

# Legal Issues of a Moon Village

## *From the Application of Current Space Law to the New Challenges of International Cooperation*

Éloi Petros\*

### Abstract

The International Space Station (ISS) is a masterpiece of engineering and international cooperation. As the program is getting to an end, probably in 2024, space agencies are looking for new ambitious projects to follow it. Johann-Dietrich Woerner, the Director General of the European Space Agency (ESA), recurrently declared that building a permanent base on the surface of the Moon, a “Moon-village”, could be a similarly ambitious undertaking to succeed the ISS. This article will assess the legal issues that such a project uncovers and will identify the answers the current legal framework, and especially the international space treaties, provides. In that regard, this article will deal with a broad range of space law aspects, such as environment (the protection of the lunar environment and the application of the international environmental law), moon’s resources exploitation or liability (in the event of a launch from the moon). It will then focus on the challenges facing an international cooperation in such a project. The construction of a ‘Moon-village’ will raise new prospects for space cooperation that will differ from the ISS legal framework, as it will include new actors such as countries that are not in States Partners of the ISS. Moreover, it may give to private sector an unprecedented role.

### I. Introduction

The Moon Village is a concept. It is not yet a program, nor an implemented project. It is an idea being explored of what the mid-term future of space activities could be.

As a potential successor to the International Space Station (ISS), it would bring its achievements to another scale, deeper in space, involving new partners and covering new activities. The Moon Village will leave

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\* Institute for Space and Telecommunication Law (IDEST) – Université Paris-Saclay, Paris, France. eloipetros@gmail.com.

engineers as well as lawyers facing new challenges, new promises and opportunities.

On the legal perspective, the establishment of a permanent human base on the surface of the Moon raises a great number of issues. If some of them are specific to the Moon Village, such as the challenge of cooperation, other issues have already been raised in the context of independent projects, such as space mining or space tourism. In other words, the establishment of a Moon Village raises legal issues that space law would have been bound to deal with, in one way or another, in the coming decades.

Considering the above, the opportunity given by the Moon Village to address such space law issues collectively and at the same moment, could be truly beneficial. Indeed, looking collectively at those challenges, as parts of a unique general scheme, as a *global equation*, will reduce the risk of giving disparate answers to linked matters and to create non-coherent or disorganized legal regimes. Such an opportunity to answer as a collective some of the major questions that space law will encounter, in a coherent structure, is precious and would allow the emergence of innovative ideas and adapted solutions.

Furthermore, it appears that the cooperation scheme that will be implemented cannot be conceived independently of the legal choices that will be made regarding those new activities. On the Moon Village, the cooperation system will itself have to deal with unprecedented challenges. Firstly, the involvement of countries that were not part of the ISS programme and that are not parties to existing large-scale interagency or intergovernmental cooperation; secondly, the involvement of private actors. For the latter, participation will have to be thought and organized from the conception of the cooperation framework, at a very early stage.

This would already constitute an important difference with the ISS. Indeed, if private activities are currently held in the station, its commercialization was not explicitly regulated in the International Agreement of 1998,<sup>1</sup> as the involvement of private actors arrived at later in the life of the ISS. This should not be the case for the Moon Village.

In addition to this point, it will be necessary for the cooperation (broadly understood) to take into account the relations between the private actors involved. This will lead to private law issues. Consequently, there are three types of legal relations that will have to be organized in the Moon Village: *Public to Public*, *Public to Private* and *Private to Private*.

Following a brief presentation of what could be the Moon Village, this article will first focus on the application of current space law to its activities (II)

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1 André Farand, Commercialization of International Space Station Utilization: The European Partner's Viewpoint, (2003) 28 *Air and Space Law*, Issue 2, pp. 83-88.

before proposing an assessment of the challenges raised by such cooperation (III).

