
REGISTRATION OF OBJECTS LAUNCHED INTO OUTER SPACE

STAKEHOLDER STUDY

November 2023



UNITED NATIONS



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Cover: Ocean clouds seen from space.

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Foreword

The registration of space objects has been a key, treaty-based obligation to promote transparency since the dawn of the space age. It helps us answer the basic question of 'who owns what in space?'. In this regard, UNOOSA has a specialised mandate to maintain the UN Register of Objects Launched into Outer Space, which we maintain on behalf of the United Nations Secretary-General.

Since the beginning of the space age, almost 17,000 satellites have been launched, and 15,550 of them have been registered with the UN. The UN Office for Outer Space Affairs received over 2,050 satellite registrations in 2022, and 2,250 in 2023 so far. With 35 per cent of all satellites launched over the past three years, and the potential of 100,000 satellites being launched over the next decade, this rapid pace of growth demonstrates the need for a better understanding of existing national registration practices so that we can properly assess how to effectively manage this process going forward.

As we look ahead, registration must keep pace with current and future space activities, such as in-orbit servicing, transfer of ownership, space mining beyond Earth's orbit, mega constellations, and active debris removal. With the outlook of tens of thousands of new satellites reaching orbit this decade, now is the time to bring the international community together to understand national approaches to registration and support new and emerging space-faring nations to use space safely and sustainably.

This stakeholder study, the ongoing process to digitise and make fit for purpose the Register of Objects Launched into Outer Space in 2024, and the 50th anniversary of the Registration Convention entering into force in 2026, will allow UNOOSA and the international community to build momentum around enhanced registration practices in the coming years.

I would like to extend my thanks to the United Kingdom for funding this study, which will enhance international expertise in registration, regulation, and the sustainable use of outer space.

Aarti Holla-Maini
Director, United Nations Office for Outer Space Affairs

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Executive Summary

The United Nations Office for Outer Space Affairs (UNOOSA), with the generous support from the United Kingdom, launched a new initiative in December 2022, entitled: *The Registration Project: Supporting Implementation of Treaty Obligations related to the Registration of Objects Launched into Outer Space*. Phase one of the *Registration Project* ran from January to October 2023, and focused on three main deliverables:

- 1) Interviews with Member States of the United Nations, and States Parties to the Registration Convention, on their approaches to implementing their international commitments related to the registration of objects launched into outer space.
- 2) An Expert Event on the Registration of Objects Launched into Outer Space, which took place in Vienna on 29-30 May 2023.
- 3) An anonymized stakeholder study.

The study examines the national approaches taken to implement the registration-related provisions of the United Nations Treaties, Principles, Guidelines, and applicable resolutions. In doing so, *the Registration Project* aims to create a baseline understanding of national approaches to registration, empower new, emerging or established space-faring nations to register satellites with the UN, enhance international expertise, and share knowledge, good practices and lessons learned from national approaches. This study can inform future capacity-building activities or topics to be discussed within expert meetings of National Focal Points on Registration.

This study illustrates how Member States use two mechanisms to register space objects with the Secretary-General of the United Nations: The 1976 *Convention on Registration of Objects Launched into Outer Space* and *General Assembly resolution 1721 B (XVI)*. For States Parties to the Convention, the registration of space objects is a mandatory treaty obligation, while registration under resolution 1721 B (XVI) is a voluntary requirement, which is available to all Member States of the United Nations. Additionally, the Convention is a mechanism that allows international intergovernmental organizations to submit registration information. In 2019, COPUOS affirmed that “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.”

The following study highlights the increasingly complex nature of present and future space activities, meaning States take varying approaches to determining of a ‘State of registry’. It highlights the coordination channels within and among actors, such as the United Nations, States, Launch Service Providers and industry, and academia, as well as the interlinkages between licensing, authorization, and registration process. As a result of the engagement with Permanent Missions to the UN, the interview series and expert event, UNOOSA has received registrations pertaining to legacy space objects and approximately 50 new or updated National Focal Points of Registration.

Methodology

The study was based on information gathered from written responses to a questionnaire circulated to all Permanent Missions of the United Nations in Vienna, and from interviews held with national competent authorities responsible for the governance of space activities and/or space object registration.

The study was also supplemented by UNOOSA with information obtained from the 2023 *Expert Event of National Focal Points on Registration*, and from the United Nations Registers of Objects Launched into Outer Space. The supplementary information addresses the practices of participants when establishing national legislation, registering space objects and their re-entry, and the various means used to submit registration information to the United Nations. Given the relevance of licensing and authorization processes, and the links to registration practices at the national and international levels, the focus of the study was broadened during the project's conceptualisation.

All Member States of the United Nations, and relevant international and regional organisations were invited to participate, to ensure that new, emerging, and established space-faring nations would be able to contribute to the study. To achieve as broad a geographical diversity as possible, interpretation services were offered in all six official languages of the United Nations (Arabic, Chinese, English, French, Russian and Spanish).

Respondents to the questionnaires and participants in the interviews represented their respective national space agencies, relevant ministries, and governmental departments (representation Science, Communications, Defence, Environment, Technology, Energy, Transport, Foreign Affairs), or aviation authorities.

A total of 46 Member States and one international intergovernmental entity responded to the questionnaires and/or participated in the interviews. Collectively, UNOOSA interviewed over 75 registration focal points, representatives and experts involved in the registration process. Representatives from all geographic regions were interviewed.

The questionnaire, interviews and expert event focused on the following eight areas of interest:

AREA OF INTEREST	RATIONALE
Baseline Information	<ul style="list-style-type: none">to determine the status of ratification to the Registration Convention or whether Member States submitted information under General Assembly resolution 1721 B (XVI);to determine the lead entity, department, or Ministry overseeing the registration of space objects at the national level.
National Legislation and Application of International Space Law	<ul style="list-style-type: none">to determine relevant national legislation, regulations and/or strategies in place or under development

	<ul style="list-style-type: none"> to determine States' approaches to the definitions of 'launching State', 'space object', and 'State of registry' therein.
National and Supplementary Registries of Objects Launched into Outer Space	<ul style="list-style-type: none"> to determine how and why a National Registry has been established, and how a Member State coordinates registration practices across government entities, as well as with non-governmental entities, such as the private sector, industry, and academia.
National Licensing and Authorization: Requirements, Mechanisms, and Eligibility Conditions	<ul style="list-style-type: none"> to examine whether Member States apply specific conditions to be met to determine the eligibility for, and authorization of, space activities and launch licenses. to identify the linkages between licensing, authorization, and registration.
Joint Launches and International Cooperation	<ul style="list-style-type: none"> to examine current practices on how registration obligations have been implemented when conducting international activities.
Submission of Information to the UN Register of Objects Launched into Outer Space	<ul style="list-style-type: none"> to identify when and what information is provided to the Secretary-General once a space object has been launched.
Emerging Trends and Future Areas for Consideration	<ul style="list-style-type: none"> to understand how Member States perceive the relationship between registration and new and novel space activities in the coming decades.
Capacity-Building	<ul style="list-style-type: none"> to establish a benchmark of helpful tools and initiatives to reinforce the Registration Convention and registration practices.

Cognizant of the role of, and work of member States in, the Committee on the Peaceful Uses of Outer Space (COPUOS), the study does not represent an attempt by UNOOSA to stipulate how Member States of the United Nations or States Parties to the Registration Convention should, or should not, approach registration of an object launched into outer space. The information gathered from the questionnaires and interviews have contributed to the development of this anonymized stakeholder study as a tool to illustrate approaches, practices, possible solutions and challenges based upon respective national experiences.

Participants of the Stakeholder Study and Acknowledgements

The United Nations Office for Outer Space Affairs (UNOOSA) would like to express appreciation to the following 47 Member States and international intergovernmental organizations who gave their time, completing interviews and questionnaires for this stakeholder study report.

States members of the Committee on the Peaceful Uses of Outer Space (COPUOS)

- | | |
|--------------------|--|
| 1. Algeria | 23. Malaysia* |
| 2. Argentina | 24. Mexico |
| 3. Armenia | 25. Morocco |
| 4. Australia | 26. Netherlands (Kingdom of the) |
| 5. Austria | 27. New Zealand |
| 6. Bahrain | 28. Nigeria |
| 7. Belgium | 29. Peru |
| 8. Brazil | 30. Philippines* |
| 9. Canada | 31. Portugal |
| 10. Chile | 32. Republic of Korea |
| 11. Côte d'Ivoire* | 33. Rwanda* |
| 12. Denmark | 34. Senegal* |
| 13. Finland | 35. Slovakia |
| 14. France | 36. Sweden |
| 15. Germany | 37. Thailand* |
| 16. Greece | 38. Türkiye |
| 17. India | 39. United Arab Emirates |
| 18. Indonesia | 40. United Kingdom of Great Britain and Northern Ireland |
| 19. Italy | 41. United States of America |
| 20. Japan | 42. Uruguay |
| 21. Kenya* | |
| 22. Luxembourg | |

Non-State members of the Committee on the Peaceful Uses of Outer Space (COPUOS)

1. Djibouti
2. Estonia*
3. Monaco*
4. Tanzania*

International Intergovernmental organizations

1. European Space Agency (ESA)

* Member States of the United Nations that are not States Party to the Registration Convention

Of the participants, the following States have previously submitted information, on the launch of a space object to the United Nations under the auspices of the Registration Convention: Algeria, Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Denmark, Finland, France, Germany, Greece, India, Indonesia, Italy, Japan, Luxembourg, Mexico, Morocco, Netherlands (Kingdom of the), New Zealand, Nigeria, Peru, Republic of Korea, Slovakia, Sweden, Türkiye, United Arab Emirates, United Kingdom, United States, Uruguay and ESA.

Kenya, Malaysia, Monaco, Philippines, and Thailand's latest registration submissions were made under resolution 1721 B (XVI).

Bahrain, Côte d'Ivoire, Djibouti, Senegal, and Tanzania had not launched any objects into Earth orbit or beyond at the time of the study.

National Focal Points for Space Object Registration

In accordance with General Assembly resolution 62/101 of 17 December 2007 entitled "Recommendations on enhancing the practice of States and international intergovernmental organizations in registering space objects", States conducting space activities and international intergovernmental organizations that have declared their acceptance of the rights and obligations under the Registration Convention should, when they have designated focal points for their appropriate registries, provide UNOOSA with the contact details of those focal points. National Focal Points have been nominated by Member States' space agencies and ministries.

