WHITE PAPER:

Registration of Landing Sites

and Other Surface Activity on the Moon

Coordination & Cooperation Project

Moon Village Association

***(Draft, November 18, 2019)***

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Abstract

Sharing information about activities in outer space is essential for safety, liability, and coordination purposes. Strong and comprehensive registration processes and institutions support both peace and sustainable development. Information sharing is also part of sharing the benefits of outer space with all of humanity. The Registration Convention, as administered by the United Nations, has tried to fulfill that function for decades. However, the scope and processes of the Convention are not adequate for all the activities involved with establishing humanity’s presence on the Moon.

The Moon Village Association’s Coordination & Cooperation Project Team, within the Registration & Information Sharing subproject, has analyzed the current space treaties, guidance documents, and proposed norms. Around 20 types of information are recommended by one or more of these sources for registration/sharing. The types of information generally fall into two categories: information that could be accommodated by the current Registration Convention and process (possibly with minor changes), and information that would be better suited for other processes/institutions. The analysis is summarized in a one-page chart that reveals an emerging consensus concerning the types of information that should be registered/shared, though the best process and institution for each item is not as clear.

The analysis has revealed gaps in the current framework of registration and information sharing. To address these gaps, the White Paper recommends that the current Registration Convention be expanded and fully implemented by all countries participating in outer space activities. It further recommends that specific institutions and processes be identified or established for depositing and maintaining additional information that is not conducive to the Registration Convention but is nevertheless essential for expanding humanity’s presence on the Moon.

Keywords: Moon, lunar register, registration convention, landing sites, Moon Village

# Objectives

This white paper has been prepared by the Registration and Information Sharing subproject team of the Coordination & Cooperation Project Team of the Moon Village Association. Its purpose is to analyze the need for a register of landing sites and other activities on the lunar surface that would aid in its exploration and use. The subproject aims to facilitate the exchange of information concerning such activities by identifying the required content and the best means for such an exchange.

To this aim, the subgroup has assessed the need for one or more publicly accessible registers of landing sites (historic and future) and other activities on or near the Moon. For existing and future registers, this white paper provides recommendations on the type of information to be registered and the procedures to be followed. The paper considers existing and proposed registers to avoid unnecessary duplication of effort.

## Scope

The scope of this paper is limited to activities on the surface or potentially affecting the surface of the Moon. The latter would include human-made objects in a trajectory toward the Moon and/or in orbit around/near the Moon, as such objects can literally impact activities on the surface.

# Legal obligations and implications

This section summarizes the legal obligations and implications of existing international treaties, associated reports or conference room papers, and proposed norms, including the Outer Space Treaty, the Registration Convention, the Moon Treaty, the Building Blocks of the Hague Space Resources Governance Working Group (Hague Group), and new developments during UNISPACE+50 thematic priorities work.

The analysis starts with the treaties that form the basis of international space law. It then considers related public policies that are promoted in recent United Nations committee reports and thematic documents. It finishes with proposals that seek to implement these policies. A one-page chart at the end of the gap analysis (Section 4) provides a quick reference, summarizing and comparing the information-sharing requirements of all the treaties and proposed norms. A more detailed legal analysis, with excerpts from relevant documents, can be found in Annex A.

## Established treaties

The first reference to registration in the context of outer space appears in a 1961 resolution (General Assembly, 1961). Since then and following its mandates, the United Nations has concluded five space treaties, which are now available online in a compilation booklet (United Nations, 2017). Three of these treaties are particularly relevant to registration.

### Outer Space Treaty (1967) -OST-

The first of these treaties, the Treaty On Principles Governing The Activities Of States In The Exploration And Use Of Outer Space, Including The Moon And Other Celestial Bodies, commonly known as The Outer Space Treaty or OST (United Nations, 1967), is sometimes called the “constitution” of space law. As of January 2019, 109 states are parties, with 23 additional signatory states that have not completed ratification (LSC of COPUOS, 2019a). The Outer Space Treaty first established a registration procedure in which non-governmental entities (NGE’s), aka “nationals”, report to their respective national governments, who then report to the international community via the United Nations registry. It reveals the first practical use of registration: establishing ownership/jurisdiction over a space object, one of the foundational policies for registration. In subsequent articles it describes what should be reported and how.

### Registration Convention (1975) -REG-

The Convention On Registration Of Objects Launched Into Outer Space, also known as the Registration Convention, (United Nations, 1975), is the forth treaty in the series (United Nations, 2017). It was the first comprehensive international treaty on gathering information about objects in outer space. As of January 2019, 69 states are parties with three additional signatory states (LSC of COPUOS, 2019a). The Registration Convention was adopted after the Rescue Treaty and Liability Convention, when it was clear that identifying an object was a first necessary step for regulating outer space activity. It further develops the framework and procedure established by the OST, detailing the information to be shared on objects launched into outer space. The Registration Convention provides the most specific requirements regarding registration (who, what, when, where, and how). It is not as expansive as the OST mandate for sharing information (e.g., sharing the results of activities, reciprocal visits).

### Moon Treaty (1978) -MOON-

The last of the 5 treaties, the Agreement Governing The Activities Of States On The Moon And Other Celestial Bodies, also known as the Moon Treaty or Moon Agreement, (United Nations, 1978), has only been adopted by 18 countries, while four additional states have signed but not completed ratification (LSC of COPUOS, 2019a). Although not as widely adopted as the earlier four treaties, there are three articles that are relevant to registration and sharing information (see Annex A). The Moon Treaty is as expansive as the Outer Space Treaty on the information that must be shared. It is more specific as to what and when. The Moon Treaty does not replace the OST or the Registration Convention; it incorporates and supplements them.

## United Nations Committee reports

The United Nations and its Committee on the Peaceful Uses of Outer Space (COPUOS) have produced policy statements to guide and encourage national governments to adopt comprehensive and uniform laws and regulations for activities in outer space. The following recent documents address both registration and information sharing.

### Guidelines for the Long-term Sustainability of Outer Space Activities

In June 2019, COPUOS adopted by consensus 21 Guidelines for the Long-Term Sustainability (LTS) of Outer Space Activities (COPUOS, 2019). Guideline A.5 specifically addresses registration practices. Its objective is to promote strong and consistent registration procedures. As with the rest the guidelines, A.5 is directed toward “states and intergovernmental organizations” (“IGO’s”, e.g. the European Space Agency), encouraging them to enact regulations that require their nationals (e.g., private operators) to provide registration information. The guideline calls for accurate, comprehensive, and timely reporting of information, and for reporting any changes in status, including terminating events. This identifies a gap in the original treaties, as terminating events do not appear in any prior treaty, agreement, or convention. Other expansion of previous registration requirements includes the reporting of “space objects planned for future separation and independent orbital flight”, such as constellations deployed from motherships (e.g., the ISS), another new technology that had not been previously considered. Moreover, it calls for reporting the use of nuclear power sources in outer space, not mentioned in the Registration Convention, but addressed in The Principles Relevant to the Use of Nuclear Power Sources in Outer Space (General Assembly, 1992).

The Guideline incorporates General Assembly resolution 62/101 (General Assembly, 2008), which calls for greater adoption and use of the Registration Convention, especially when more than one country or entity is involved.