The *Sustainable Moon Surface Operations*, commonly designated under the less ‘serious name’<sup>2</sup> of “Moon Village” will consist on a permanently inhabited base on the surface of the Moon, and in that regard, it will be the first permanent human presence on another celestial body. As being ‘a *single place with multiple uses and users*’, the Moon Village will have to be legally structured in a way allowing it to be open to new partners and activities. It could legally be considered as an opened platform that gives a framework for cooperation on the Moon. The facilities that would be constructed under its execution will serve various users for various uses.

The Moon Village is not exclusively a “space exploration program”. If it will clearly serve this purpose – by exploring the Moon and exploring from the Moon – it cannot be entirely categorised as such. The Moon Village is more than a space exploration program and the commercial activities that it aims to create and foster are an entire and essential part of it.

Even if the Moon Village will lead to a permanent human presence on another celestial body, it is important to differentiate it from existing projects aiming to “colonize” a celestial body. This distinction has to be made in order to determine the relevant legal issues that will raise the Moon Village. If some of these legal matters are common with “colonization” projects, the latter are raising particular legal issues that will not be treated in this article.

In sum, the Moon Village can be considered as an inhabited international platform of cooperation on the surface of the Moon, with different type of users and usage. The scope of its activities will be very broad from the beginning, and should be made extendable. Those activities will be human and robotics and involve scientific research (Moon science, astronomy, cosmology, fundamental research, space exploration), as well as commercial activities, such as transportation, mining, tourism, commercial research and development or tourism among others.

This list of activities is not exhaustive and the legal framework that will administrate the Moon Village will have to allow and foster the conduct of new activities. As a consequence, the Moon Village should not be seen as a scientific base on the surface of the Moon. The expression “Moon Village” emphasized the fundamental characteristic of this idea.

Now that the structuring aspects of the Moon Village have been defined, the application of the current space law can be interrogated.

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2 Johann-Dietrich Woerner, ESA Director General, Moon Village, IAF Spring Meetings 2016, available at: <https://www.youtube.com/watch?v=b042E3pwS8o> (accessed 09/04/16).

## II. The Application of Current Space Law

The Moon Village will raise legal issues in international space law and have several implications at the other level of the legal framework regulating space activities: national space legislation and private law practices.

### II.a. International Space Law

Considering that very few States are party to the Moon Agreement of 1979 (only sixteen States have ratified it for the time being<sup>3</sup>) and that its provisions could not really be recognized as being customary law,<sup>4</sup> the Moon Agreement will not be considered in this article as being part of current space law. The “international space law” will then here refers to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (OST), the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (ARRA), Convention on International Liability for Damage Caused by Space Objects (LIAB) and the Convention on Registration of Objects Launched into Outer Space (REG).

It should also be noted that, providing that ‘*States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law*’, the Art. III OST makes international law applicable to the establishment of a Moon Village.

With the exception of the Moon Agreement, there are currently no principles in international space law that can be interpreted as being direct obstacles to the establishment of a peaceful, non-military, Moon Village. Similarly, the conduct of commercial activities is not prohibited by the international space law corpus. Space mining remains however subject to debate, despite the existing national initiatives<sup>5</sup> and position paper.<sup>6</sup>

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3 Status of International Agreements relating to activities in outer space as at 1 January 2016, United Nations Committee on the Peaceful Uses of Outer Space, 4 April 2016, A/AC.105/C.2/2016/CRP.3.

4 “Arguably, the agreement should be given little weight as evidence of developing customary law, since, in contrast to other ‘space law’ agreements that have achieved widespread ratification, the Moon Agreement has, over a considerable period, gained few adherents, none of which are significant space powers”, Richard B. Bilder, A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options (2009), *Fordham International Law Journal*, Issue 2, p. 269.

5 From the United States: U.S. Commercial Space Launch Competitiveness Act (H.R. 2262) and from Luxembourg: spaceresources.lu.

6 Position Paper on Space Resource Mining, Adopted by consensus by the Board of Directors on 20 December 2015, International Institute of Space Law, *available at*: <http://www.iislweb.org/docs/SpaceResourceMining.pdf>.