In paragraph 5(b) of resolution 62/101, UNOOSA is requested to make those contact details public through its website¹. UNOOSA would like to thank the following States, who have provided information on their national space object registration focal points:

- | | | |
|-------------------------|---------------------|------------------------|
| 1. Argentina | 20. Greece | 38. Republic of Korea |
| 2. Armenia | 21. Italy | 39. Russian Federation |
| 3. Australia | 22. Japan, | 40. Senegal |
| 4. Bahrain | 23. Kenya | 41. Singapore |
| 5. Belarus | 24. Kuwait | 42. Slovakia |
| 6. Belgium | 25. Lao People's | 43. Slovenia |
| 7. Brazil | Democratic | 44. Spain |
| 8. Cambodia | Republic | 45. Sweden |
| 9. Canada | 26. Lebanon | 46. Sudan |
| 10. Chad | 27. Luxembourg | 47. Tanzania |
| 11. Chile | 28. Madagascar | 48. Thailand |
| 12. China (the People's | 29. Malaysia | 49. Türkiye |
| Republic of) | 30. Monaco, | 50. Uganda |
| 13. Congo | 31. Myanmar | 51. Ukraine |
| 14. Colombia | 32. Netherlands | 52. United Arab |
| 15. Cote D'Ivoire | (Kingdom of the) | Emirates |
| 16. Democratic | 33. New Zealand | 53. United Kingdom of |
| People's Republic | 34. Pakistan | Great Britain and |
| of Korea | 35. The Philippines | Northern Ireland |
| 17. Djibouti | 36. Portugal | 54. Uruguay |
| 18. Finland | 37. Qatar | 55. Zimbabwe |
| 19. Germany | | |

¹ Registration of Space Objects: Focal Points of States and International Intergovernmental Organizations, <https://www.unoosa.org/oosa/en/spaceobjectregister/national-focal-points/index.html>

Summary of Observations and Findings

National Legislation and Application of International Space Law

Participants acknowledged that ratifying the Convention and having national legislation in place often created a common playing field among Member States, created a predictable regulatory environment for investors, and promoted the growth of private sector activities.

Most participants indicated that they have developed, or are developing, national space legislation, relating to the licencing, authorization, and registration of space objects. Some Member States were in the process of updating or revising their national space legislation to accommodate changes within their national space sector, e.g., due to the increased role of the private sector or academia and a shift away from space activities being conducted solely by the government.

Some participants' registration practices called for a strict interpretation of the definitions of 'launching State', 'space object', and 'State of registry', other participants were flexible in using the definitions within the outer space treaties.

Article VI of the Outer Space Treaty requires that "the activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty" and the term 'launching State' as defined in Article I of the Convention means: "(i) A State which launches or procures the launching of a space object; (ii) A State from whose territory or facility a space object is launched."

Interviewees from *only* Spanish speaking nations noted inconsistencies in the translation of the definitions of 'launching State', for example: "(i) *Un Estado que lance o promueva el lanzamiento de un objeto espacial.*" The word 'procure' was translated to 'promueva', meaning 'to promote'.

Some States are not Party to either the Outer Space Treaty or the Registration Convention. In this context, those States noted that they are not bound by obligations under either treaty. Some States are willing to voluntarily accept the obligations even when they are non-Party while others are not. The absence of national legislation does not prevent Member States from registering their satellites with the United Nations through General Assembly 1721 B (XVI) on *International Co-operation in the Peaceful Uses of Outer Space*.

National Licensing and Authorization: Requirements, Mechanisms, and Eligibility Conditions

Member States with space laws, policies, and regulations have the approval process, and eligibility conditions for licensing and authorization stipulated in their legislation.

In many cases, licensing and authorization is dealt with first by space agencies, and/or leading government departments and then Ministers. Several States have established independent regulators, such as an Aviation Authority, to independently oversee and regulate licensing and authorization. This allows for impartiality.

Views on eligibility criteria, for issuing a license, varied. The most common eligibility criteria

mentioned by the participants were the long-term sustainability and space debris mitigation, environmental impact, insurance, finance, and risk management. Other criteria included the provision by the operator of proof of ITU frequency allocation, cybersecurity plans, strategic national value, or national benefit of the space activity. There was no uniform approach taken by Member States on whether these conditions should apply to both their governmental entities (defence, governmental, R&D, academia) and the private sector. Some Member States did, however, apply the same criteria.

Some participants described establishing a “one-stop shop” to authorizing space activities and registration. The “one-stop shop” approach was described as a single government department that coordinated ITU filings, licensing, authorization, as well as the national registration process. This allowed for the governmental department to have oversight of national space activities. Other States took a “multiple entity process” which involved coordinating across governmental departments, regulators, or aviation authorities, on licensing, authorization, ITU filings, and registration.

Member States expressed the importance of supervising their national space activities and of knowing “who’s who in the zoo” and some shared examples of how they had recently established an industry forum or consortium that had allowed to them to engage with, and have oversight of, their national space sector, and conduct regulatory training with their domestic space sector. Many Member States have not institutionalised their communication or coordination channels with their national space sector due to the comparatively small size of their space sector and the informal nature of the contacts.

A handful of participants noted that their governments took a proactive approach to publishing information on licensing applications and eligibility criteria, as well as the authorisation and registration processes. The rationale for this was to help national and international stakeholders, or potential new investors, to easily understand the regulatory landscape and enter their space economy.

National and Supplementary Registries of Objects Launched into Outer Space

Most participants (both States Parties and non-Parties to the Convention) have established national space object registries through formal legislation. As the contents of each registry and the conditions under which it is maintained is determined by the State of registry, States’ practices in the establishment, content and maintenance can vary. Most participants who are States Party to the Convention indicated that they had established a national space object registry pursuant to Article II of the Convention.

Presently, many participants are looking at revising the types of additional information contained in their registries and are taking steps to ensure their registries are publicly accessible, free-of-charge. Participants noted that their private sector entities were incentivised to register satellites due to the prestige, publicity, and the potential for further commercial opportunities that come from successful launches and adherence to regulation.

A handful of Member States were aware of the concept of ‘Supplementary’ or ‘Complementary’ registries. Supplementary registries were being considered or used by those States with operational spaceports, e.g., for the purpose of where they may not be the State of registry, but where they wish to keep track of objects launched from their territory. Some noted that they also had established supplementary registries for instances

where respective entities under their jurisdiction operate a space object, but they are not a launching State as defined in the Convention. In these cases, those States list the space object on the supplementary registry.

Joint Launches, Transfers of Ownership, and International Cooperation

Various practices have emerged in how States are determining 'State of registry' when there are two or more launching States. Many States consider themselves as 'State of registry' when they, or an entity under their jurisdiction, "have their hands on the joystick" or have effective control of a satellite. Some participants noted that the "authority over the one who has the joystick", rather than technical control of a satellite's manoeuvrability, was more important. For many interviewees, the following were important additional factors in a decision on who would become the State of registry:

1. Authorization and/or issuance of a licence or permit at the national level for the space activity, the launch vehicle, or the launch of the space object.
2. Ownership of the space object by a national entity and/or financing of the space object by a national entity.
3. Effective/operational control over the object by a national entity.
4. Ability to exercise continuing supervision over the entity operating the space object.

As per the Registration Convention, there was consensus among the interviewees that all States involved in a launch are automatically 'launching States'.

Member States with launch facilities or a spaceport have in extreme circumstances taken on the responsibility as State of registry but have done so unwillingly ("a registration of last resort") to prevent there being an "orphan satellite". The question of liability has led many States, and even launch service providers, to consider registration and seek a pre-determined State of registry before agreeing to launch on behalf of a foreign operator. Many new or emerging space-faring nations require capacity-building to understand the implications of one of their academic institutions launching from a foreign territory.

The need for effective coordination and communication among States was stressed and, in this regard, interviewees welcomed the network of Focal Points of States and International Intergovernmental Organizations², as recommended by General Assembly resolution 62/101. For many major space-faring nations with a history of launch there were longstanding interpersonal connections, and Memorandums of Understanding, that determine who the State of registry is. Many States acknowledged that there were ad-hoc approaches to registration.

Submission of the information to the UN Register of Objects Launched into Outer Space

The registration information submission form³ developed pursuant to resolution 62/101 on *Recommendations on Enhancing the Practice of States and International Intergovernmental*

² Registration of Space Objects: Focal Points of States and International Intergovernmental Organizations <https://www.unoosa.org/oosa/en/spaceobjectregister/national-focal-points/index.html>

³ Resources on space object registration - <https://www.unoosa.org/oosa/en/spaceobjectregister/resources/index.html>

Organizations in Registering Space Objects was widely used by participants as the basis of their own national registration forms. In a few cases, participants simply translated the UNOOSA template into their official languages.

In adopting this information submission form, participants found this helped smoothen the registration processes at the national level and then subsequently with the United Nations. These forms were also widely used to identify possible additional information that could be provided by a State of registry, such as geostationary position (when applicable), a space object's owner/operator, the contact details or website of the operator/owner, or date of decommissioning.

The timeframe for submitting registration information to the Secretary-General was heavily dependent on the participants' national mechanisms and other factors such as the number of objects launched annually. Participants recognised that the Convention states that information should be submitted "as soon as practicable". In practice, the interpretation of "as soon as practicable" can vary from days, weeks, months, or even years.

Emerging Trends and Future Areas for Consideration

The evolving nature of space activities, including by new actors entering the space sector or involving new and novel missions, was raised by interviewees. In this regard, the role of registration and providing notifications to UNOOSA under other formal information exchange mechanisms (such as Article XI of the Outer Space Treaty) were viewed as increasingly important. The interviews and the expert event raised the following activities that may have implications for the registration of objects launched into, serviced, or manufactured in Earth orbit or beyond: in-orbit transfer of ownership, active debris removal, spaceports, lunar and planetary surface operations, such as space research stations or resource mining operations on the Moon or Mars, the launch of large- or mega-constellation, satellite serial-licensing and mass production, in-orbit servicing, growth of launch providers, international space stations, space-based deployments, and space tourism.

Some participants noted their governments or private sectors intentions to develop a national spaceport within their territory. This required the establishment of national registers, a licensing and authorization process, launch service agreements, and effective communications channels with other States to determine a State of registry.

Regarding large- or mega-constellations of satellites, the main point raised during the interviews was whether these objects should be registered per batch launched or individually. Some participants noted recent agreements within the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space, in which UNOOSA was requested to consider options to ensure the efficient processing of registration information submissions on space objects forming part of a satellite constellation, as part of UNOOSA's ongoing process of developing an online registration portal.

When asked about the future novel missions or lunar activities, most of participants stated that they are not currently thinking about such missions. However, many noted the importance of considering registration or using Article XI of the Outer Space Treaty to update other States on these activities.

Capacity building

The interview series and the expert event on National Focal Points identified the need to strengthen capacity-building around five key areas: 1) increased national expertise on space law; 2) increased institutional understanding of the process for notifying the United Nations of objects launched into outer space; 3) enhanced engagement with, and communication among, the National Focal Point Network; and 4) promoting robust regulation and training at the national level with domestic space actors; and 5) increased synergies and collaboration between international organizations. Interviewees noted that the 50th Anniversary of the Registration Convention coming into force in 2026 and the ongoing process, by UNOOSA, to digitize the registration process for the UN Register of Objects Launched into Outer Space, provided opportunities to increase international momentum around enhancing registration practices.

