and Development Agency (NASRDA), the Nigerian Outer Space Agency

Space activities in Nigeria are now concentrated on the impact of space applications on Earth and human lives; however, there is still significant interest in lunar exploration. In this regard, it is essential to have a look at the Outer Space Treaty, and, at article I, as it constitutes the basis that guarantees the possibility of developing countries to access outer space.

Concerning benefit-sharing, these should include:

- Resources
- Technology
- Collaboration
- Law

Some African countries have economies based on mining, so a possible form of collaboration could include sharing expertise in this field, possibly useful for lunar projects. Many research institutions could offer their expertise in different areas. In Nigeria, for example, some laboratories are simulating the lunar environment, several laboratories are working on rover design, space food, and a series of different things. Therefore, many projects are going on that could be useful in the development of future lunar exploration missions, and which could constitute a valuable resource to share.

But how to practically share benefits? There could be the establishment of a resource reservoir to create a common level playing field for capacity building. Moreover, there should be conservation of mineral resources in space, bearing in mind the heritage of mankind principles. It should, however, happen equitably, for example, through the establishment of slots, or mining list, establishing the quantity of resources to be mined or the time during which an operator can extract them.

Still, there are some challenges and concerns. For example, art. II of the Outer Space Treaty establishes the principle of non-appropriation of outer space and celestial bodies, including the Moon. So, the creation of a permanent settlement, for example, could be considered a form of appropriation? Could it be seen as a way that is preventing other countries from having access to that portion of the Moon?

It is also essential to consider the establishment of governing law because national laws are good, but international law is better. Some critical issues to consider are, for example, the regulation of settlements and settlers, funding, and technological transfer.

In conclusion, although Nigeria is currently more inclined towards space science and technology applications, and how they are impacting their citizens directly, many projects are in place to ensure transitioning into deep space exploration.

The interpretation of benefit-sharing from the developing countries implies sharing both resources and technology. Finally, developing countries are keen on being a part of the process, hence open to collaborating with other countries.

Sharing benefits of lunar activities - Perspective from South America

**Loreto Moraga, Director Moon Project Committee Coordinator, Chilean Space Association
(ACHIDE)**

(This presentation only reflects the opinion of ACHIDE and has not been consulted with regional organizations or space agencies or the Chilean Government.)

The Chilean Space Association AG - www.achide.org - is a civil, non-profit entity, created in February 2000, which currently has more than 50 professionals' specialists in space law, satellite engineering, earth observation, telecommunications, global navigation and positioning satellite systems, astronomy, medicine, and other related themes.

Our mission is the promotion, protection, and improvement of activities related to space and the development of all kinds of space activities, ensuring the creation and application of public policies and especially encouraging the study and use of space science and technology for the benefit of sustainable development of humanity.

Except for Chile and Uruguay, all regional countries have a space agency, considering Ecuador and Colombia with an intermediate space organization – all constituted from the 1960s onward, and the last being set up in Paraguay in 2014. Regardless of the level of development of each country, all of them carry out space activities, highlighting Brazil and Argentina that manufacture their satellites, with public resources.

What should we understand by “benefits”? Looking at the Moon Agreement (TMA), 4 of 12 countries in the region have ratified it. These are Venezuela, Uruguay, Peru, and Chile. Considering the total number of countries which ratified it, this can be regarded as a considerable number.

- Articles IV, VI, and XI refer to “benefits” - with no definition – that shall be carried out in the interests of all countries, irrespective of their degree of economic or scientific development;
- Article XI states that “Neither the surface nor the subsurface of the Moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental organization, national organization or non-governmental entity or of any natural person [...] States Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible.”

This is one way of looking at the definition of benefits. We can also have a look at the MVA principles, considering that not all regional countries are part of TMA, the “benefit” outlined in the principles is broad since it applies to those countries that are not part of the TMA and also protect their interests – “for all humanity.”

In particular, principles N°2 and N°5:

- “Conduct lunar activities in a manner that takes into account the interests of other actors and benefits all countries and humankind. Both governmental and non-governmental actors involved in lunar activities should provide for benefit-sharing through all feasible means, including, for example, the promotion of the participation in lunar activities by all countries, and, in particular, developing countries.”

- "Promote the development of private activities on the Moon and in cislunar space, including purely commercial activities, such as space tourism and resource extraction, as well as non-commercial private activity, such as science and exploration.

For countries that signed and ratified TMA, the nature of the “purely commercial” activities would need to be clarified for actors of these States also to become signatories to these principles. International treaties have not regulated space tourism, and regarding the extraction of resources, TMA indicates explicitly that an international regime should be established to regulate the appropriate procedures in relation to this activity (considering that the resources would be common heritage of humanity and are not susceptible of appropriation if the conditions of said Agreement are not fulfilled).