As for the International Space Station's Intergovernmental Agreement (IGA),<sup>7</sup> the Moon Village legal framework will have to ensure that the Moon Village will be '*developed, operated, and utilized in accordance with international law, including the Outer Space Treaty, the Rescue Agreement, the Liability Convention, and the Registration Convention*' (Art. II IGA). Most of the legal choices that have been made for the ISS in order to comply with international law could be use with only few adaptations in the legal framework that will govern the Moon Village. However, some space law provisions are applicable to the Moon Village and not relevant for the ISS.

The registration of the different parts of the Moon Village will be needed in order to comply with the Art. VIII OST and with the provisions of the REG. A choice will have to be made in order to decide if the Moon Village shall be registered as a single space object or if each of its parts shall be registered individually. The second option was chosen regarding the ISS: '*With the refusal by the other partners States already under the 1988 Intergovernmental Agreement to simply register the whole ISS as a U.S. space object, the involvement of many jurisdiction came into place*'<sup>8</sup> and could be choose for the Moon Village. The existence of multiple jurisdiction will request to define specific mechanisms regarding several issues such as intellectual property rights. The IGA already provides such mechanisms.

The '*launching state mechanism*', provided by the Article VII of the OST and by the provisions of the LIAB shall apply to the launching activity from the Moon, as nothing in the relevant article, nor in international space law corpus, excludes the application of this mechanism for launches from a celestial body. Because the Moon is not subject to national appropriation by application of the Art. 2 OST, States can be considered as a launching State in three situations on the Moon: if it launches, procures the launching or if the space object is launched from its facility (Art. 1 LIAB).

The permanent human presence on the Moon and the conduct of activities of very different natures, that could include the launch of space objects as well as the construction of a telescope or the mining of space resources, will request a particular attention to the Art. IX OST. Providing that '*States Parties to the Treaty shall pursue studies of outer space, including the Moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of*

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7 Agreement among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station.

8 Frans G. von der Dunk, Space Law in the Age of the International Space Station, in *Humans in Outer Space – Interdisciplinary Odysseys*, ed. Luca Codignola, Kai-Uwe Schrogl, Agnieszka Lukaszzyk, and Nicolas Peter (Springer Vienna, 2009), pp. 148-161.

*Earth resulting from the introduction of extraterrestrial matter and, when necessary, shall adopt appropriate measures for this purpose*', the OST establishes a principle of environmental protection which is absolutely relevant for the Moon Village. *'Appropriate measures'* will have to be adopted and shall be part of the Moon Village's legal framework. Those provisions may also have to complete the last requirements provided by the Art. IX OST and to provide for a more precise regime.

Among the space law provisions that are directly applicable to the Moon Village and not relevant to the ISS, is the paragraph 2 of the Art. IV OST. This article provides that the Moon and other celestial bodies shall be used for exclusively purposes only and prohibits the establishment of *'military bases, installations and fortifications'*, as well as the *'the testing of any type of weapons and the conduct of military maneuvers'*. It however allows the use of military personnel *'for scientific research or for any other peaceful purposes'*. As it is initiated by the European Space Agency (ESA), which shall itself conduct its activities for *'exclusively peaceful purposes'* under its Convention (Art. II ESA Convention), the Moon Village is today a civil and peaceful concept. However, regarding the large scope of activities that could be conducted on it, and especially with regards to commercial research and development, a specific attention will have to be given to the prohibition of *'weapon testing'*. Indeed, the *'dual use'* nature of many space technologies and a wide interpretation of *"weapon testing"* should lead to such a control. The Moon Village will be both human and robotic. The human presence will not be limited to astronauts working for governments or space agencies. Space tourism as well as activities involving the presence of private companies employee and staff will necessitate a redefinition of the *astronaut* concept, or at least to provide it with additional precisions. On that matter, it is important to note that efforts have already been made at a national level. The U.S provides a clear example of such precisions, where *crew* (defined as *'any employee of a licensee or transferee or of a contractor or subcontractor of a licensee or transferee who performs activities in the course of that employment directly relating to the launch; reentry, or other operation of or in a launch vehicle or reentry vehicle that carries human beings'*) and *space flight participant* (defined as *'an individual, who is not crew, carried within a launch vehicle or reentry vehicle'*<sup>9</sup>) are differentiated. As of today, the legal debates regarding space tourism are mostly focused on suborbital flights and do not address questions that could be raised by the presence of private companies staff in order to execute professional work in outer space (e.g. space mining, repair works, tourism activities). Moreover, the permanent human presence on the surface on the Moon will request the implementation of a *"Code of conduct"*. The ISS experience will again be of great value, as