### COPUOS Subcommittees reports

The 2019 COPUOS Final Report incorporates two subcommittee reports: the Report of the Scientific and Technical Subcommittee (STSC of COPUOS, 2019) and the Report of the Legal Subcommittee (LSC of COPUOS, 2019b). The STSC report did not specifically address registration and sharing information, but did discuss their relevance to the policy objectives of safety, sustainability, assisting developing countries, and peace through cooperation (as opposed to the potential conflicts arising from unilateral action). The LSC report also commented on registration policies while addressing an anticipated increase in demand for registration services.

### UNISPACE+50 Thematic Priorities documents

In the years leading up to 2018, the Committee and its Subcommittees tasked working groups and other mechanisms to develop seven thematic priorities as part of the UNISPACE+50 effort. UNISPACE+50 marked the 50th anniversary of the first United Nations UNISPACE conference in 1968 (Secretariat of COPUOS, 2018a), presenting a unique opportunity to look back at the achievements of the past 50 years and into the future to prepare the grounds of new developments. Of the seven thematic priorities, two of them, on the legal regime and the sharing of information, are relevant to this white paper.

#### UNISPACE+50 Thematic Priority 2: “Legal regime of outer space and global governance: current and future perspectives”

The Secretariat of COPUOS prepared a series of notes for each of the Thematic Priorities. The relevant note on Thematic Priority 2 (Secretariat of COPUOS, 2018b) identified the Working Group on the Status and Applications of the 5 United Nations Treaties as the mechanism to develop it further. Building on this note, the chair of the Working Group submitted a draft guidance document under Thematic Priority 2 (WG on the Status and Application of the 5 UN Treaties on Outer Space, 2019) to the Legal Subcommittee at its 2019 meeting. It includes a summary of the benefits of registration. The report also summarized positions the LSC has taken concerning launching states, national legislation, and registration practices. As with the LTS Guidelines, it highlights the need to supplement information on any change in status of the operation of a space object.

#### UNISPACE+50 Thematic Priority 3: “Enhanced information exchange on space objects and events”

Similarly to other thematic priorities, a Note by the Secretariat was produced in 2018 (Secretariat of COPUOS, 2018c). It sets forth objectives, the types of information sought, and suggested improvements in the processes of information exchange. It is also the first document to specifically include activities on the Moon’s surface (“lunar exploration and habitation”) in the scope of registration and sharing information.

## Additional proposals for registration and information sharing

Building on United Nations policies, the following proposals have been made to provide a comprehensive international framework.

### The Hague Building Blocks (2019)

In 2017, The Hague International Space Resources Governance Working Group produced the Draft Building Blocks For The Development Of An International Framework On Space Resource Activities. The final version was released in November 2019 (Hague International Space Resources Governance Working Group, 2019). The “Building Blocks” create a framework for implementing the various space treaties so as to facilitate the extraction and recovery of materials in outer space. Several articles address the topic of registration and information sharing.The list of information to be shared is very specific and similar to UN treaty requirements. It includes reporting of “the results of space resource activities”. If that includes the discovery of resources, then the Building Blocks are in full compliance with all five UN-sponsored space treaties concerning the sharing of information (see Table 1 in Section 4, below).

The Building Blocks make up the most comprehensive proposal to date of what information should be registered or shared, including priority rights, best practices, and heritage sites. They also propose an international body (new or designated) that would collect, hold, and share such information.

### Proposed implementation plans for the Moon Treaty

At the LSC meeting in April 2019, Belgium and Greece, who have not adopted the Moon Treaty, nevertheless proposed using it as a base for establishing an international framework of laws for space resource activity. Although their proposal (Belgium and Greece delegations, 2019) gained wide support, it did not achieve consensus.

A comprehensive proposal for an Article 11 implementation agreement (O'Brien, 2019) was recently presented at the 8th CSA-IAA Conference on Advanced Space Technology by The Space Treaty Project. The proposed agreement is 10 paragraphs long and addresses registration and sharing information. With the suggested additions, the Moon Treaty becomes almost identical to the Hague Group’s Building Blocks and the United Nations recommendations in the areas of registration and sharing information (see Table 1 in section 4, below).

# Existing registries

## Online Index of Objects Launched into Outer Space

The Online Index of Objects Launched into Outer Space (UNOOSA, 2019a), allows public online access to the information submitted by Member States to the United Nations Space Objects Register in accordance with the Convention on Registration of Objects Launched into Outer Space (United Nations, 1975). As such, it contains mainly information regarding the *nature, location, launching state, designation, date of launch* and *orbital parameters* after launch, and possibly information about *termination* (see Table 1). It does not necessarily contain geographical coordinates for objects landed or impacted on other celestial bodies. The Index is maintained by the United Nations Office for Outer Space Affairs, discharging the responsibilities of the Secretary-General under the legal regime on outer space. Notifications from states, including their initial notice of establishing registration, are accessible through UNOOSA’s website (UNOOSA, 2019b).

### National Registration Requirements

Member States are encouraged to maintain their National Registries and are responsible for submitting new and updated information to the United Nations. Private and public launching entities that cannot be considered Member States or their designated agencies cannot register an object directly. The list of National Registries stablished thus far can be found online (UNOOSA, 2019c).

### Objects on the surface of the Moon

Regarding lunar objects, at present (1 October 2019), the Online Index contains **51** **objects** with designated location *“on Moon”*, 19*“selenocentric”* objects, plus one additional object *“in Moon L2”* (referring to Earth-Moon L2 point). It is important to note that many selenocentric objects, if updated, change status to *“on Moon”* at their end-of-life if their orbit decays until surface impact. At least 10 of the 19 objects listed as selenocentric have decayed and their status has not been updated. Only **a single one** of these objects provides **longitude and latitude coordinates**.

There might be additional errors or omissions in the Online Index. Notable instances are, for example, the many Luna probes or Apollo 11 still being listed only as *“selenocentric”* and not *“on Moon”*, while all spacecraft and objects left behind by these missions are now on the surface (landed or crashed) and not on orbit. Correcting absences or errors in the current register entries is beyond the scope of this white paper. However, it is worth highlighting that maintenance and update of any such register requires additional and continuous effort.

The following graphs summarize some relevant information regarding the 51 objects *“on Moon”*, as they appear on the Online Index.

Figure : Percentage of objects on the Online Index listed as “on Moon” that are registered with the UN (left) and with an update after change of status (right)

As shown in Figure 1, most objects on the Online Index have been officially registered with the United Nations following the established procedures. The few that are still unregistered correspond to launches in the past few years, so it is possible that the launching state may submit the notification later on. Some of them may correspond to rovers that were launched together with a lunar probe, and only the orbiter was officially registered. Less than a quarter of these objects have their status updated after separation events, landings, crashing or end of life termination. This highlights how necessary a proper maintenance of a registry is, in order to have the most updated information available to all interested parties.

For All Moonkind has produced a report (For All Moonkind, 2019a), analyzing the status and completeness of the online index. The report mentions at least 61 missing sites on the surface of the Moon. Some of the 61 correspond to some of the 19 objects listed as selenocentric and that have since decayed. Others could be different objects or vehicles that landed together as whole (for example in the Apollo era).

Figure : Classification of objects on the Online Index listed as “on Moon” by state or organization (left) and by mission type (right)

So far, only 7 states or organizations (including the European Space Agency) have objects on the Online Index listed as “on Moon” (see Figure 2). Three quarters of these missions are from the United States of America or The Russian Federation. Not all of these missions were successful. Two recent failures at landing in 2019 (by Israel and India) convey the difficulty of such and endeavor. However, the number of Moon missions and amount of activity on the Moon is expected to increase greatly in the coming years, along with the number of actors that take part in these activities.