Stakeholder Study

OBSERVATIONS



National Legislation and Application of International Space Law

Context

The first call for States to provide information on objects launched into outer space is contained in General Assembly resolution 1721B (XVI) adopted on 20 December 1961. In 1963, in its *Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space*,⁴ the General Assembly set out the principles by which States should be guided in the exploration and use of outer space. The Declaration formed the basis of the *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies* ("Outer Space Treaty"), which was adopted on 19 December 1966, and entered into force on 10 October 1967.

The principles set out in the Outer Space Treaty were then expanded upon through subsequent treaties, and with respect to registration, in the Convention on Registration of Objects Launched into Outer Space which was adopted on 12 November 1974 in resolution 3235 (XXIX) and entered into force on 15 September 1976.

Through the adoption of the Convention, the General Assembly made provision for the national registration by launching States of space objects launched into outer space and provided the means and procedures to assist States Parties in the identification of space objects. In addition to providing a mandatory system for registration, the Convention clarifies the meaning of 'launching State', 'space object' and 'State of registry' (Article I).

The Convention requires the launching State to maintain an appropriate registry, requests launching States to jointly determine which of them would register an object where there are two or more launching States (Article II) and sets out the information that States of registry should provide to the Secretary-General of the United Nations (Article IV).

In implementing their obligations under the Treaties, States Parties take different approaches at the national level. To better understand those approaches, UNOOSA gathered information on how States are regulating national space activities; how the concepts 'space object', 'launching State' and 'State of registry' are defined or understood; how States Parties authorize and continuously supervise the activities of non-governmental entities in outer space; and how States Parties maintain jurisdiction and control over the objects carried on their registries.

The following constitutes a summary of information collected through the study.

National legislation

Nearly two-thirds of the participants to the study indicated that their governments had enacted laws and regulations to govern the conduct of space activities at the national level and that such legislation addressed registration, licensing, and/or authorization of space objects. Several participants informed that they had provided copies of their national space laws and policies to UNOOSA. These national space laws are publicly available on

⁴ *Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space*, see: https://www.unoosa.org/pdf/gares/ARES_18_1962E.pdf

UNOOSA's ASTRO Portal.⁵

Several others indicated that they were in the process of developing such legislation, and in some instances that these were in advance state of preparation. Some participants indicated that the development of their national space laws and policies would also pave the way for their countries to join the United Nations Outer Space Treaties. Motivating factors to establish national legislation, included creating a robust and predictable regulatory environment to attract investors and grow their domestic space economy.

Some participants noted that their national laws consisted of a single piece of legislation while others indicated that separate laws and regulations existed for different types of space activities (such as communication or remote sensing). Some participants also indicated that specific legislation or executive decrees had been enacted to fulfil their obligations under the Convention, including the formal establishment of their national registries.

Definition of Launching State and State of registry

On the definition of a 'launching State', many participants noted that the definition in their national legislation closely corresponded to, or was consistent with, the definition in the Registration Convention, which states in Article II that a launching State is a "State which launches or procures the launching of a space object" and a "State from whose territory or facility a space object is launched". Some participants specifically cited the Convention for the definition while others cited the definitions used in Article VII of the Outer Space Treaty or Article I of the Liability Convention. Other participants informed that they did not specifically define launching State in their national laws, as they used the definitions within the Convention.

Due to the evolving nature of the space sector, some participants said that it had been necessary to expand the definition of launching State in their space law to include the space activities conducted by non-governmental entities. Some participants noted that 'launching State' as defined in their national legislation specifically included instances whereby their nationals (or corporations) launched from outside the national territory; foreign nationals launched from within their territory; and foreign nationals launched from foreign territory using their launch vehicle.

Some participants indicated that they did not have a definition for 'State of registry' or that such determinations were made on a case-by-case basis.

Another participant noted that while they bore international responsibility in accordance with article VI of the Outer Space Treaty for space objects operated by non-governmental entities if those entities were under their jurisdiction and control (as provided for under article VIII of the Outer Space Treaty), they did not assume 'State of registry' for the space objects operated by those entities as they were not a launching State.

⁵ Accessing Space Treaty Resources Online (ASTRO): <https://astro.unoosa.org/astro/national-space-law-landing-page.html>

Participants informed about factors that also play a role in their determination of the launching State and/or State of registry. These factors include ownership interest in a space object, the authorization and/or licencing of the launch and/or the operation of the space object, the involvement of citizens or national entities (public or private) in the space activities and operating or having use of the space object.

More information on how Member States are determining 'State of registry' when there are two or more launching States is available under section *Joint Launches, Transfers of Ownership, and International Cooperation*.

Definition of Space Object

Participants that defined a space object in their national space laws indicated that the term space object applied specifically to artificial or man-made objects, others included references to manned or unmanned where a few participants indicated that their legislation also included references to "natural" space objects.

While the legislation of most participants referred to objects launched into outer space (either Earth orbit or beyond), one national definition referred to both orbital and sub-orbital trajectories.

'Space object' includes component parts of a space object as well as its launch vehicle and parts thereof.

Article I (b) of the Convention

Some participants indicated that they did not have a definition for "space object" while others cited the definitions used in the United Nations treaties governing outer space activities.

National and Supplementary Registries of Objects Launched into Outer Space

The concept of a national space object registry to record information on a nation's space objects has been part of international law since the 1960s and was codified as a treaty requirement in Article II of the Convention.

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.

Article II (1) of the Convention

National Registries

Most participants whose States are Party to the Convention indicated that they had established a national space object registry pursuant to Article II of the Convention. Several participants indicated the establishment of their national registry was enacted through national legislation. While most were established as separate entities, one participant indicated that their space objects were registered in an annex to their national aircraft register. As the contents of each registry and the conditions under which it is maintained is determined by the State of registry, States' practices in the establishment, content and maintenance can vary.

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

Article II (3) of the Convention

Of the participants whose States were non-party to the Convention, some informed that they had formally established national registries while others had established ad hoc/informal registries for the purpose of submitting information to the Secretary-General. Several interviewees, with one or a small number of satellites, noted that they had an informal registry (for example a Microsoft Excel spreadsheet), while other participants indicated that they were in the process of establishing national registries.

Concerning accessibility, some participants indicated that their national registries were publicly available (sometimes online) while others indicated that access to the information would be made available only on request. Those who made their national registries publicly available, and free-of-charge, chose to do so for the purposes of transparency.

When requested to share good practices, challenges or lessons learned from establishing a national registry, one participant highlighted that to facilitate registration processes, they had taken the approach to be the initiator of a national-level dialogue with the operator prior to launch. This involved engaging with respective entities in advance so that after the launch of the space object the only requirement on the operator was to provide orbital data post-launch.

Some participants noted that their processes required non-governmental entities to provide information to the responsible governmental entity within 2 days, 30 days, or 60 days of launch. One participant responsible for registration indicated that they routinely

monitored open-source data, such as the media, to track all national launch activities (governmental and non-governmental).

Another participant noted that while their national legislation identified the responsible governmental entity for registration, it had no inspection or verification powers, nor was it responsible for the correctness of the information provided by the space object's operator. The participant did note, however, that it reserved the right to request clarification from the operator on information provided.

A few participants noted that challenges had arisen from the emergence of non-governmental space actors and that they were in the process of updating registration-related regulations and procedures. One of these participants indicated that they were proactively engaging with their non-governmental space sector seeking their experiences with the laws and regulations of other countries.

Other participants noted that the registration information submission form developed by the Office pursuant to resolution 62/101 had assisted in identifying information types that could be added to their national registries - in several cases, authorities chose to translate UNOOSA's information submission form into their official State languages, to ensure continuity between national and international registration practices. One participant noted that they were considering adding two-line elements to their national registry to facilitate tracking of their space objects while another participant indicated it had recently added a new category to their national template to accommodate information on a space object that would be deployed on another celestial body.

Another interviewee noted that they had developed two national registers. One for the purposes of their objects launched into outer space, and the other for the purposes of equipment being used for "space equipment used on the ground."

Many participants noted that the governmental entity responsible for space object registration coordinated with their respective foreign ministries to communicate their registration information to the Secretary-General. See more on this under the section *Submission of Information to the United Nations Register of Objects Launched into Outer Space*.

Supplementary registries

As national registries established pursuant to Article II of the Convention⁶ are meant to contain space objects that are subsequently registered with the Secretary-General, some States of registry have established separate registries for space objects for which they are not the State of registry but have some involvement as either a launching State or where the satellite has recently transferred ownership. These registries have been referred to as "Supplementary registries" or "Complementary Registers" by some States.

⁶ Notifications on the establishment of national registries in accordance with Article II of the Convention can be found on UNOOSA's website at:

<https://www.unoosa.org/oosa/en/spaceobjectregister/national-registries/index.html>

Supplementary registries were being considered or used by those States with operational spaceports, e.g., for the purpose of where they may not be the State of registry, but where they wish to keep track of objects launched from their territory. Some noted that they also had established supplementary registries for instances where respective entities under their jurisdiction operate a space object, but is not a launching State, it will list the space object on the Supplementary Registry.

Most participants indicated that they were not aware of the concept of supplementary registries. Several participants, including those that provide launch services to foreign clients, indicated that such registries were under consideration while a few other participants confirmed that they had established supplementary registries for satellites where they have issued a license, or have an interest, but where they were not the State of registry.

Another example of the need for a supplementary registry was to ensure that transfers of ownership could be effectively monitored. For example, 'country A' sells a satellite to a company in 'country B' but the satellite may still be operated by 'country A'. In this instance, 'country A' would add the satellite to its supplementary registry.

Some interviewees requested more information on what supplementary registry meant; but said they would consider the establishment of one as they move to develop a spaceport.

National Licensing and Authorization: Requirements, Mechanisms, and Eligibility Conditions

“Establishing a licensing and authorization regime had the positive net effect of ensuring that the satellite operators and procurers of launches proactively chose to seek authorization and register their satellites: the private sector wants the prestige and publicity of having their satellites registered.”

Anonymous interviewee

Under Article VI of the Outer Space Treaty, States “bear international responsibility” for space activities conducted by governmental agencies and non-governmental entities and States are required to authorize and continually supervise the activities of non-governmental entities in outer space.

National licencing and authorizing mechanisms have been highlighted/identified as the most effective way of fulfilling these obligations under international space law as they provide the necessary visibility of space activities under, their jurisdiction. While separate from the requirements of space object registration, these licencing and authorization mechanisms underpin the registration process at a national and international level.

Licensing and Authorization Processes

We recognise that robust licensing and permitting regulations are required for the safe and sustainable use of outer space.

Anonymous interviewee

Many interviewees highlighted the inter-linkages between the licensing and authorization process for procuring or launching a space object, and the subsequent registration of said object. Several noted that the issued-license forms are attached as an annex to national registration submissions.

For licensing/authorization, some participants reported having a very direct process, where the applicant would submit their request directly to the appropriate authority responsible for granting licenses/authorizations, which depending on their national approach to decide the authorizing body would be an independent space agency, a space office within a governmental entity, or a specific ministry whose portfolio included space activities.

Participants indicated that the final decision to grant a licence could be by a single Minister; a Cabinet Office; an independent aviation authority or regulatory agency; or a collective decision by an inter-agency group or cabinet of Ministers.