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9 U.S. Commercial Space Launch Amendments Act of 2004.

such a “Code of conduct” has been implemented for the station. However, the fact that the Moon Village may host staff of private companies as well as astronauts from space agencies will request to provide a very detailed hierarchy scheme, clearly providing the responsibilities of everyone. The accordance of the Moon Village with international law will request the creation of new legal mechanisms and lead to legal innovation.

### **II.b. National Space Legislation**

National space legislations are used by States to comply with international space law, and more specifically with the Art. VI OST, and are the tool by which they choose and organize their space activities.

The establishment of the Moon Village will have at least two sets of implications in national space laws: the translation of the evolution of international space law in national space legislation and the choices that States will make to organize the conduct of activities taken under their jurisdiction on the Moon Village. Private entities are not subject of international law and, by contrast to public bodies (especially States and International Organizations) *‘are not even mentioned (...) in the key treaties’*,<sup>10</sup> national space laws are providing the legal framework for the conduct of commercial space activities.

Despite the diversity of national space law, some elements can be common in all of them – as they are the transcription of international law – or in almost every one of them – because they often appear essential to the States. Provisions regarding the scope of application, the authorization and licensing requirements, the registration process, the indemnification or the insurances can be regarded as *‘building blocks’* of national space law.<sup>11</sup> To apprehend the establishment of a Moon Village and the conduct of activities by entities under their jurisdiction on the Moon Village, States will have to complete and adapt their respective national space legislation. Therefore, the previously mentioned *‘building blocks’* will have to be completed with provisions and requirements regarding activities on the Moon Village, they will have to take into consideration new requirements and provide for new situations. A new *‘building block’* dedicated to the Moon Village could also appear in national space laws.

Instead of modifying or add to their existing legislation, States could decide to pass a new law to implement the Moon Village requirements. This mechanism had been chosen by Canada regarding the ISS. The Civil International Space Station Agreement Implementation Act was passed on

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10 Frans von der Dunk, *Fundamental Provisions for National Space Laws* (2006), Meeting international responsibilities and addressing domestic needs: Proceedings United Nations, Vienna, p. 92.

11 Alexander Soucek, *Space Law Essentials*, Vol. 1, Linde (2015), p. 56.

November 19, 1999 in order to ‘*fulfill Canada’s obligations under the [Intergovernmental] Agreement*’ (Art. 3).

Thus, States will have to define specific conditions and requirements for the authorization to conduct activities on the Moon Village. They could decide that such activities will be subject to a specific license. Insurances requirements could also be an important part of the evolutions of national space legislation, especially during the first years of activities.

### **II.c. Private Law Practices**

As the Moon Village will create relations between companies for their activities in space – “private to private” legal relations – a new field of private law will have to be explored. New kind of contracts will emerge and their redaction will request legal innovation. As an example, a company that financed and own facilities on the Moon Village could decide to rent them to another company. Such a contractual practice, that shall be provided upstream by the general framework of the Moon Village, will lead to the creation of new clauses and new practices. Space insurance companies, that are today at the forefront of private law related to space activities, will occupy a central part of this creative process.

The diversity of activities that will take place in the Moon Village will lead to numerous legal issues that are not all predictable. The Moon Village’s legal framework could however request specific clauses and provisions to be implemented in the contracts.