Out of the seven actors with objects on the Moon, only Israel is missing signing or ratifying the Registration Convention, while, on the other hand, only India has signed the Moon Agreement (albeit not ratified it) (LSC of COPUOS, 2019a). The situation of ESA, not being a Member State of the United Nations, is special, with several members having ratified the Moon Agreement (Austria, Belgium or the Netherlands), while France or Romania having only signed it (LSC of COPUOS, 2019a). Future actors, particularly when they represent consortia of various countries or private companies, will have diverse degrees of ratification of applicable treaties.

Figure 2 also shows the objects “on Moon” classified by mission type. Over one quarter of these objects are Orbiters, which change the status to “on Moon” after decaying at the end of their mission. It is important to highlight once again the importance of updating entries in any registry after significant changes in the status of one object.

## “For All Moonkind” Register

For All Moonkind is a private nonprofit organization that wants to create a registry separate from the United Nations that captures more activity on the Moon. It is especially interested in preserving cultural, historical, and scientific sites and developing standards and recommended practices for the exploration and use of the Moon. Maintenance of a private but accessible registry, separate from the United Nations, would be consistent with the public/private model that is common in other aerospace activities.

The Moon Registry of For All Moonkind is expected to be released in 2019 (For All Moonkind, 2019b). At the time of writing of this white paper, the Registry lists 61 missions (previously listed as 118 sites before a recent update). These missions can be filtered by operator, mission type or year, and provide additional information not listed on the UN Online Index, such as Latitude and Longitude of many sites.

## Other models of registration or information platforms

In 2012, NASA published a report containing the “final catalogue of manmade material on the Moon” (NASA History Programme Office, 2012). The catalogue includes a detailed description of material at all US sites, and lists as well 22 Russian, 5 Japanese, 2 Indian, 1 Chinese and 1 ESA sites. The catalogue is very complete to that date, in particular regarding US material, but is not maintained to our knowledge.

The NASA Space Science Data Coordinated Archive (NSSDCA) also allows queries by spacecraft type in their Master Catalogue Search (NSSDCA, 2019a). Moon missions appear under Planetary Science. The NSSDCA Moon Page (NSSDCA, 2019b) lists Moon missions by various agencies, including up to the recent landing attempt by Israel.

A commendable private effort is Gunter’s Space Page (Krebs, 2019), with comprehensive information on most space missions. A Quicksearch for “Moon” returns 138 entries, of which 104 provide detailed spacecraft or missions information. The rest correspond to 21 astronauts, 7 launch vehicles, and several other related pages. The discrepancy between 104 spacecraft to the Moon and the number of entries in the other registries (51 on the United Nations, 61 on For All Moonkind’s) can be explained by the inclusion of future, failed or cancelled missions and missions that departed cislunar space.

# Comparison and gap analysis

Table 1 presents a summary and comparison of the items to be registered according to the aforementioned treaties, guidelines and proposals. With the proposed Implementation Agreement (O'Brien, 2019), the Moon Treaty becomes almost identical to the Hague Group’s Building Blocks and the United Nations recommendations in the areas of registration and information sharing.

Concerning Moon activity, the United Nations documents listed are limited when it comes to the scope of what is to be registered. The focus is on objects that are launched rather than objects or activities on the surface of the Moon. For example, they lack requirements concerning geographical coordinates or guidance on the use of a standard format or coordinate system. For that reason, UN treaties and guidelines will be helpful as a foundation but are neither complete nor determinative concerning the registration of landing sites and other activities on the lunar surface.

Regarding the two main registries, the process for registration currently used by the United Nations is best suited for hard factual information such as launching state, initial orbital parameters, landing sites, and type of vehicle activity. Its benefits are that it is universally recognized and accessible to all. However, it might not be as useful for evolving topics such as scientific discoveries, standards and recommended practices, and the harmful impact of activities. As pointed out in the UN Thematic Priorities, each country controls both the content and process of its own registry, which often results in inconsistent reporting and a reduced number of updates. Thus, the completeness and accuracy of the records have limitations. Because of this, MVA supports the recommendation listed in recent developments (WG on the Status and Application of the 5 UN Treaties on Outer Space, 2019) (COPUOS, 2019), that states should report any “appropriate updates” or “change[s] of status in operations”.

On the other hand, the registry initiated by For All Moonkind has the advantages of greater ease of registration and of updates, allowing for higher completeness and accuracy and for additional information. Its focus on Moon surface objects is in line with Moon Village Association interests. Its limitations include less recognition and less authority than the Online Index maintained by the United Nations.

Other registries or catalogues mentioned above are maintained by a single country or individual person and either focus and detail one single actor’s elements, or lack international authority and widespread recognition.

Table 1: Comparison of registration and information sharing requirements and implications

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Outer Space Treaty | Registration Convention | Moon Agreement | Building Blocks | COPUOS & Thematic Priorities |
| Nature\* | X | X | X | X | X |
| Location | X | X | X | X | X |
| Results | X |  | X | X |  |
| Inspection | X |  | X | X | X |
| Launching state |  | X | (X) |  | X |
| Designation/identification |  | X | (X) |  | X |
| Date/time |  | X | X | X | X |
| Orbital  parameters |  | X | X | X | X |
| Termination |  | X | (X) | X | X |
| Duration |  |  | X | X |  |
| Endangering phenomena |  |  | X | X | X |
| Scientific discovery/life |  |  | X | X |  |
| Resources |  |  | X | ? |  |
| Priority rights |  |  | (X) | X |  |
| Harmful impacts |  |  |  | X |  |
| Best practices |  |  | (X) | X |  |
| Scientific/ Heritage sites |  |  | (X) | X |  |
| Nuclear power |  |  |  |  | X |
| Change of status |  |  |  |  | X |
| Web links |  |  |  |  | X |

\* Includes function, purposes, and conduct

(X) = with proposed implementation agreement (O'Brien, 2019)

? = The Hague Group’s Building Blocks include sharing the results of a mission; it is not clear if this includes the discovery of resources.

(Section 2 legal analysis, Annex A, and Table 1 courtesy of [The Space Treaty Project](http://www.spacetreaty.org/))

# Findings

## Policies

Sharing information with a strong, comprehensive, and uniform registration process supports the following policies that are identified in the above treaties, reports and proposals:

1. Peaceful cooperation between nations
2. Long-term sustainable development of outer space resources
3. Sharing the benefits of the exploration and use of outer space with all countries,irrespective of their degree of economic or scientific development
4. Identification
5. Safety and mitigation of risk
6. Legal jurisdiction and liability
7. Transparency and confidence building
8. Facilitating increased involvement by non-governmental entities, increased public-private partnerships, and increased multi-national efforts.

## Additional Topics for the Registration Treaty

In addition to the information already mandated for registration under the Registration Convention, the following types of information are amenable to being included in a treaty-mandated registration process that is mission-specific and administered by the United Nations:

1. Expected duration of mission
2. Anticipated end-of-mission events, including possible impact sites (for successful impactors, or failed missions)
3. Use of nuclear power
4. Websites providing information about the object/mission.