TMA requires creating a legal framework, and these principles could lay the foundations for the same so that the countries bound by TMA fulfill their obligation and can participate in lunar activities.

To achieve greater adherence to the MVA principles, it is necessary to adapt them to those countries that signed TMA (so that they do not fall into contradictions) and also make them attractive to other developing countries that are not signatories of TMA but who are concerned not to be left out of space activities.

On the other hand, understanding "benefits" in a broad sense, South America shall be part of lunar activities because this will be a very revealing stimulus in the development of knowledge - which we understand framed in the Fourth Industrial Revolution. South America can be a relevant member not only to “receive” benefits but also to make appropriate contributions to the rest of the countries in Lunar Activities.

A formula can be to define a quota of participation, but not from a “paternalistic outlook” - instead, with the willingness to receive regional contributions based on the knowledge and industries in which the countries of the region are strong. That means being considered as partners and not only as countries receiving benefits, hence by having a relevant contribution.

Regional contributions can be sustained, for example:

- Forestry Industry
- Food research and production
- Mining industry
- Astronomy
- Providing natural laboratories

We understand that work should be developed under collaborative terms, with a modern perspective that integrates public and private actors at the regional level. Part of the common activity should be focused on the revision of TMA by the 4 countries that ratified this treaty, in a sense previously indicated. And here again, the Best Practices could be a starting base for reaching broader consensus inside COPUOS.

Q&A moderated by Antonino Salmeri, Space Generation Advisory Council

Q: Can the principles be expanded, addressing the risk of monopolizing behaviors on the Moon? Maybe a general agenda at the UN level could prevent the development of these predatory behaviors?

A [Mark Sundahl]: concerning limited natural resources, we have the example of the allocation of geosynchronous orbital slots, which are in a limited number. The ITU has addressed this issue by allocating, reserving some orbital slots for different stakeholders. We could do something on those lines, but it is an open question.

Q: Should private actors be required to share the discovery of resources? If that is a “government taking” of proprietary information, should they be given a tax credit equal to the value of the information?

A [Ian Christensen]: Benefit sharing is an obligation on States, not on any private individual actor. The Hague WG talks about encouraging it with seven different types of benefit sharing, one of which is the establishment of an international fund if we talk about monetary benefit. Concerning the discovery of resources, there will be a discussion on this topic that may evolve in the long term in the creation of a registry that could probably develop with the protection of the private commercial data. But I don't think we will see a mandatory disclosure in the short term.

Q: Concerning the mining list, **who** would administer such a lease, and under what conditions?

A [Fadahunsi-banjo Motolani]: We are keener on having robust international legislation because it is essential to have unifying legislation, not to create several different regimes. We should also have national legislation to which national entities could refer, but still, we would need legislation binding States at an international level.

Q: What would be the quota system for sharing mined resources by developed countries to non developed countries?

A [Loreto Moraga]: A quota system would be similar, for example, to the system that some countries are applying for women's participation in political bodies. It is a system that must be built, having South Americans working together and showing up at an international level as a strong group. We can't define now how this system would work, but to achieve this goal, we must work together in collaborative terms as a region.

Q: The international road takes time, so while we work together to develop an international regime than in the long run would indeed happen, what should we do in the next 5/10 years? Should we wait or use some other instruments, like soft law?

A [Mark Sundahl]: we can't necessarily create a new bureaucracy, and process, and documents for allocating natural resources on the Moon. We are going there very soon, and the use of natural resources is going to happen. We do have protection in places, and we need to look at the existing instruments that we have already, especially thinking that the most pressing issue is that we don't have to interfere with the activities of other actors, and we have to operate with due regard.

A [Ian Christensen]: We have many documents already being developed, and there are lots of commonalities as well. Where there are no commonalities is in the discussion on what to do with that content and how to move that forward. What we need to do is a confidence-building exercise, and I would look at the process of the Long Term Sustainability Guidelines, including both public and private actors and civil society. A similar, smaller-scale process could potentially be useful for the topic of lunar activities and use of resources, to create discussion, create awareness, and build understanding.

A [Fadahunsi-banjo Motolani]: Activities should proceed even if we are not ready yet because it will take a long process. But what we should consider is collaboration, encouraging confidence-building, and a shared understanding of what is going on. And this should involve developing countries, not only from a benefit-sharing perspective but in the international discussion.

A [Loreto Moraga]: In the case of South America, national legislation exists only in a couple of countries, and creating more bureaucracy is probably not the right way. A good alternative could be the use of soft law, but also, in this case, there is a need for conciliation with the Moon Agreement and the Best Practices because that will provide certainty. And with certainty, we will be able to agree and collaborate within the region by creating the legal regime that the Moon Agreement is asking for.