The application of current space law to the Moon Village does not reveal any major obstacle to its realization. Some mechanisms will have to be set up to ensure its compliance with international law. States and companies will have to integrate new requirements in their legal practices regarding space activities.

### **III. The New Challenges of International Cooperation**

A wide array of participants, with different use, nature and capabilities, will participate in the Moon Village. The involvement of a large number of countries (*spacefaring nations* and *non-spacefaring nations* as well as ISS partners and non-partners) and the unprecedented participation of private actors are two major challenges that international cooperation will face in the context of the creation of a Moon Village.

As the Moon Village must not only be thought as a “space exploration” project but as a general platform for space activities, including commercial activities, its cooperation framework will need to take into consideration the needs of a very large variety of users. The diversity of uses and users that will be involved require an open and flexible framework. The efficiency of the legal framework will rely on its ability to foster those new activities and to ensure fair general governance. Moreover, having a well-defined mechanism



for bringing in new partners will be essential for the Moon Village, as it aims to grow in time, with the potentially increasing participation of a broad range of actors. The requirement to have an already established mechanism to bring in new partners has been emphasized as a lesson learned from the ISS and more precisely from the 4 years negotiation process to bring Russia in as an ISS Partner.<sup>12</sup> It is particularly relevant for the Moon Village, as it is conceived as an active platform, which will be constantly open to new actors. The ISS IGA and the experience of its drafting and negotiation bring important lessons for the conception of a new large-scale cooperation framework. The Moon Village and the ISS are sharing many similarities, both in their nature and purposes (the IGA defines in its Art. 1 para. 3 the ISS as a ‘*permanently inhabited civil international Space Station [that] will be a multiple-use facility*’) and some of the major legal mechanisms that have been chosen for the ISS could be use with few adaptations in the legal framework that will govern the Moon Village. The novelty of the Moon Village may principally lie in some of the activities that it will host, in the complete involvement of private partners and in the importance of the international cooperation that it will involve. Indeed, the length and the intensity of the ISS negotiations can be effectively explained by three challenges they faced: a “technical an operational” challenge, a political challenge and a legal challenge.<sup>13</sup> The Moon Village will have to deal with a fourth one, that is an economical challenge. The involvement of the private sector in the Moon Village, including “space” and “non space” companies will be essential to its complete realization. The Moon Village will be completed when actors from various horizons will conduct there their activities. The involvement of the private sector will be an additional challenge for the negotiations. Private companies will occupy a large place on the Moon Village and consequently will have to be involved at a very early stage of the conception of the project. Considering commercial engagements early in the process and determine the best stage to pursue appears as an important lesson taken from the ISS.<sup>14</sup> In that consideration, it is necessary to envisage private actors’ participation in the negotiation. Their preferences as well as their requirements shall be fully taken into account during the construction of the cooperation framework. Therefore, their role during the process of negotiation will have to be determined in this perspective, and the question of their involvement at this stage of the conception of the Moon Village will need innovative solutions.

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12 International Space Station Lessons Learned for Space Exploration, (2014) Human Exploration & Operations Mission Directorate (HEOMD), NASA, p. 6.

13 G. Lafferranderie, Les accords relatifs à la station spatiale internationale, in *Revue Générale de Droit International Public*, Avril-Juin 1989 – Numéro 2, p. 318-319.

14 International Space Station Lessons Learned for Space Exploration, (2014) Human Exploration & Operations Mission Directorate (HEOMD), NASA, p. 12.

The involvement of private actors in the Moon Village will also foster ‘*international cooperation through industry*’.<sup>15</sup> Industrial liaisons lead to international cooperation. Cooperation on an *industry-to-industry* basis will foster the standardization process that will have to be initiated by the Moon Village and bring flexibility to governments. The creation of another level of cooperation, which is *de facto* added to the intergovernmental cooperation, through the involvement of private partners will be an important characteristic of the Moon Village.