Several participants noted that applicants were able to obtain relevant forms, templates, and guidance on their respective websites for the sake of transparency, and to allow foreign or national entities to enter their space economy. Other participants indicated that their approved licences and permits were made publicly available online.

One State interviewed elaborated on its voluntary pre-license engagement procedure, based on a “traffic light system”. This is a free service, provided by the regulator on the regulator’s publicly available website, and consists of an initial set of standardized questions

that the applicant answers. Based on the answers, the regulator then forms an initial, non-binding, high-level assessment and provides technical feedback on the safety risks. This procedure encourages potential operators to approach the regulator at the earliest possible time to discuss their ambitions, and to troubleshoot any obstacles at the early stage.

Another mechanism presented during the interviews, as an approach that facilitated coordination of space activities at the national level, was the consolidation of the authorization & registration process under a single entity. The “one-stop shop” approach was noted as useful for those interested in securing the national licences to conduct space activities. Having a single point of entry made the processes easier for new space actors to navigate but also facilitated coordination at the national level. One participant noted that their department *also* dealt with ITU filings, which allowed for a comprehensive overview of international obligations.

Other participants mentioned having ‘multi-entity’ or ‘cross-governmental’ processes for coordinating and authorising license applications. For example, the license application would be received by a space agency, who would forward its advice to their respective ministry. The ministry would then process the application for others governmental entities (ministries, agencies, etc.) to decide if the license should be issued or not. This cross-governmental engagement also reflected the varied competencies and expertise required for satellite activities. For example, one national focal point noted the need to consult: their national regulator on a frequency allocation or ITU radio regulations; the respective government department involved in export controls; and the space agency, who would consider liability, insurance, end-of life protocols or space debris mitigation, and the Mission plan.

Eligibility Criteria for the Issuance of a License

Of those participants who reported having established eligibility criteria for issuing and authorizing licenses, several requirements were repeatedly raised:

LICENSING AND AUTHORIZATION CRITERIA	INTERVIEWEE'S COMMENTS
Finance	<ul style="list-style-type: none"> Most participants noted that the operator’s financial status was an important criterion. The demonstration of financial stability, provision of audited/certified accounts covering a specified period, guarantee of a credit institution, equity funds, source of finances, etc., were some requirements highlighted by participants.
Insurance	<ul style="list-style-type: none"> While some participants indicated that they required insurance for all space objects, other participants indicated insurance exemptions in the case of CubeSats, objects launched for “public interest”, or for educational purposes (universities). There are also requirements of insurance liability and compensation coverage against damage that might be caused by the space activities to a third party.

<p>Long-Term Sustainability and Space Debris Mitigation</p>	<ul style="list-style-type: none"> • A significant number of participants specifically highlighted long-term sustainability and space debris mitigation as important criteria for licencing/ authorization, with some referencing the COPUOS Space Debris Mitigation Guidelines (2007) and the Guidelines for the Long-Term Sustainability of Outer Space Activities (2019). One participant emphasised that a key focus of their licensing/authorizing mechanism was to create a safety culture within their space industry.
<p>Environmental Impact</p>	<ul style="list-style-type: none"> • Environmental impact was also specified as another important criterion, participants indicated that they required the operator to present some guarantees that the space activity would not cause environmental damage to the Earth and/or outer space. Some interviews noted that the 25 or five-year re-entry rule for de-orbiting created an unlevel playing field for different States. • One participant indicated that they require a specific license for the disposable stage of a launch vehicle to rest on the seabed. • Another participant noted that their recent space strategy was designed to be the greenest yet, and that their government was aspiring to take a Net Zero approach to space activities. This meant that criteria around end-of-life disposal was a key consideration. • Some participants noted that some adverse environmental impacts were not harmonized internationally and that the level of national space technology may determine/affect the acceptable level of environmental impact by each country. Some participants highlighted the importance of not establishing conditions that are too restrictive so as not to put the national industry at a disadvantage compared to its international competitors.
<p>Risk Analysis</p>	<ul style="list-style-type: none"> • Some participants require compliance with safety rules regarding satellite operation, risk to employees, people and third parties, and flight safety analysis. This criterion is closely related to insurance.
<p>Public Health and Safety</p>	<ul style="list-style-type: none"> • Participants indicated that space activities should be compatible with public safety standards and that the probability of the launch causing substantial harm to public health had to be satisfactorily assessed. Examples provided included evaluations of the survivability of fragments from a satellite re-entering the Earth's atmosphere; where applicable, trajectories and ablation of fragments from a space vehicle during re-entry; a list of the potential survivable objects and their characteristics upon ground impact; and the characteristics of fragments to compute corresponding casualty area, and prohibition against the use of certain materials (e.g., radioisotopes, hydrazine, lead-finishing).

Technical Information	<ul style="list-style-type: none"> • Technical information includes a description of the mission, the satellite, the ground station/ground segment, the end-users, the payload, and its performance, with some additional dedicated requirement for Earth observation applications (subject to a prior declaration to the administrative authority depending on the resolution of the Earth observation sensor, the location precision, the observation frequency band, and the quality of Earth observation data).
Other Criteria	<ul style="list-style-type: none"> • Provision by the operator of proof of ITU frequency allocation • Cybersecurity plans • Strategic national value • National benefit of the space activity (citing issues such as national security, intellectual property and sensitive information protection, economical downstream benefits in the private sector). • International obligations • Fit and Proper Persons

Criteria for governmental versus non-governmental space activities

Another participant noted that it was a challenge to establish an effective coordination platform between governmental and non-governmental entities. One participant noted that its government department oversees all matters related to licensing, authorization, ITU filings, and registration; this allowed for a holistic approach to the registration of national space activities.

Some participants indicated that while space objects of their non-governmental entities would require licensing/authorization, space objects with national defence or governmental purposes would be exempt from authorization requirements. Similarly, some participants noted that their licensing/authorization processes were the same for governmental and non-governmental space objects, others indicated they had different processes for governmental and private entities.

Several participants reported simplified processes to encourage space development in certain areas such as defence, innovation, research & development, and academia.

Criteria for National versus Foreign Entities

Some participants indicated that their licencing/authorization mechanisms gave them a clearer picture of their space objects for the purposes of registration. Several participants noted that identifying the State of registry of a space object was part of their licence assessment process, and that an agreed State of registry was a pre-requisite for a launch being authorized. Another participant stated that since their non-governmental entities required a permit to launch space objects regardless from which country the launch takes place, the licensing process was sufficient for coordination of the registration of those space objects.

One Member State noted that they had developed a system to consider permit applications from national and foreign applicants: "1) Complex Applications include criteria on risk, hazard, environmental considerations, and space debris mitigation; and 2) Less complex applications (which are the majority of licenses) are overseas payload permits. These need to meet the test for long-term sustainability."

Rationale for having no Legal Framework on Licensing

Some participants in the study indicated that they did not have any space activities or were in the process of drafting, revising, approving, or implementing national legislation and, as such, had no defined eligibility criteria for issuance of a license. A few participants indicated they did not consider the issue of licensing and/or authorization relevant for the topic of space object registration.

Of the participants with no eligibility criteria, a few indicated that they did not have established criteria because their only space activities were governmental in nature.

Although some countries do not have specific conditions for eligibility in their space laws or regulations, some participants reported they are free to determine conditions on a case-by-case basis, depending on the ownership of the space object, and the launch provider selected by the operator.

Joint Launches, Transfers of Ownership, and International Cooperation

Where there are two or more launching States in respect of any such space object, they shall jointly determine which one of them shall register the object...

Article II (2) of the Convention

Various practices and trends have emerged in how States are determining 'State of registry' when there are two or more launching States for a single space object. The study explored which factors play a role in their decision and what solutions are being implemented at the national level to accommodate the increase in non-governmental entities engaging in space activities and launching space objects.

Participants in the study were requested to describe their approach to joint launches, in determining the launching State(s) and State of registry, to share their experiences in the case of 'ride-shares', and how they were determining the 'launching State', when the private sector entity/operator carrying out launches from their territories were multinational.

Further information was requested on practices in registering space objects when there was a transfer of ownership, what procedures were being followed to notify changes in supervision, what communication and coordination channels Member States may have established among each other, and if and how the agreements on State of registry were being recorded.

National approaches in determining 'State of registry'

Several participants noted that their general approach, if their only connection to the space object was the territory from which it was being launched or the entity providing launch services, was to convince the requestor of the launch service to ensure that the object be entered in the registry of the entity's State. One country took the view that all States involved in a launch are to be considered the launching States of each payload, but the State of Registry is determined as the country that has operational control over the object.

If the operations are taking place from outside [our country], the general rule would be that we would not want to be the State of registry. We would want the State from which the operations are taking place, and in fact from where that State would have oversight of those operations, to be the State of registry.

Anonymous interviewee

Some participants noted that the primary constraint in a State assuming State of registry was that they were not party to the Registration Convention. In such instances, the practice taken by other States was to encourage voluntary registration by such States, through resolution 1721B (XVI) to ensure that space object did not remain unregistered or become an "orphan satellite". Some participants informed that some States could not assume State of registry despite the availability of the voluntary or soft law mechanism because there was no international obligation on them to do so.

Other participants noted that national laws would need to be adjusted to accommodate the increase in international cooperation in launching of space objects, especially when multiple entities and States were involved in a single enterprise.

Criteria used by States to determine State of registry

The common theme across all interviews was the need to coordinate and pre-agree who should on the responsibility of becoming State of registry ahead of launch.

[Before we revised our national legislation, the State of Registry would be the State] that had the hand on the joystick of the satellite, so the one in charge of manoeuvring it. [After the change in legislation] it was changed to be the 'Authority' over the entity with the hand on the joystick. Meaning there was a shift away from technical criteria to a legal criterion. This means that the captain of the satellite is the one with authority over the decision-making.