## Additional Topics for Other Registration Processes

The following types of information are important to share for one or more of the policy reasons stated above, but are not mission-specific or amenable to the current United Nations registration process:

1. Sites and objects\* to be protected for scientific, historical, and/or cultural reasons
2. Assignment of priority rights
3. Discovery of resources
4. Harmful impacts of lunar activity
5. Discovery of life, endangering phenomena, or other scientific discoveries
6. Designation of lunar landing sites
7. Standards and recommended practices

\* The scope of lunar activity may be expanded to vehicles, modules and constructions, rover tracks, waste disposal sites, surface experiments, inter alia.

# Actions and Recommendations

After consideration of the above analysis and findings, the Coordination and Cooperation Project Team of the Moon Village Association makes the following recommendations to the international community for action:

1. Seek international agreement complementing the Registration Convention to include the additional types of information identified in Findings subsection 5.2.
2. Seek international agreement to clarify and standardize the manner of registration that is mandated by the Convention for all countries engaged in outer space activity, including the mandate that all non-governmental entities (“nationals”) must register activities with their authorizing governments.
3. Encourage development of an automated registration system (e.g., an online form with mandatory fields that can be accessed by reporting countries) to alleviate the burden on the limited United Nations personnel available for such work.
4. Seek international agreement (e.g., amendment to Registration Convention, implementation agreement for the Moon Treaty) to mandate sharing of information identified in Findings subsection 5.3 that is not amenable to the current UN-administered registration process, along with the creation or designation of an agency for developing/maintaining such information.
5. Seek international agreement on the use of designated landing sites.

## Future work and actions for the MVA

Among other projects, the Moon Village Association will consider continuing tasks associated with registration practices, including but not limited to:

1. liaison with entities performing/planning activities on the Moon;
2. awareness-raising of the obligations and benefits of registering;
3. promotion of existing registers among established space actors and new players.
4. encouraging the 7 current players on the Moon, and any future ones, to update the status of their lunar missions in the United Nations register
5. contribution to drafting standards and recommended practices (SARP’s) for registration, including potential national legislation and/or international agreements.

The above tasks can be summarized as capacity-building for space law, **creating the implementation framework for the United Nations Guidelines for Long-Term Sustainability with regards to registration and information sharing of lunar surface activity**. Such an overall task would be consistent with MVA’s mission and within the expertise/objectives of the Coordination and Cooperation Project.

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ANNEX A: Detailed legal analysis

This annex provides context to the analysis of legal obligations and implications. The documents themselves are extensively quoted, **with emphasis to highlight sections that are most relevant to registration and sharing information.**

1. Outer Space Treaty (1967)

Article VI

**States Parties to the Treaty shall bear international responsibility for national activities** in outer space, including the moon and other celestial bodies, **whether such activities are carried on by governmental agencies or by non-governmental entities, and for** **assuring that national activities are carried out in conformity** with the provisions set forth in the present Treaty.

Article VI establishes the overall process and framework for space law. National governments adopt laws and regulations in order to enforce and implement their international responsibilities. As summarized in the main body of text, their non-governmental entities (NGE’s), aka “nationals”, are then obliged to follow the national laws and regulations. For registration, that means that NGE’s report to their respective national governments, who then report to the international community via the United Nations registry. (Note: a proposal for direct reporting by NGE’s to an international body is in the Hague Group’s Building Blocks, see below)

Article VIII

**A State Party** to the Treaty on whose registry an object launched into outer space is carried **shall retain jurisdiction and control over such object**, and over any personnel thereof, **while in outer space or on a celestial body**. . . Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return.

Article VIII reveals the first practical use of registration - establishing ownership/jurisdiction over a space object and ensuring its return. It is one of the foundational policies for registration.

Article XI

**In order to promote international co-operation in the peaceful exploration and use of outer space,** **States Parties** to the Treaty conducting activities in outer space, including the moon and other celestial bodies*,* **agree to inform the Secretary-General of the United Nations as 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.** On receiving the said information, the Secretary-General of the United Nations should be prepared to disseminate it immediately and effectively.

Article XI requires sharing information with the public, describing what should be reported and how. The foundational policy is international cooperation, essential for “the peaceful exploration and use of outer space.” Note also the inclusion of “results”, which goes beyond the simple registration of objects and flight plans. As noted above, these obligations apply to NGE’s, through implementing national laws/regulations, as much as they do to national governments.

Article XII

**All stations, installations, equipment and space vehicles** on the moon and other celestial bodies **shall be open** to representatives of other States Parties to the Treaty on a basis of reciprocity.

Article XII mandates a particular type of information sharing, the right of mutual inspection.

1. Registration Convention (1975)

The Conventions begins with its foundations in the preceding treaties:

Preamble

Recalling also that the [**1968 Rescue Treaty**] provides that a **launching authority shall, upon request, furnish identifying data** prior to the return of an object it has launched into outer space found beyond the territorial limits of the launching authority,

Recalling further that the [**1972 Liability Convention**] establishes international rules and procedures concerning the **liability of launching States for damage caused by their space objects,**

Desiring, in the light of the [**1967 Outer Space Treaty**], to make provision for the **national registration by launching States** of space objects launched into outer space . . .

Article II

1. **When a space object is launched into earth orbit or beyond, the launching State** **shall register** the space object by means of an entry in an appropriate registry which it shall maintain. Each launching State shall inform the Secretary-General of the United Nations of the establishment of such a registry. . .

3. **The contents of each registry and the conditions under which it is maintained shall be determined by the State of registry concerned.**

Article II builds upon the framework established by the Outer Space Treaty, i.e., that each country is responsible for maintaining a registry, which is then sent to the United Nations.

Article III

1. **The Secretary-General of the United Nations shall maintain a Register** in which the information furnished in accordance with article IV shall be recorded.

**2. There shall be full and open access to the information in this Register.**

Article IV

**1. Each State of registry shall furnish to the Secretary-General of the United Nations, as soon as practicable, the following information concerning each space object carried on its registry:**

**(a) name of launching State or States;**

**(b) an appropriate designator of the space object or its registration number;**

**(c) date and territory or location of launch;**

**(d) basic orbital parameters, including:**

**(i) nodal period;**

**(ii) inclination;**

**(iii) apogee;**

**(iv) perigee;**

**(e) general function of the space object.**

2. Each State of registry may, from time to time, provide the Secretary-General of the United Nations with additional information concerning a space object carried on its registry.

3. Each State of registry shall notify the Secretary-General of the United Nations, to the greatest extent feasible and as soon as practicable, of **space objects** concerning which it has previously transmitted information, and **which have been but no longer are in earth orbit.**

Article IV of the Registration Convention provides the most specific requirements re registration (who, what, when, where, and how). It is not as expansive as the OST mandate for sharing information (e.g., results, inspections).

1. The Moon Treaty (1978)

The Agreement Governing The Activities Of States On The Moon And Other Celestial Bodies, (United Nations, 1978) contains three articles that are relevant to registration and sharing information:

Article 5

1. **States Parties shall inform** the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of their activities concerned with the exploration and use of the moon. **Information on the time, purposes, locations, orbital parameters and duration shall be given in respect of each mission to the moon as soon as possible after launching, while information on the results of each mission, including scientific results, shall be furnished upon completion of the mission.** In the case of a mission lasting more than sixty days, information on conduct of the mission, including any scientific results, shall be given periodically, at thirty-day intervals. For missions lasting more than six months, only significant additions to such information need be reported thereafter.