Willing to be as universal as possible and to go further in space cooperation, the Moon Village will involve as much States as possible. This objective will raise important challenges for the cooperation framework, which will bring together States partners to the ISS as well as non-partner States, spacefaring nations as well as developing countries. In this perspective, mechanisms ensuring that its activities will benefit to emerging countries will have to be implemented, in the spirit of the United Nations General Assembly Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries of 1996.

Bringing together a very large number of participants, the viability of the Moon Village will necessitate an important standardization process, in order to ensure and maximize compatibility, interoperability, safety and quality. Regarding the number of States, including “space faring nations” and the specific characteristics of each national industry, the definition of the standards will be an important challenge.

ESA has the particularity to be an international organization that can be considered as a mechanism of international cooperation among States as well as an actor of international cooperation.<sup>16</sup> In other words, ‘*States cooperate through ESA, and ESA cooperate with other partners*’.<sup>17</sup> With its twenty-two Member States and its fifty years experience in space cooperation, ESA appears as a suitable lead player to conduct such an endeavor as the Moon Village. An internal ESA issue could however reside in the fact that some of its Member States are parties to the Moon Agreement. Today, three of the ESA Member States are parties to the Moon Agreement (Austria, Belgium and the Netherlands) and two are signatories (France and Romania).<sup>18</sup>

15 D. A. Broniatowski, G. Ryan Faith, and G. Sabathier, *The Case for Managed International Cooperation in Space Exploration* (2006) Center for Strategic and International Studies, Washington, D.C.

16 The European Space Agency as mechanism and actor of international cooperation, United Nations Committee on the Peaceful Uses of Outer Space, 28 March 2014, A/AC.105/C.2/2014/CRP.28.

17 Ibid.

18 Status of International Agreements relating to activities in outer space as at 1 January 2016, United Nations Committee on the Peaceful Uses of Outer Space, 4 April 2016, A/AC.105/C.2/2016/CRP.3.

According to the Art. 18 (a.) of the Vienna Convention on the Law of Treaties (VCLT), France and Romania '*are obliged to refrain from acts which would defeat the object and purpose*' of the Treaty they have signed. The question of determining if the creation of a Moon Village would lead to such a situation will depend on its legal framework and remains open. This provision of the VCLT shall however be emphasized at this stage of the development.

Because the Moon Village could eventually interfere with the provisions of this treaty, the involvement of those States in its establishment through their membership to ESA is a legal issue. A solution could be for ESA to implement the Moon Village as an optional program, according to the Art. V para. 1 of the ESA Convention. Optional programs are open to cooperation with non-Member States, as stated by the Art. XIV (b) of the ESA Convention.

Regarding the scale of the Moon Village initiative, that aims to involve a maximum amount of international actors, and that will lead to major space law achievements (as some legal questions that are not today clearly covered by the existing space treaties will need to be answered), the question of the involvement of international institutions shall be raised. Indeed, the United Nations and more precisely the United Nations Committee for Outer Space Affairs, appears to be the most appropriate place to discuss and decide for the evolutions of international space law to which the Moon Village will lead.

#### **IV. Conclusion**

The Moon Village will raise legal issues at all the levels of space law. It will have implications in international law as well as in national space legislation and private law practices. No principle of the current legal framework prohibits such an initiative. The establishment of a Moon Village will request legal creativity and innovation, as new mechanisms will have to be conceived in order to ensure its compliance with international law and to draw a cooperation framework that will involve many actors. On a legal perspective, the Moon Village is a precious opportunity to address collectively and in a same moment space law issues that will be raised, in a way or another, in the coming decades. It is a chance to give legal answers to major interrogations raised by the emergence of new kinds of commercial activities, while conceiving at the same time new interactions between private and public actors in space activities. The cooperation and governance framework will also be a major legal challenge raised by the Moon Village. If the ISS experience brings major lessons that will help the establishment of the framework, the specificities of the Moon Village, including the involvement of private actors and the diversity of the activities that it will host, will raise unprecedented challenges.