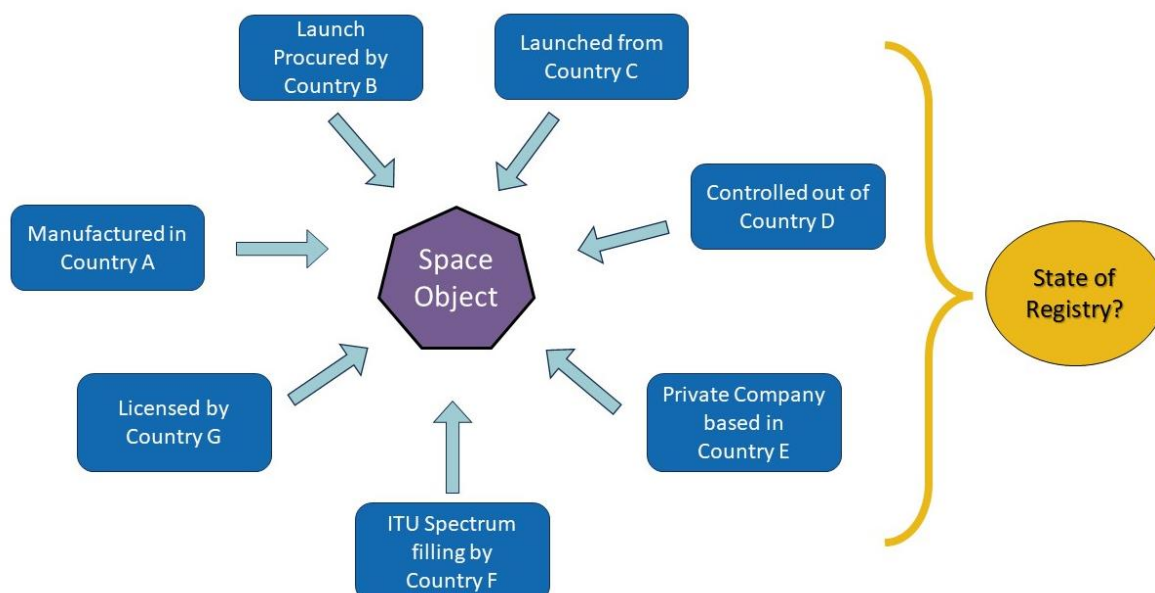
Anonymous interviewee

Several participants informed that being a launching State was not the only criteria used to determine the State of registry. For many interviewees, the following were important additional factors in a decision:

1. Authorization and/or issuance of a licence or permit at the national level for the space activity, the launch vehicle, or the launch of the space object.
2. Ownership of the space object by a national entity and/or financing of the space object by a national entity.
3. Effective/operational control over the object by a national entity.
4. Ability to exercise continuing supervision over the entity operating the space object.

Figure 1 below highlights the various influencing factors that have been considered by States in their determination of State of Registry.

Figure 1: 'Disentangling the State of Registry' - Source: National Focal Point Expert Meeting



Examples were provided on how the above-mentioned factors intersected with, or complemented, the criteria established in the definition of 'launching State' under the

Registration Convention. The deciding criteria or combinations differed extensively between participants.

In some instances, participants made it clear that irrespective of any of the additional criteria mentioned above, if they were not a launching State, they could not assume State of registry for a space object.

The term “State of registry” means a launching State on whose registry a space object is carried in accordance with article II.

Article I (b) of the Convention

Some participants explained that while the determining criteria was generally established based on ownership of the object by a national entity, that in instances where the operation of that object was taking place from outside of their national jurisdiction the Government would not ordinarily assume State of registry as being able to exercise continuing supervision of the entity that operated the object was equally important.

Overall, ownership and effective control of the space object by a national entity appeared to be one of the most common criteria for States in determining State of registry.

Multinational entities

There is an increasing number of new missions with multiple launching States, which makes it trickier to identify which of them should also be the State of registry.

Anonymous interviewee

Participants acknowledged that there were scenarios or instance where determining the State of registry became challenging, especially if ‘operational control’ lay with a multinational entity, at which point consideration would include not only determining which State had ‘operational control’ but also ‘legal control’.

Such complex arrangements were typically negotiated between the respective States. For example, some participants noted that their state’s space laws required multinational entities to seek authorization before they would be able to launch from their territory, and for some that included having clarity on State of registry prior to launch.

Some participants remarked that entities that had changed jurisdiction, who either owned or had operational control over a space object prior to the change of their domicile, also contributed to different approaches being applied when it came to determining the State of registry. In that regard, finding a compromise depended on whether being a launching State was a national prerequisite for entering a space object on their national registries.

Other participants noted that they had yet to be confronted with instances where multinational entities’ activities had resulted in their becoming a launching State, as the conduct of space activities in their countries were still fully governmental.

Coordination process: Determining the State of registry

Formal and informal coordination or consultation was deemed to be critical, with some participants confirming that such engagement would begin in the early stages of a cooperative mission or project with multiple partners being developed; normally several years in advance of when space objects would be launched. A few participants did not deem it necessary to coordinate with other launching States to determine the State of registry, as a State of registry was typically established based on ownership of the space object.

Internal and external coordination are key. Internal coordination among government agencies to ensure accurate data, a clear understanding of roles and responsibilities, and timely submissions.

External coordination to seek additional and pertinent information, foster a common understanding of registration practices and relevant factors with other countries, and mitigate the risk of duplicate submissions or omissions.

Anonymous interviewee

The role of Launch Service Providers (LSPs) was highlighted, with participants noting that they could streamline their coordination and consultations as LSPs sometimes required a State of registry to be determined prior to launch. In such cases, or if a State operated a spaceport, general State-to-State agreements would be established on which of the launching States would assume State of registry for the launch of those space objects. Such "overarching" or "blanket" arrangements, while reviewed periodically, were considered a useful mechanism to provide clarity on which State will enter the object on their national registry and have certainty the space object would not remain unregistered.

When asked about some of the challenges experienced in coordinating and determining State of registry, some participants noted that establishing contact ("finding the correct person") and agreeing on State of registry was more challenging when the other State had little or no prior knowledge of the space activity being undertaken (for example, by a private sector entity) or when the State was not a party to the Outer Space Treaties.

Another participant noted that assuming the State of registry would require confirmation, through an exchange of letters, at the level of the Ministry for Foreign Affairs.

On ridesharing, some participants noted that the practice was for the space object to be registered by the State whose entity procured the launch. One participant provided an example of a positive ride-share experience, which in this instance was a free flight opportunity for their payload. The example involved the simultaneous launch of several CubeSats. As part of the ride-share agreement, the agreed State of registry had also provided the launch service provider with a written confirmation of its commitment to register the space object.

Transfer of ownership

Some participants shared their experience in determining State of registry when the ownership of the space object had changed in orbit. In doing so, they confirmed that in their experience, an agreement had been reached to enter the space object in their national

registry and notify the United Nations of the State of registry following the conclusion of the transfer.

Some participants informed that if an object was transferred in orbit that the object would be removed from their national registry, as expected under their space law. However, one of those participants advised that the transfer required authorization and that the operator would be required to provide a guarantee that the space object that would be transferred would be registered after the transfer in the registry of the other State and duly notified to the United Nations.

[Our] operator provides the [our] Ministry with a letter from the future foreign operator stating that they will have the satellite registered by their State and that the transfer will be notified to Secretary-General of the United Nations.

Anonymous interviewee

Some participants noted that such agreements were essential, particularly if the 'receiving State' may not be a launching State per the definitions in the outer space treaties.

Some participants noted such authorizations, or acceptance of the transfer, would require the explicit agreement of their Minister. Another participant noted that procedurally they had followed the same process in case of a transfer of ownership as they usually did for registering other space objects. The participant said that while the process was the same it was important to retain a full historical registration record for such space objects.

For some States, the ownership of the space object was a lesser concern, and instead focus would be on which entity maintained effective control over the object or that its operations could be adequately supervised before they would consider assuming State of registry for an object transferred in orbit.

The ownership of the space object is not relevant under our national law. We don't really care about who is the owner, we only care about who has effective control over the object. It's important because sometimes you will have the transfer of ownership without the transfer of effective control.

Anonymous interviewee

Participants who indicated an increased interest from their private sector in space activities said that they consider the possibility of transferring an object in orbit when authorising such activities, and that in their view any licences issued would be transferrable.

There is an increase in space companies with ambitions to perform activities which involve, or even heavily rely, on a transfer of operations to succeed. Early engagement with the space sector, particularly before the point of application for a licence, is essential.

Anonymous interviewee

The Legal Aspects of On-Orbit Transfer of Ownership

Some participants explained the challenges that they perceived from transfers of ownerships in orbit. A common reflection on the question was that “the outer space treaties had not anticipated scenarios where a State could become State of registry without having been a launching State.”

Some participants noted that transfers of ownership would not result in their assumption of becoming the State of registry, because under their legislation they were required to be a ‘launching State’ per the definition in the Registration Convention. This meant that even if a national entity assumed ownership or operational control of the space object, the State of the entity transferring the object, and presumably the State of registry for that object, would remain the State of registry.

On challenges, one participant noted that they had been taken by surprise by a transfer in orbit and that the entities involved had not brought their intentions to the attention of the State of registry and that presently consultations were underway on the way forward.

Other participants noted the entities seeking to transfer of ownership of their space objects should seek prior approval of that action and be authorized or licenced at the national level in same way as authorization or licencing of a space activity or the launch of an object was necessary.

Submission of Information to the United Nations Register of Objects Launched into Outer Space

While the core registration information furnished to the Secretary-General has remained unchanged, reflecting the requirements of the Convention as well as national mechanisms; the increasing complexity of outer space activities has resulted in an expansion of additional information provided by States of registry on their space objects.

The interviews highlighted that existing and new space actors are actively examining what additional information should be included in their national registries, and what should subsequently be provided to the United Nations. Resolution 62/101 was cited by many participants as a basis for their identifying the types of additional information under consideration.

It was commonly understood by participants that the registration of space objects with the Secretary-General can only be performed by the government of a State of registry through accredited Permanent Missions to the United Nations, and by the headquarters of an international intergovernmental organization that has declared acceptance of rights and obligations under the Registration Convention.

Some Member States were aware that UNOOSA had received direct submissions by national space agencies, academic institutions, and private entities, which were not considered to be valid registration submissions. In these instances, UNOOSA clarifies that the information should be submitted through the respective States accredited Permanent Missions.

As part of the study, the Office took the opportunity to review the registration status of space objects with the participants to understand the reasons and challenges that they may be experiencing in registering space objects. The interviews and expert event also provided the opportunity for UNOOSA to clarify the submission process, namely:

1. Validation -
 - Ensuring the submission to UNOOSA is received through recognised official channels, (i.e., Permanent Missions to the United Nations or IGO Headquarters).
2. Verification -
 - Ensuring that the submission is submitted under the appropriate mechanism (Registration Convention or General Assembly resolution 1721 B (XVI)).
 - Ensuring that the submission does not conflict with Article II, para. 2 of the Convention.
 - Ensuring that the submission has no technical data issues.
3. Document Processing
 - Editing and translation of submission.
4. Dissemination
 - Submission is made publicly available.

Some participants noted that their internal registration process also considered their commitments as Subscribing States to the Hague Code of Conduct against Ballistic Missile

Proliferation, in which they exchange information related to pre-launch notifications of spaceflight vehicles.

Status of registration

Of 47 respondents to the questionnaires and participants to the interviews, 80% indicated that they had registered at least one space object with the Secretary-General. Of those that had registered, 87% of participants' most recent submissions were under the Convention while 13% of participants had decided to voluntarily register their space object under General Assembly resolution 1721 B (XVI).

During and following the interviews, several participants indicated that they were in the process of preparing information for submission on some - if not all - of their unregistered space objects.

Use of the Model Registration Form

In 2007, the General Assembly adopted resolution 62/101 entitled "Recommendations on enhancing the practice of States and international intergovernmental organizations in registering space objects". As requested in the resolution, UNOOSA has prepared a model registration form to assist States and organizations in registering space objects⁷.