2. If a State Party becomes aware that another State Party plans to operate simultaneously in the same area of or in the same orbit around or trajectory to or around the moon, it shall promptly inform the other State of the timing of and plans for its own operations.

3. In carrying out activities under this Agreement, States Parties shall promptly inform the Secretary-General, as well as the public and the international scientific community, of **any phenomena they discover in outer space, including the moon, which could endanger human life or health, as well as of any indication of organic life.**

Article 11

6. In order to facilitate the establishment of the international regime referred to in paragraph 5 of this article, **States Parties shall inform the Secretary-General** of the United Nations **as well as the public and the international scientific community**, to the greatest extent feasible and practicable, of **any natural resources they may discover on the moon.**

Article 15

1. Each State Party may assure itself that the activities of other States Parties in the exploration and use of the moon are compatible with the provisions of this Agreement. To this end, **all space vehicles, equipment, facilities, stations and installations on the moon shall be open to other States Parties.**

1. UN Guidelines for the Long-term Sustainability of Outer Space Activities

The Guidelines are divided into four topics:

1. Policy and regulatory framework for space activities (including registration)
2. Safety of space operations
3. International cooperation, capacity-building and awareness
4. Scientific and technical research and development

The policies behind all the guidelines was stated in Section 1, Paragraph 4:

The development of voluntary guidelines is premised on the understanding that **outer space should remain an operationally stable and safe environment that is maintained for peaceful purposes and open for exploration, use and international cooperation by current and future generations, in the interest of all countries, irrespective of their degree of economic or scientific development, without discrimination of any kind and with due regard for the principle of equity.** The **purpose of the guidelines** **is to assist States and international intergovernmental organizations**, both individually and collectively, **to** **mitigate the risks** associated with the conduct of outer space activities **so that** **present benefits can be sustained and future opportunities realized.** Consequently, the **implementation** of the guidelines for the long-term sustainability for outer space activities **should** **promote international cooperation in the peaceful use and exploration of outer space.**

Guideline A.5 specifically addressed registration practices. Since it is the most relevant guidance document with the broadest support, it is presented in full:

**Guideline A.5**

**Enhance the practice of registering space objects**

1. States and international intergovernmental organizations, acting in accordance with their obligations under article VIII of the Outer Space Treaty and the Convention on Registration of Objects Launched into Outer Space and taking into consideration the recommendations contained in General Assembly resolutions 1721 B (XVI) and 62/101, should **ensure the development and/or implementation of effective and comprehensive registration practices**, as proper registration of space objects is a **key factor in the safety and the long-term sustainability of space activities**. Inadequate registration practices may have negative implications for ensuring the safety of space operations.

2. To that end, States and international intergovernmental organizations **should adopt appropriate national or other relevant policies and regulations to** **harmonize and sustain** over the long term such **registration practices** **on the widest possible international basis**. When registering space objects, States and international intergovernmental organizations should bear in mind the need to provide timely information that contributes to the long-term sustainability of outer space activities and should consider also providing information on space objects, their operation and their status, as set out in General Assembly resolution 62/101.

3. Prior to the launch of a space object, the State from whose territory or facility a space object will be launched should, in the absence of prior agreement, contact States or international intergovernmental organizations that could qualify as the launching States of that space object to **jointly determine how to proceed with the registration** of that particular space object. Following the launch of a space object, and considering relevant criteria in the Convention on Registration of Objects Launched into Outer Space (Registration Convention), States and/or international intergovernmental organizations that were involved in the launch should coordinate among themselves,to include those States and international intergovernmental organizations that may exercise jurisdiction and control over the non-registered space object, to register the space object.

4. In the event that a State or international intergovernmental organization receives, from another State or international intergovernmental organization, an enquiry seeking clarification about the registration/non-registration of a space object that could presumably be under its jurisdiction and/or control, that State or international intergovernmental organization should respond, as soon as practicable, in order to facilitate the **clarification and/or resolution of a particular registration issue**. In certain circumstances, a State may choose to communicate an enquiry through or copy an enquiry to the Office for Outer Space Affairs. In such cases, the requested State is encouraged to reply likewise.

5. The Office should be effectively engaged, within its standing responsibilities and existing resources, in executing integrated functions pertaining to: (a) the **accumulation of information** on orbital launches performed (i.e., completed launches resulting in the placement of objects into Earth orbit or beyond) and on orbital objects (i.e., space objects that have been launched into Earth orbit or beyond); and (b) the **assignment of international designations** to orbital launches and orbital objects **in accordance with Committee on Space Research notation**, as well as the provision of such designations to the States of registry. States and international intergovernmental organizations should support efforts by the Office to promote initiatives that would enable States to adhere to registration practices and consider implementing and sustaining the provision of registration information in furtherance of General Assembly resolution 62/101.

6. The launching States and, where appropriate, international intergovernmental organizations **should request all necessary information from space launch service providers and users under their jurisdiction and/or control to meet all registration requirements under the Registration Convention** and encourage their receptiveness to and consideration of the provision of expanded registration information. States and international intergovernmental organizations, having institutionalized the practice of providing expanded registration information, should strive to sustain such practice and identify circumstances complicating the achievement of that task.

7. States and international intergovernmental organizations should take into account General Assembly resolution 62/101 and consider **providing information on any change of status in operations (inter alia, when a space object is no longer functional)** and, following the change in supervision of a space object in orbit, information about changes in the orbital position. States and international intergovernmental organizations should be aware of **the importance of achieving and sustaining a practicable degree of coherence and uniformity** in applying the provisions of this paragraph. Varying implementation practices, inasmuch as such may relate to the contents and attributes of information furnished, may necessitate addressing appropriate interpretative aspects. In such cases, States and international intergovernmental organizations should, through **dedicated consultative process within the Committee on the Peaceful Uses of Outer Space**, consider, acquire and develop shared positions with respect to providing information on any changes in space objects’ status of operations and in the orbital positions of space objects.

8. In cases where a **launched space object contains other space objects planned for future separation and independent orbital flight**, States and international intergovernmental organizations should, when entering these objects in their registry and when furnishing registration information to the Secretary-General of the United Nations, indicate (for example, in the form of side notes) the number and names of space objects that may, in the future, separate from the main space object, on the understanding that those space objects should not be given different or modified names when they are subsequently registered.

9. In accordance with article IV, paragraph 2, of the Registration Convention, and considering General Assembly resolution 62/101, on registration practices, as well as principle 4.3 of General Assembly resolution 47/68, States and international intergovernmental organizations should provide information to the Office through internationally accepted mechanisms on all space activities or objects that involve **the use of nuclear power sources in outer space.**

Guideline A.5 is the longest of the 21 guidelines, perhaps reflecting the importance and complexity of the subject. Its objective is to promote strong and consistent registration procedures. As with all the guidelines, A.5 is directed toward “states and intergovernmental organizations” (“IGO’s”, e.g. the European Space Agency), encouraging them to enact regulations that require their nationals (e.g., private operators) to provide registration information (Paragraphs 1-2).

Paragraphs 3-6 call for accurate, comprehensive, and timely reporting of information.

Paragraph 7 calls for reporting any changes in status, including terminating events, repeating a recommendation in other recent UN thematic documents. This is noteworthy because reporting terminating events does not appear in any prior treaty, agreement/or convention.

Paragraph 8 calls for reporting “space objects planned for future separation and independent orbital flight”, such as constellations launched from motherships (e.g., the ISS), another new technology that had not been previously considered.

Paragraph 9 calls for reporting the use of nuclear power sources in outer space. Surprisingly, the Registration Convention itself does not mention nuclear power.

Throughout A5 there are references to United Nations 2008 General Assembly resolution 62/101 (General Assembly, 2008). That resolution also calls for greater adoption/use of the Registration Convention, especially when more than one country or entity is involved. It took note of the changes that had occurred since the Convention had been adopted in 1976, changes that required greater detail in the information registered:

Noting that changes in space activities since the Registration Convention entered into force include the **continuous development of new technologies**, an **increase in the number of States carrying out space activities**, an **increase in international cooperation in the peaceful uses of outer space** and an **increase in activities carried out by non-governmental entities**, as well as **partnerships formed by non-governmental entities from more than one country** . . .

Although both documents provide guidelines as to the process of registration, they are limited when it comes to the scope of what is to be registered. The main purpose of Guideline A.5 is to reaffirm and describe the “state-based” framework of space law, including registration: treaties/principles/guidelines instruct the sovereign states, and the states adopt policies and regulations for the authorization and supervision of their national activities, including the activities of non-governmental entities.

1. 2019 COPUOS Subcommittees reports

As mentioned in the main body of the white paper, the Report of the Scientific and Technical Subcommittee (STSC of COPUOS, 2019) discusses their relevance to the policy objectives of safety, sustainability, assisting developing countries, and peace through cooperation (versus the potential conflicts arising from unilateral action):

30. Some delegations expressed the view that **international cooperation should be an essential component of peaceful activities in outer space**, in particular in developing countries, and that international cooperation was **essential to pursuing the sustainability of space activities as the common objective of all**. In that connection, international cooperation in the scientific and technical aspects of the exploration and use of outer space for peaceful purposes would contribute to, among other things, the **development of common understanding and to the strengthening of friendly relations among Member States.**

31. The view was expressed that, regrettably, in matters related to space activities, a number of States frequently chose the path of unilateral action rather than international regulation. Such **unilateral action had the potential to create** **conflict** among space actors and thus **adversely affect the entire security and safety system in outer space**. In that connection, the **absence of internationally agreed rules on** a number of important aspects of the safety of space operations, **the monitoring of objects and events in outer space**, space traffic management and the utilization of mineral resources, **continued to have a negative effect on the preservation of outer space as a functionally stable and safe environment.** The delegation expressing that view was also of the view that that situation **severely affected the interests of developing countries.**

Meanwhile, the Report of the Legal Subcommittee (LSC of COPUOS, 2019b) commented on registration policies while addressing an anticipated increase in demand for registration services:

23. The Director of the Office [of Outer Space Affairs] referred to one of the recommendations in the report [by the Office by the Inspection and Evaluation Division of the Office of Internal Oversight Services], namely that **in anticipation of growth in the number of objects launched into outer space in the near future, the Office should review and modernize its registration process and capacity to maintain a high registration rate**. The expected large increase in the number of space objects launched in the years to come and the related registration obligations remained an area of concern to the Office. **The Register continued to serve as a common, treaty-bound mechanism to ensure that national space activities were conducted responsibly**, and the United Nations and its Member States must work together to ensure that awareness of and adherence to the Register would always be as high as possible. The Office had already taken steps to implement a number of recommendations in the report. However, certain recommendations could not be implemented due to the Office’s lack of human resources.

76. Some delegations expressed the view that the **Registration Convention represented a key facilitator of transparency and confidence-building measures** in outer space activities, and that parties to that Convention should provide complete and timely information on the objects they launched, and should maintain their national registers. Those delegations also expressed the view that **training and capacity-building that focused on registration practices was vital for new space actors.**

1. UNISPACE+50 Thematic Priority 2: “Legal regime of outer space and global governance: current and future perspectives”

The draft guidance document under Thematic Priority 2 (WG on the Status and Application of the 5 UN Treaties on Outer Space, 2019), submitted to the Legal Subcommittee at its 2019 meeting, includes a summary of the benefits of registration:

II. Elements to assess when considering becoming a party to the United Nations treaties on outer space

D. Registration regime and jurisdiction and control under the law of outer space

45. **By acceding to, implementing and observing the provisions of the Registration Convention, States:**

(a) **Enhance the usefulness and maintenance** **of the United Nations Register** of Objects Launched into Outer Space, in which information furnished by States and international intergovernmental organizations that have declared their acceptance of the rights and obligations under the Registration Convention is recorded;

(b) **Benefit from** **additional means and procedures that assist with the identification** of space objects;

(c) **Have the** **right to request assistance from other States**, including States possessing monitoring and tracking facilities, to identify a space object that has caused damage or that may be of a hazardous or deleterious nature.

46. **Universal acceptance, implementation and observance** of the provisions of the Registration Convention:

(a) Leads to a **clarification of jurisdiction and control** as a comprehensive legal concept;

(b) Leads to **increased establishment of national registries**;

(c) Contributes to the **development of national procedures and mechanisms** for the maintenance of national registries and, consequently, the provision of information to the United Nations Register;

(d) Results in **standardized procedures, both national and internationally**, for registering space objects with the United Nations Register;

(e) Leads to **uniformity with regard to the information** to be furnished and recorded in the United Nations Register concerning each space object listed in the national registries;

(f) **Enables the receipt** and recording in the United Nations Register **of** **additional information** concerning space objects on the national registries and/or information on objects that are no longer in Earth orbit.

The report also summarized positions the LSC has taken concerning launching states, national legislation, and registration practices:

III. Work done by the Legal Subcommittee related to the operation of space activities -

**A. Launching State**

54. The following is a list of elements that, depending on the space activities in the country concerned, could be included in national legislation and licensing regimes for space activities:

(f) **Entities carrying out activities in outer space may be required to provide the Government with information on the space activities, including appropriate updates**. For certain space activities, provisions could be included for the inspection and monitoring of space activities by designated government officials, including requirements to permit appropriate access to facilities and technical information;

(n) **Establishment of a national registry of objects launched into outer space, in accordance with provisions of the Registration Convention**, including identification of the government authority responsible for maintaining the registry;

(o) Establishment of mechanisms for **coordinating registration of space objects with other launching States**, under article II, paragraph 2, of the Registration Convention;

(p) Provisions for **providing information to the United Nations** under article IV of the Registration Convention;

The structure of international space law relies on sovereign states adopting national space legislation that regulates the space activities of their nationals. The following section does not mention registration per se, but its policy directives would apply to any national legislation concerning registration:

**B. National space legislation**

55. A prominent reason to enact national space legislation is **the** **need to provide a practical regulatory system for private sector involvement**. Moreover, common reasons are the need to **fulfil obligations under treaties** to which a State has become a party and the **need to achieve consistency and predictabilit**y in the conduct of space activities under the jurisdiction of that State.