The form is comprised of four separate parts and reflects information customarily provided by States and organizations when registering a space object as well additional information as recommended in resolution 62/101. The four parts, which can also be found under Annex III, are:

- Part A for information provided in conformity with the Registration Convention or General Assembly resolution 1721 B (XVI);
- Part B for additional information for use in the United Nations Register of Objects Launched into Outer Space, as recommended in General Assembly resolution 62/101;
- Part C for information relating to the change of supervision of a space object, as recommended in General Assembly resolution 62/101; and
- Part D for additional voluntary information for use in the United Nations Register of Objects Launched into Outer Space.

Several participants welcomed the availability of the model registration form developed by the Office. The form was often used to guide registration focal points on the information to be provided, was generally easy to use and even when not used internally to support the collection of information at the national level was used as the basis upon which internal forms were developed.

More than two-thirds of the participants that registered space objects and participated in the study confirmed that were using the model form to register their space objects with the United Nations. The participants using the form were a mix of established space-faring States as well as new and emerging space nations. Other participants advised that they

⁷ Resources and Reference Material for States & Organizations,
<https://www.unoosa.org/oosa/en/spaceobjectregister/resources/index.html>

had developed and used national templates, and that in at least one case their national template included the fields of information recommended by resolution 62/101.

Submissions at the National Level and to the United Nations

Some participants noted that the space object owner/operator was responsible for collecting the necessary information on the space object and for its provision to the entity responsible for registration. Some participants indicated that the timeframes for operators to provide the necessary information to the responsible governmental entity ranged from 14 days to three months after the launch of the space object.

Upon enquiry as to what additional information was included in national registries, some participants confirmed the practice of providing only the information required under the Registration Convention whereas several others noted that they also included information recommended by resolution 62/101 in their submissions, such as the COSPAR international designator⁸, Coordinated Universal Time as the time reference for launch, geostationary orbit location, change in operational status, web links, date of decay or re-entry and/or date and physical conditions of moving a space object to a disposal orbit. Some participants noted that the information that was required exclusively at the national level was not shared with the United Nations.

Submission timeframes to the United Nations also varied, with submissions transmitted on a case-by-case basis or with a monthly, quarterly, semi-annual, or annual frequency. The timing varied depending on the internal processes of the Member State.

A participant noted that as part of their authorization process, space objects were pre-registered in their national registry prior to launch. This pre-registration was followed up by a post-launch information update (including actual basic orbital parameters) provided by the operator before the registration was submitted to the United Nations. As a result of the entry of the space object in the national registry at the time of authorization, the timeframe to register the object with the United Nations was shortened significantly, to approximately 2 weeks after receiving the updated orbital parameters from the respective operator.

Participants also advised that the deployment of space objects from another object already in space (such as the International Space Station) also impacted on the submission timeframe, with some waiting until the object had been deployed before transmitting the registration notification. Other participants noted that their submissions were sometime affected by how soon they could obtain/determine international designations assigned to a space object being registered.

Participants also noted that there may be a perception among some private sector entities that registration with the United Nations is an action they can take upon themselves without

⁸ The COSPAR International Designators (COSPAR ID) are an international designation system used to identify space objects orbiting Earth. Codified by the Committee on Space Research (COSPAR) in the early 60s, the International Designators are based on the year of launch, number of successful launches that year and the number of objects identified as having originated from that launch. Presently, the International Designators are nominally assigned by the United States Space Force and are obtained from their Space Track website www.space-track.org

the engagement of national authorities. In these examples, UNOOSA would connect the entity with the relevant Permanent Mission to the United Nations or National Focal Point.

Rationale for Not Registering a Space Object

Several participants noted that there was no obligation to register their space object, as:

1. they were not a party to the Convention.
2. the object had been launched for educational or demonstrative purposes (developed by students).
3. the object had already re-entered and was no longer in outer space.

Other participants, however, who had previously registered some space objects but who had not registered others, cited several reasons:

1. the expectation that another State would register a space object.
2. that as they were not a launching State, they could not be State of registry and instead had provided information on those space objects under Article XI of the Outer Space Treaty.
3. that the necessary information had not yet been received from the operator and that once such information was provided, the registration of the space object would proceed in line with their national registration mechanism.

Registration information provided to the United Nations

Participants of the interview series made the following remarks on the registration information that they provide (the full range of information contained in the model registration forms to assist States and organizations in registering space objects' can be found within Annex III):

TOPICS	INTERVIEWEE'S COMMENTS
<p>Designator (name, COSPAR or National Designator)</p>	<ul style="list-style-type: none"> • All participants that had registered space objects and participated in the study identified their space object by providing the common names of their space objects. • Over half of registering participants provided all three means of identifying their space objects. The overwhelming majority used the Committee on the Space Research International Designator (COSPAR ID) in their most recent registration submissions while half used a national designator.
<p>Basic Orbital Parameters</p>	<ul style="list-style-type: none"> • When applicable, under half of registering participants provide the geostationary position of space objects in their submissions.

<p>Change of Status</p>	<ul style="list-style-type: none"> • Over half of participants proactively monitor the status of their space objects. • Participants indicated that the operators of their registered satellites are required to inform the entity responsible for registration when there is a change in its status. • With the increasing number of space objects being launched annually, monitoring the status of space objects plays a significant role in the long-term sustainability of outer space activities.
<p>Additional Information</p>	<ul style="list-style-type: none"> • A few States included in their submissions that their space objects were either in orbit or on the surface of a celestial body other than Earth. • A few participants also indicated that they provide information on the change of status of a space object, such as its disposal to a graveyard orbit or when a space object was no longer operational. • As part of additional information submitted, one participant indicated that they include whether a space object carries a nuclear-power source in their submission template. • Nearly two-thirds of registering participants provided the owner/operator of a space object in their most recent submissions.
<p>Re-entry Notifications</p>	<ul style="list-style-type: none"> • Though required by paragraph 3, Article IV, less than a third of participants Party to the Convention indicated that they provide (or will provide) a notification to the Secretary-General when their space object was no longer in Earth orbit. Of participants who had not done so, some indicated that their space objects had not re-entered to date, • Other participants indicated that they were presently working on internal mechanisms to provide such information to the Secretary-General. A few non-Party participants indicated that they have provided (or would provide) a re-entry notification. A few participants indicated that re-entry notification was part of their national legislation/process.

Registration of Military or Intelligence Satellites

International space law makes no distinction between "military/government/dual-use" or "civilian" satellites, and the Registration Convention notes that all space objects, should be registered within a national registry. The issue of registering military or defence satellites was raised during the expert event of National Focal Points, and during some of the interviews.

The expert event and interviews highlighted that there is perception among some States that military or intelligence satellites are "deniable" and do not require registration. Some States noted that registration is a vital mechanism to improve transparency and confidence among States, and as such they notify UNOOSA of space objects that perform a military or governmental missions. Where it relates to notification of military satellites, some States Parties have used the following language:

- "Intended for assignments on behalf of the Ministry of Defence"
- "Satellite conducting missions assigned by the Government"
- "Military communication"
- "Practical applications and uses of space technology, such as weather or communications"
- "Earth observation"

Online Index of Objects Launched into Outer Space (*Comment by the Secretariat*)

During the interviews, some participants requested further information on how to access and navigate the Online Index of Objects Launched into Outer Space⁹ (Online Index). The Online Index, maintained by UNOOSA, provides an efficient means to access registration information for functional space objects provided by States and international intergovernmental organizations in accordance with the Convention and/or resolution 1721 B (XVI). The Online Index also includes links to other relevant notifications provided by States under the 1967 Outer Space Treaty, 1968 Rescue Agreement and the 1992 Principles Relevant to the Use of Nuclear Power Sources in Outer Space.

The Online Index is a synthesis of the official information mentioned above, as well as information obtained from official data sources, such as the United States Space Force Space Track website, as well as the websites of national space agencies, regulatory bodies, and official media sources. Unofficial information is differentiated by appearing within square brackets ([]) and are highlighted in green. As the Online Index includes unregistered functional space objects, it also serves as a means for States to identify which space objects require registration.

Currently the Index contains information on approximately 17,000 satellites, lunar/planetary probes and landers, crewed spacecraft, supply craft and space station flight elements. Space debris and other non-functional objects are presently not included.

⁹ Online Index of Objects Launched into Outer Space - https://www.unoosa.org/oosa/osoindex/index.aspx?f_id=

Emerging Trends and Future Areas for Consideration

The evolving nature of space activities, including by new actors entering the space sector or involving new and novel missions, was raised by interviewees. In this regard, the role of registration and providing notifications to UNOOSA under other formal information exchange mechanisms (such as Article XI of the Outer Space Treaty¹⁰) were viewed as increasingly important. The interviews and the expert event raised the following activities that may have implications for the registration of objects launched into, serviced, or manufactured in Earth orbit or beyond: in-orbit transfer of ownership, active debris removal, spaceports, lunar and planetary surface operations, such as space research stations on the Moon or Mars, resource mining operations on an asteroid, the launch of large- or mega-constellation, satellite serial-licensing and mass production, in-orbit servicing, growth of launch providers, international space stations, space-based deployments, and space tourism.

Spaceports

Our approach to a future spaceport [in our territory] would reflect what other Member States are doing, so [we] would not be State of registry for foreign payloads.

Anonymous interviewee

Some participants noted that they had established, or were in the process of developing, domestic spaceports, or spaceflight capabilities. Some of these participants indicated that national commercial entities had successfully secured launch facility licences to build a spaceport. Participants who were in the process of developing spaceports said that they are likely to follow the example of others, by managing the expectations of foreign clients when it comes to deciding upon a State of registry prior to the commercial launch service contract or agreement being signed. This would ensure the registration of space objects launched from their spaceport were not “orphan satellites.”

Several participants indicated that they were exploring or already had plans in place to develop a spaceport. Some of those participants indicated that they had begun coordinating internally to study the proposal further, including which policies would be necessary to proceed. Overcoming environmental and public safety concerns were among the considerations that were being investigated.

Other participants noted since the Government was supportive of commercial space launches taking place from their territory and that interim measures were put in place for licencing of launches undertaken by a national private entity that had begun developing a commercial spaceport.

¹⁰ “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.”

Other participants advised that the establishment of national legislation to authorize and supervise the activities of their spaceport would be a prerequisite to proceeding to their government's plan to develop a spaceport.

Large and Mega Constellations

"The Registration Convention does not provide for registration of constellations, but for registration of single satellites. Concerning the licensing regime, it is up to the States which approach they prefer."

Anonymous interviewee

On what constitutes a large or mega-constellation, most of participants asked UNOOSA about a definition of what should be considered a large or mega-constellation. Some participants had already launched constellations into outer space but were uncertain as how to classify them because they lacked a clear definition of what can be considered a large constellation.

Most of the participants to the study confirmed that they had not nor presently had any plans to launch large or mega-constellations. A few participants advised that while they didn't anticipate launching large or mega constellations, they were developing plans for deploying a series of smaller constellations (ranging from 10-60 satellites per constellation) to serve specific purposes.

Some participants shared the view that each object under such constellations should be authorized or licenced and registered. Other participants noted that while the Registration Convention provided exclusively for registration of each space object individually, when it came to the authorization or licencing of those objects Member States could determine which approach to take. One participant indicated that in accordance with their law all space equipment as well as space objects required registration in their national registry and that the same approach would be taken in registering space objects with the United Nations.

"It is highly likely that the satellites will be licenced in batches, whereas the registration would be per satellite".

Anonymous interviewee

On licensing and authorization, some participants favoured licencing and authorizing the whole constellation rather than doing so individually for each object in the constellation. One participant noted that clarity on how they would licence or register the series remained to be established, but that they considered that licencing could be done in batches.

On how to register, some participants noted that currently their practice for moderately sized constellations was to take an individual approach to registering space objects with the United Nations.

Some registration focal points have consulted with UNOOSA on how best to provide the information and are actively engaged in refining those practices. Up to now, the main change observed is the use of a spreadsheet format to submit registration information on multiple satellites from a satellite constellation. Another participant noted the case where

they had licensed two satellite in a single licence but because their national designation system was based on their licencing mechanism, the satellites were assigned the same national designation. This would therefore have implications for their consideration of how to register with the UN.

Lunar Operations

There is an increased interest in novel mission types such as in-orbit manufacture and lunar missions, for which there is no specific guidance or precedent on how registration should be approached.

Anonymous interviewee

On future lunar operations, some interviewees noted that “COPUOS and international community need to have the conversation on the registration of “dead objects” remaining on celestial bodies (when the appropriate time to notify UNOOSA of this change in position) or when these objects are repurposed or cannibalized. These types of activities will be happening in the same geographical region of the Moon. A discussion under providing information under Article XI of the Outer Space Treaty could allow for information exchange on this topic. Looking into the future – for there to be open and transparent activities in space (in-orbit servicing, active-debris removal, etc) you need to have updated information on positioning. An updated register is key to transparency.”

Other Issues

The Registration Conventions should be discussed in the LTS Working Group [...] how do you register 3D printing on the moon or when you are building objects on space [...] COPUOS is going to play a big role on how registration evolves.

Anonymous interviewee

Several participants noted that they were regularly monitoring developments in space activities to anticipate and, as necessary, adjust national policies, licencing requirements, and registration processes to consider new and novel space missions, such as in-orbit servicing, assembly, and manufacturing, as well as the role of registration for active debris removal. Some participants indicated that it would be useful to be able to regularly engage and exchange information on emerging trends and novel missions, for example through the Working Group on Long-term Sustainability of Outer Space.

Capacity-Building

The last area of enquiry with the participants in the study was the need for capacity-building, and national activities that can facilitate greater awareness and understanding of registration obligations. The summary of possible capacity-building activities highlighted in the interview series and expert event includes:

ISSUE	POSSIBLE ACTIONS
<p>Increasing National Expertise in Space Law</p>	<ul style="list-style-type: none"> • Participation in Technical Advisory Missions for, or provision of technical experts to, UNOOSA's Space Law for New Space Actors Project, which provides targeted capacity-building to States that are in the process of developing or finalising their domestic legislation.
<p>Enhancing expertise on how to notify the United Nations of Objects Launched into Outer Space</p>	<ul style="list-style-type: none"> • The creation of a series of frequently answered questions (FAQs), e-learning materials, toolkits, a dedicated handbook, and a compendium on how to register space objects. • Greater provision of in-person training at the local and regional level for those governments who have joined the Registration Convention, and who may not have national legislation, to help them understand how they can voluntarily register space objects under General Assembly Resolution 1721B (XVI) (20 December 1961). • A simplified registration process
<p>Coordination and Engagement among National Focal Points</p>	<ul style="list-style-type: none"> • Annual meeting of National Focal Points. • Targeted capacity-building for National Focal Points on Registration and Permanent Missions of Member States to the United Nations on how to they can navigate the digitized-Register of Objects Launched into Outer Space, that UNOOSA will be rolling-out in 2025. • Greater provision of information on how National Focal Points can use the Online Index of Objects Launched into Outer Space.
<p>Promoting Regulation at the National Level or with Industry and Academic Stakeholders</p>	<ul style="list-style-type: none"> • Support with the creation of space regulation advisory forums and setting up of industry consortiums to institutionalize and regularize information exchanges on planned activities and ensure understanding of national authorization and licensing requirements and registration obligations. • Greater awareness-raising about the UN Register for Objects Launched into Outer Space, and technical

	workshops with industry or academia on national and international obligations to register space objects.
Creating Synergies between International Organizations	<ul style="list-style-type: none"> Some participants noted that UNOOSA could carry out more capacity-building in partnership with the International Telecommunications Union, given the linkages between the ITU filing and registration processes.

Participants made the following remarks during the interviews and during the Expert Event of National Focal Points:

Increasing National Expertise on Space Law

Several participants noted that the establishment of national space programmes and entities and the development of national space policies, strategies, laws, and regulations provided the necessary avenues to promote and raise greater awareness of the responsibilities and obligations that States Parties bear under the Outer Space Treaties. Doing so helped them to establish robust legislation, and a predictable legal environment for attracting investment and the growth of the private sector. Many participants noted their participation in Technical Advisory Missions, or provision of technical experts to, UNOOSA's *Space Law for New Space Actors Project*, which provides targeted capacity-building to States that are in the process of developing or finalising their domestic legislation.

Enhancing Expertise on How to Notify the United Nations of Objects Launched into Outer Space

When requested about how the Office may be of assistance, participants highlighted the need for capacity-building tools to be developed for Member States to enhance registration practices. Participants noted that these could take the form of a series of frequently answered questions, e-learning materials, toolkits, a dedicated handbook, and a compendium.

There are different levels of experience with registration across the signatories to the Registration Convention, which can lead to difficulty identifying the correct point of contact and understanding the local policy on registration. Capacity building and open dialogue in this area would be of great value.

Anonymous interviewee

Some participants noted the need to bridge the knowledge gap that existed with respect to registration requirements. In this regard, assistance on how to set up their registries and processes; maintain the registries, and submit the information to the United Nations, was deemed necessary. In-person training at the country level would allow for administrations to gather all relevant stakeholders together for a richer and deeper learning experience. Events at the national level, bringing together all stakeholders were effective as a springboard for establishment of networks of local or regional practitioners, which

facilitated the building of necessary coordination processes.

Some participants requested a simplified registration process, for example, whereby space operators could be authorized to enter the registration information directly, with national authorities performing only the official clearances prior to submission to the United Nations.

Some participants stressed the need for more events to be organized, for example a series that could be webcast, focussed on registration to promote greater understanding and awareness, aimed not only at government representatives but also at participants from the private sector, academia and civil society entities interested in conducting space activities.

Many States would like the registration submission form to be an online tool that could be filled out by the space object operator, then checked or rejected by the competent authority of the State of Registry and eventually received by UNOOSA. As a first step, UNOOSA will be modernising the registration mechanism from a paper-based process to a digital one. As the first phase, in 2024, UNOOSA intends to launch a Space Object Registration Portal allowing States to submit registration information online.

Coordination and Engagement among National Focal Points

The need for regular coordination and knowing who to contact was raised. One such mechanism highlighted by participants was the establishment of a working group, or a regular meeting, of national focal points responsible for authorization/licensing and registration of space activities, that usually met on a yearly basis, to discuss space law and enforcement-related matters. The group could be informal, with a loose agenda, as per the *Expert Event on the Registration of Objects Launched into Outer Space* which took place in Vienna from 29-30 May 2023. This group would exchange information on their practices and experiences in authorizing and licencing space activities in their respective countries and exchanging information on common issues and challenges to “bridge the knowledge gap”.

Promoting Regulation at the National Level or with Industry and Academic Stakeholders

We need to bridge the knowledge gap and help industry to understand national processes and international obligations.

Anonymous interviewee

Engagement of focal points, from planning to de-orbiting was particularly challenging in the absence of inadequate national processes. Some participants noted that staying fully informed of planned activities at the national level, especially with the increasing number of private actors conducting space activities, was essential. Some participants noted that their focal points tried to mitigate this by being pro-active in gathering information through the means available to them, for example through their network of contacts, inter-departmental information exchange sessions and by sourcing information in the public domain, such a press and media advisories issued by space actors, nationally and internationally.

Mechanisms found to be particularly effective at the national level by some participants included the creation of space regulation advisory forums and setting up of industry

consortiums to institutionalize and regularize information exchanges on planned activities and ensure understanding of national authorization and licensing requirements and registration obligations. Other participants noted that they promoted information on national space activities through public information and outreach campaigns, and had organized dedicated information sessions, proactively engaging with non-governmental entities, including academia, to ensure greater awareness and understanding of the international obligations of States in registering space objects.

Some noted that it was challenging for them to compel operators in countries that had not yet become party to the Registration Convention or were still in the process of finalizing their national space laws and regulations, to provide information that was necessary despite their governments' prior practice to voluntarily registering space objects under resolution 1721B (XVI). They noted that greater understanding of the significance of registration would support their efforts.

Creating Synergies between International Organisations

Some participants noted that while their space operators were mostly well versed on frequency licensing requirements and procedures with the International Telecommunications Union (ITU), the processes and interlinkages to registration, nationally and internationally, were not adequately known. They noted that in some instances operators did not fully understand the requirements nor did they prioritize the need to provide the information promptly to national focal points. Some participants noted that UNOOSA could carry out more capacity-building in partnership with the International Telecommunications Union, given the linkages between the ITU filing and registration processes.

Post-Launch Supervision

Some participants informed that it could be challenging to be fully informed of planned space activities and follow developments, including post registration of the object. They noted that a mechanism was necessary to facilitate regular updating of their national registries, to ensure receipt of the latest information on the status of space object carried in their registries. Participants whose space-related entities or authorities didn't have independent ability to track their space objects noted the difficulty in being notified periodically on operational changes relating the respective space objects. Having ready access and a way to be notified periodically would allow them to maintain their records more regularly, facilitating, for example, their notifications of re-entry that to the United Nations in line with the Registration Convention.

Concluding Remarks

This stakeholder study provides a basis for UNOOSA and the international community to build momentum around enhanced registration practices in the coming years. The interviews and expert event highlighted the varying interpretations of obligations under the Registration Convention and other applicable international law and approaches to determining a State of registry. All National Focal Points stressed the need to be “informed” about the registration process and expressed their intentions to update their regulations to take into account recent developments in the space sector. This demonstrated how there is more work to be done to share approaches, enhance coordination, develop robust regulation, interpret international law, build capacities, and understand the complexities of registration with a view to harmonising practices.

National Focal Points from major space-faring nations underlined the relationship between licensing and authorization, whereby States can determine the safety and sustainability of space missions; and the registration of objects launched into outer space. In this regard, interviewees expressed the view that UNOOSA and donors continue to strengthen collaboration between focal points, national experts, and relevant stakeholders on registration, as well as the implementation of the Guidelines for the Long-Term Sustainability of Outer Space (e.g., Guideline A.5 focuses on *Enhancing the Practice of Registering Space Objects*).