56. The Working Group on National Legislation Relevant to the Peaceful Exploration and Use of Outer Space agreed that the following **elements**, as reflected in the annex to the report of the Working Group (A/AC.105/C.2/101), could be considered by States when enacting regulatory frameworks for national space activities, as appropriate, taking into account the specific needs of the State concerned:

*Scope of application*

(a) **The scope of space activities targeted by national regulatory frameworks** may include, as appropriate, the launching of objects into and their return from outer space, the operation of a launch or re-entry site and the operation and control of space objects in orbit. Other issues to be considered may include the design and manufacturing of spacecraft, the application of space science and technology, and exploration activities and research;

(b) **The** **scope of application** should take into account the role of a State as a launching State and as a State responsible under the United Nations treaties on outer space and **should** **determine national jurisdiction** over space activities carried out from the national territory of a State and space activities carried out elsewhere in which its nationals, whether natural or juridical persons, are involved, provided, however, that if another State is exercising jurisdiction with respect to such activities, the State should consider forbearing from duplicative requirements and avoid unnecessary burdens for operators of space objects;

*Authorization and licensing*

(c) **Space activities should require authorization by a competent national authority**. States might employ separate procedures for the licensing of operators conducting space activities and for the authorization of specific projects and programmes;

(d) **The conditions for authorization should be consistent with the international obligations and commitments of States, in particular under the United Nations treaties on outer space** and other relevant instruments;

(e) The authorities and procedures, as well as the conditions, for granting, modifying, suspending and revoking the authorization should be set out clearly to **establish a predictable and reliable regulatory framework;**

*Safety*

(f) The conditions for authorization should help to verify that **space activities are carried out in a safe manner** and minimize risks to persons, the environment or property and that those activities **do not lead to harmful interference** with other space activities. Such conditions could also relate to the technological qualifications of the applicant;

(g) The conditions for authorization could include safety and technical standards that are in line with space debris mitigation guidelines, in particular the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space.

**C. Registration practice**

57. The Committee on the Peaceful Uses of Outer Space also agreed on the following elements relating to registration practice:

*Registration*

(a) A **national registry** of objects launched into outer space **should be** **maintained by an appropriate national authority**. Operators should be requested to submit information to that authority to enable the State to submit the relevant information to the Secretary-General in accordance with international instruments, including the Convention on Registration of Objects Launched into Outer Space and General Assembly resolutions 1721 B (XVI) and 62/101;

(b) Operators of space objects could also be requested to submit information on any **change in the main characteristics** of space objects, **in particular** of those space **objects which have become non-functional;**

***Transfer of ownership or control*** *of space objects in orbit*

(d) **Continuing supervision of non-governmental space activities should be ensured in the event of a transfer of ownership or control** of a space object in orbit. National regulations may provide for authorization requirements or obligations for the submission of **information on the change in status of the operation of a space object.**

1. UNISPACE+50 Thematic Priority 3: “Enhanced information exchange on space objects and events”

The corresponding Note by the Secretariat (Secretariat of COPUOS, 2018c) is the first document to specifically include activities on the Moon’s surface (“lunar exploration and habitation”) in the scope of registration and sharing information.

2. The UNISPACE+50 thematic priority three, entitled “Enhanced information exchange on space objects and events”, has the following **objectives:** **define and develop requirements for enhanced information exchange and notification procedures** under the United Nations Register of Objects Launched into Outer Space, taking into account the recommendations contained in the report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities (A/68/189) and the future guidelines for the long-term sustainability of outer space activities specifically addressing risk-reduction notification needs**; identify cooperation mechanisms to support this objective; and encourage capacity-building and outreach activities on transparency and confidence-building measures.**

27. The **types of information** disseminated by the Secretary-General include **space object registration data; recovery and return of astronauts and space objects; notifications relating to the launch and re-entry of nuclear-powered space objects; and notifications relating to lunar exploration and habitation, remote sensing, direct broadcasting and outer space activities (including the discovery of harmful phenomena).** A more comprehensive overview of the role of United Nations entities in supporting Member States in the implementation of transparency and confidence-building measures in outer space activities can be found in document A/AC.105/1116.

29. [**Risk-Reduction Notifications**] The Secretary-General’s obligations under international space law already include the requirement for the immediate and effective dissemination of information comparable to the risk reduction notifications recommended by the Group of Governmental Experts. Historically, States have used the existing treaty mechanisms to convey information on **controlled and uncontrolled re-entries of high-interest space objects, emergency situations related to nuclear power sources and intentional orbital break-ups.** Depending on the circumstances, such notifications have been processed on a priority basis and disseminated immediately.

48. However, **universal application** [of registration practices] **remains elusive**, and it is suggested that further consideration could be given to providing the following types and **formats of information**:

(a) **The Committee on Space Research international designator**, where appropriate;

(b) **Coordinated Universal Time,** as the time reference for the date of launch;

(c) **Kilometres, minutes and degrees**, as the standard units for basic orbital parameters;

(d) **Apogee and perigee altitude** (i.e., measured from the Earth’s surface);

(e) **Any useful information relating to the function of the space object in addition to the general function required by the Registration Convention.**

49. Some States are also voluntarily informing the Secretary-General **when space objects are decommissioned or when they are no longer operational**. However, States of registry could give further consideration to **furnishing additional information** to the Secretary-General in the following areas:

**(a) The geostationary orbit location, where appropriate;**

**(b) Any change of status of operations (inter alia, when a space object is no longer functional);**

**(c) The approximate date of decay or re-entry, if States are capable of verifying that information;**

**(d) The date and physical conditions of moving a space object to a disposal orbit;**

**(e) Web links to official information on space objects.**

51. Given the growing number of space missions that involve multiple launching States, consideration could be given to providing pre-launch notifications to establish, in advance, **which launching State is the State of registry.**

54. With the possibility of significant space operations involving **multiple space objects** being conducted **in, around or on other celestial bodies**, consideration could be given to ensuring that information on the space objects and their status is communicated to the Secretary-General. As most plans in development include the **deployment of space objects from a central “station/hub”** orbiting the particular celestial body, information on the deployment of such objects could also be provided to the Secretary-General.

59. However, present and anticipated future space activities have demonstrated that the **enhancement of existing criteriafor designating space objects may be beneficial at this time.** In particular, present space activities have for the most part been conducted in near-Earth space. As noted in section II above, it is expected that **a significant amount of space activities will occur around other celestial bodies in the near future.**

72. To **further enhance services** provided and ensure their efficient delivery, the Office aims to implement the following measures:

(a) **Develop a space object registration and treaty implementation module to be used in carrying out its capacity-building activities**;

(b) **Expand the technical advisory services** currently provided to States and inter-governmental organizations on registration and other treaty implementation matters;

(c) **Carry out outreach and advocacy activities** on the space treaties, for countries new to space activities or soon to be involved in space activities, and **provide technical assistance for national legislation**;

(d) Develop the Office’s engagement with the small-satellite community on registration and related matters through its programmes and initiatives, to assist future small-satellite projects and make project operators aware of legal issues relating to the operation of space objects;

(e) Expand the document entitled “Guidance on space object registration and frequency management for small and very small satellites”.

1. The Hague Building Blocks (2019)

The Hague International Space Resources Governance Working Group is composed of “stakeholders of space resource activities and represent consortium partners, industry, States, international organizations, academia and NGOs.”. Several articles of their Building Blocks (Hague International Space Resources Governance Working Group, 2019) address the topic of registration and sharing information.

5. **International responsibility for space resource activities**

The international framework should provide that:

a) **States shall bear international responsibility for national space resource activities, whether such activities are carried out by governmental agencies or non-governmental entities, and for ensuring that such activities are carried out in conformity with the international framework;**

b) Non-governmental space resource activities shall require prior authorization and continuing supervision by the appropriate State;

c) When space resource activities are carried out by an international organization, responsibility for compliance with the international framework shall be borne by the international organization and by the States participating in such organization.

This is the same foundational language as the OST, linking private activity to the space treaties through their national governments.

7. Priority Rights

The international framework should enable the **attribution of priority rights** to an operator to search for and/or recover space resources for a maximum period of time and a maximum area **upon registration in an international registry**, and provide for the international recognition of such priority rights. The attribution, duration, and the area of the priority right should be determined on the basis of the specific circumstances of a proposed space resource activity.

Registration is required for any rights, recognition, and legal protections. Some entity or process is envisioned for determining the physical and temporal extent of such rights.

13. Sharing of benefits arising out of the utilization of space resources

13.1 Bearing in mind that the **exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and humankind**, the international framework should provide that States and intergovernmental organizations authorizing space resource activities shall provide for **benefit-sharing through the promotion of the participation in space resource activities by all countries**, in particular developing countries. **Benefits** **may include**, but not be limited to enabling, facilitating, promoting and fostering: . . .

c) Cooperation and contribution in education and training;

d) **Access to and exchange of information**

The Building Blocks thus support the policy of sharing the benefits of space exploration and development by sharing information.

14. Registration and sharing of information

The international framework should provide that States and intergovernmental organizations shall:

**a) Register priority rights of an operator to search and/or recover space resources** in accordance with the international framework;

**b) Give advance notification of space resource activities, including any area-based safety measure associated with them**, for which they are responsible through an international database;

c) Register space objects in accordance with the REG,6 United Nations General Assembly Resolution 1721 B (XVI),7 or Article XI OST, taking into account United Nations General Assembly Resolution 62/101;8

d) Notify frequency assignments for recording in the Master International Frequency Register in accordance with the Radio Regulations of the International Telecommunication Union;

e) **Provide**, taking into account Article XI OST and the legitimate interests of operators, **information and best practices on the prior authorization and continuing supervision of space resource activities** for which they are responsible through an international database, including:

**i. The purposes, locations, orbital parameters and duration of space resource activities;**

**ii. The nature, conduct, and locations of space resource activities and associated logistic activities, for example deployment of stations, installations, equipment and vehicles;**

**iii. The results of space resource activities;**

**iv. Any phenomena discovered in outer space which could endanger human life or health, as well as of any indication of life;**

**v. Any harmful impacts resulting from space resource activities authorized by them and the measures planned or implemented to redress such impacts;**

f) Notify the **termination** of space resource activities authorized by them through an international repository together with a statement on the condition of the area where the space resource activity was carried out, including the presence of any space objects or space products, or parts thereof.

This list is very specific and similar to the UN treaty requirements. It even includes the reporting of “the results of space resource activities”. **If that includes the discovery of resources, then the Hague Building Blocks are in full compliance with all five UN-sponsored space treaties concerning the sharing of information** (see Table 1).

17. Visits relating to space resource activity

The international framework**should provide for the applicability of Article XII OST** [open visits], taking into account the legitimate interests of operators.

Although this statement requires some cross-referencing, it appears that the Hague Group’s Building Blocks accept the mandate to be open for visits by other States Parties. Although such visits are not part of registration, they are essential for a comprehensive framework of sharing information.

17. Institutional arrangements

The international framework should provide for:

a) **The establishment and maintenance of a publicly available international registry for registering priority rights** of an operator to search and recover space resources *in situ*;

b) The establishment and maintenance of **an international repository, in addition to the international registry**, for making publicly available:

**i. Information and best practices;**

**ii. The list of designated and internationally endorsed outer space natural and cultural heritage sites; and**

**iii. The list of designated and internationally endorsed sites of scientific interest;**

c) The **designation or establishment of an international body or bodies** responsible for:

i. The **identification of best practices**;

ii. The listing of **designated and internationally endorsed outer space natural and cultural heritage sites, and sites of scientific interest**;

iii. The **monitoring and review of the implementation of the international framework as well as its modification or amendment**; and

iv. The **governance of the international registry, the international repository and any other mechanism that may be established for the implementation of the international framework.**

The Building Blocks are the most comprehensive proposal to date for what information should be registered and/or shared, including priority rights, best practices, and heritage sites. It also proposes an international body (new or designated) that would collect, hold, and share such information.

1. Proposed Implementation Agreement for the Moon Treaty

The Moon Treaty (United Nations, 1978) is, by its own terms, incomplete

Article 11.5. 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 provision shall be implemented in accordance with [Article 18](http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/moon-agreement.html#a18) of this Agreement.

The proposal for an Article 11 implementation agreement (O'Brien, 2019) by The Space Treaty Project, a California nonprofit dedicated to peace and sustainability in the exploration and use of outer space, includes the following articles regarding registration and sharing information:

**2.3. Requirements for License**

The Agency shall issue a license [for priority exploitation of resources] upon the proper application by any NGE that is authorized and supervised by a State Party to this agreement. **The States Parties agree to require that their nationals (a) accept the public policy obligations of the Treaty** as mandated by Treaty Article 14, and (b) share technology as described in Paragraph 5 of this Agreement. The license shall be revoked if, at any time, a licensed NGE fails to comply with its obligations.

**4. Public Policy Obligations**

The States Parties agree that the public policy obligations of the Treaty include the following:

1. Using outer space exclusively for peaceful purposes (Article 3.1);

2. Providing co-operation and mutual assistance (4.2);

**3. Informing the public of activities, any scientific discoveries, any phenomena which could endanger human life or health, or any indication of organic life (5.1-5.3), along with full compliance with the Registration Convention;**

4. Protecting the environment and preserving areas of “special scientific interest” such as historic landing sites (7.1-7.3);

**5. Allowing free access to all areas by other parties (9.2);**

6. Honoring the Rescue Treaty (10.1)

**7. Informing the public of the discovery of resources (11.6).**

Table 2: Ratification status of registration related United Nations treaties among lunar mission actors as of January 2019. (S) Signature (R) Ratification (LSC of COPUOS, 2019a)

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1967  OST | 1975  REG | 1979  MOON |
| China | R | R |  |
| India | R | R | S |
| Israel | R |  |  |
| Japan | R | R |  |
| USA | R | R |  |
| Russian Federation | R | R |  |
| ESA \*\*by member | *R* | *82%*  *(83%)R* | *14%(13%)R*  *9%(8%)S* |
| -Austria | R | R | R |
| -Belgium | R | R | R |
| -Czech Republic | R | R |  |
| -Denmark | R | R |  |
| -Estonia | R |  |  |
| -Finland | R | R |  |
| -France | R | R | S |
| -Germany | R | R |  |
| -Greece | R | R |  |
| -Hungary | R | R |  |
| -Ireland | R |  |  |
| -Italy | R | R |  |
| -Luxembourg | R |  |  |
| -the Netherlands | R | R | R |
| -Norway | R | R |  |
| -Poland | R | R |  |
| -Portugal | R | R |  |
| -Romania | R |  | S |
| -Spain | R | R |  |
| -Sweden | R | R |  |
| -Switzerland | R | R |  |
| -United Kingdom | R | R |  |
| (Canada) | R | R |  |
| (Slovenia) | R | R |  |