Communication and coordination channels within and among actors, such as the United Nations, States, Launch Service Providers, industry, and academia were viewed as essential. Several States highlighted how they had established industry consortiums with the goal of creating structured dialogues, giving oversight of national space activities, and providing opportunities for regulatory training on national legislation and international obligations.

New and novel space missions, in the coming years, will only raise the relevance of registration as a means of understanding ‘who owns what’ in space. Issues which may require the attention of the Member States include: in-orbit transfer of ownership, active debris removal, spaceports, lunar and planetary surface operations, such as space research stations or resource mining operations on the Moon or Mars, the launch of large- or mega-constellations, satellite serial-licensing and mass production, in-orbit servicing, the growing number of launch providers, international space stations, and space-based deployments.

This stakeholder study, along with the ongoing process to digitize the Registers of Objects Launched into Outer Space in 2024, as well as the 50th anniversary of the Registration Convention entering into force in 2026, provide such opportunities for UNOOSA and the international community to build momentum around enhanced registration. It was evident that the expert event in May 2023 raised more questions about registration, than it provided answers. In this context, Member States or other partners are invited to provide extra-budgetary contributions in the coming years, so that UNOOSA could host annual or regular expert meetings of the National Focal Points of Registration.

In terms of short-term impact stemming from phase one of the project, UNOOSA has received registrations pertaining to legacy space objects and approximately 50 new or updated National Focal Points of Registration. It is therefore our hope that this snapshot of the current practices will promote an understanding of good practices, lessons learned, common challenges and capacity-building needs; ensuring the UN Register of Objects Launched into Outer Space reach a 100% registration rate in the future.

ANNEXES

Annex I - Baseline Information

Space Object Registration Mechanisms and Treaty Status (as of 1 October 2023)

Member States use two mechanisms for registering space objects with the Secretary-General of the United Nations: the Registration Convention and General Assembly resolution 1721 B (XVI). Registration of space objects under the Convention is a mandatory treaty obligation while registration under resolution 1721 B (XVI) is a voluntary requirement. Additionally, the Convention allows international intergovernmental organizations (that meet the Convention's requirements) to submit registration information while the resolution mechanism is solely for Member States.

Presently, 75 States are Party to the Registration Convention. They are Algeria, Antigua and Barbuda, Argentina, Armenia, Australia, Austria, Bahrain, Belarus, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Cuba, Cyprus, Czech Republic, Democratic People's Republic of Korea, Denmark, Djibouti, Finland, France, Germany, Greece, Hungary, India, Indonesia, Italy, Japan, Kazakhstan, Kuwait, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, Mexico, Mongolia, Montenegro, Morocco, Netherlands (Kingdom of the), New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Paraguay, Peru, Poland, Portugal, Qatar, Republic of Korea, Romania, Russian Federation, Saudi Arabia, Serbia, Seychelles, Slovakia, Slovenia, South Africa, Spain, St. Vincent and the Grenadines, Sweden, Switzerland, Türkiye, Ukraine, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay, & Venezuela (Bolivarian Republic of). A further three States (Burundi, Iran (Islamic Republic of) & Singapore) have signed but not ratified the Convention.

In accordance with Article VII of the Convention, four international intergovernmental organizations: European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), European Space Agency (ESA), European Telecommunications Satellite Organization (Eutelsat) & Intersputnik International Organization of Space Communications have declared acceptance of the rights and obligations provided for in the Convention.

Space Object Registration by States and IGOs

The following States have submitted registration information under the Convention: Algeria, Argentina, Australia, Austria, Belarus, Belgium, Brazil, Canada, Chile, China, Colombia, Czech Republic, Democratic People's Republic of Korea, Denmark, Finland, France, Germany, Greece, Hungary, India, Indonesia, Italy, Japan, Kazakhstan, Lithuania, Luxembourg, Mexico, Morocco, Netherlands (Kingdom of the), New Zealand, Nigeria, Norway, Pakistan, Peru, Poland, Republic of Korea, Russian Federation, Saudi Arabia, Slovakia, Slovenia, South Africa, Spain, Sweden, Türkiye, Ukraine, United Arab Emirates, United Kingdom, United States & Uruguay.

In addition, two international intergovernmental organizations have also submitted information under the Convention: EUMETSAT & ESA. A further 22 States not party to the Convention provided their registration information in accordance with resolution 1721 B (XVI): Azerbaijan, Bhutan, Bolivia, Egypt, Ethiopia, Guatemala, Iran (Islamic Republic of), Israel, Kenya, Lao People's Democratic Republic, Malaysia, Mauritius, Republic of Moldova, Monaco, Mongolia, Papua New Guinea, Paraguay, Philippines, Thailand, Tunisia, Uganda, Venezuela.

Annex II – Applicable International Law related to the Registration of Objects Launched into Outer Space

Treaties

- [Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies \(1967\)](#)
- [Convention on Registration of Objects Launched into Outer Space \(15 September 1976\)](#)
- [Agreement on the Rescue of Astronauts, the Return of Astronauts and Return of Objects Launched into Outer Space](#)
- [Convention on International Liability for Damage Caused by Space Objects](#)

General Assembly Resolutions and Non-Legally Binding Instruments

- [General Assembly Resolution 1721B \(XVI\) \(20 December 1961\)](#)
- [General Assembly Resolution 62/101 on Recommendations on Enhancing the Practice of States and International Intergovernmental Organizations in Registering Space Objects \(2007\)](#)
- [The Guidelines for the Long-Term Sustainability of Outer Space Activities \(2019\)](#)
- [The Space 2030 Agenda and its implementation plan \(2021\)](#)

Part B: Additional information for use in the United Nations Register of Objects Launched into Outer Space, as recommended in General Assembly resolution 62/101			
Change of status in operations			
Date when space object is no longer functional (hours, minutes, seconds optional)	dd/mm/yyyy	hrs min sec	Coordinated Universal Time (UTC)
Date when space object is moved to a disposal orbit (hours, minutes, seconds optional)	dd/mm/yyyy	hrs min sec	Coordinated Universal Time (UTC)
Physical conditions when space object is moved to a disposal orbit (see COPUOS Space Debris Mitigation Guidelines)			
Basic orbital parameters			
Geostationary position (where applicable, planned/actual)			degrees East
Additional Information			
Website:			
Part C: Information relating to the change of supervision of a space object, as recommended in General Assembly resolution 62/101			
Change of supervision of the space object			
Date of change in supervision (hours, minutes, seconds optional)	dd/mm/yyyy	hrs min sec	Coordinated Universal Time (UTC)
Identity of the new owner or operator			
Change of orbital position			
Previous orbital position			degrees East
New orbital position			degrees East
Change of function of the space object			
Part D: Additional voluntary information for use in the United Nations Register of Objects Launched into Outer Space			
Basic information			
Space object owner or operator			
Launch vehicle			
Celestial body space object is orbiting (if not Earth, please specify)			
Other information (information that the State of registry may wish to furnish to the United Nations)			
Sources of information			
General Assembly resolution 62/101	http://www.unoosa.org/oosa/SORegister/resources.html		
COPUOS Space Debris Mitigation Guidelines	http://www.unoosa.org/oosa/SORegister/resources.html		
Texts of the Registration Convention and relevant resolutions	http://www.unoosa.org/oosa/SORegister/resources.html		

Section A. Instructions for completing the form

1. Download the electronic version of the form from <http://www.unoosa.org/oosa/SORegister/resources.html>.
2. Reference sources and other resources for completion of the form are available from the above web-link.
3. Review definitions in Section B below and complete the form. If there are any queries, please e-mail soregister@unoosa.org.
4. The **completed hardcopy form** should be sent through official government channels to the relevant Permanent Mission to the United Nations (Vienna) to be formally transmitted to the United Nations.
5. The **completed electronic form** should be sent by the appropriate government entity to the United Nations Office for Outer Space Affairs using e-mail soregister@unoosa.org.

Section B. Definition of terms

Part A: Information provided in conformity with the Registration Convention or General Assembly resolution 1721B (XVI)

Launching State/States/international intergovernmental organization

State of registry/international intergovernmental organization: The State of registry is the launching State which carries the space object on its national registry of objects launched into outer space. The international intergovernmental organization is an organization which has declared its acceptance of the rights and obligations provided for in accordance with Article VII of the Registration Convention.

Note: In accordance with Article II of the Registration Convention, **only one State of registry can exist for a space object**. When more than one launching State exists, they should jointly determine which State should register the space object.

Other Launching States: As defined in the Registration Convention, "launching State" means:

- (i) A State which launches or procures the launching of a space object;
- (ii) A State from whose territory or facility a space object is launched;

Designator

Name: The common name/names used to identify the space object.

COSPAR international designator: Alphanumeric designator established by the Committee on Space Research (COSPAR) for space objects that successfully reach Earth orbit or beyond. The SPACEWARN Bulletin (available at <http://nssdc.gsfc.nasa.gov/spacewarn>) confirms the designators assigned by the World Warning Agency for Satellites on behalf of COSPAR. The designator can also be obtained from the Online Index of Objects Launched into Outer Space at <http://www.unoosa.org/oosa/osoindex.html>.

National designator/registration number: Designator or registration number assigned to a space object by the State of registry.

Date and territory or location of launch

Date of launch: The date of launch of the space object using Coordinated Universal Time (UTC) (also referred to as Greenwich Mean Time (GMT)).

Territory or location of launch: The territory or location of the launch of the space object. For a table of global launch locations, see <http://www.unoosa.org/oosa/SORegister/resources.html>.

Basic orbital parameters: Basic data on the space object's orbit around the Earth or a celestial body such as the Sun, Moon, etc. If object is orbiting a body other than Earth, please specify. The parameters are:

Nodal period: Time taken by the space object to complete one revolution around the body it is orbiting.

Inclination: The angle relative to the equator of the Earth or celestial body the space object is orbiting. Measured counter-clockwise from the equator.

Apogee:	The furthest distance in the space object's orbit from the surface of the body it is orbiting.
Perigee:	The closest distance in the space object's orbit from the surface of the body it is orbiting.
General function:	General information on the space object. Can include mission objectives, frequency plans, etc. If required, please attach text in a separate page.
Change of Status:	The date of the space object's decay, reentry, recovery, deorbit or landing.

Part B: Additional information for use in the United Nations Register of Objects Launched into Outer Space, as recommended in General Assembly resolution 62/101

Change of status in operations

Date when space object is no longer functional:	The date using Coordinated Universal Time (UTC) (also referred to as Greenwich Mean Time (GMT)) when the space object ceases to perform operational functions for the State of registry.
Date when space object is moved to a disposal orbit:	The date using Coordinated Universal Time (UTC) when the space object is moved into a disposal orbit. See COPUOS Space Debris Mitigation Guidelines for recommendations on disposal orbits, http://www.unoosa.org/oosa/SORegister/resources.html .
Physical conditions when space object is moved to a disposal orbit:	The physical conditions when the space object is moved into a disposal orbit. Conditions can include the change in orbit (e.g. +300 km above GSO), passivation of the space object and other measures as recommended in the COPUOS Space Debris Mitigation Guidelines.

Basic orbital parameters

Geostationary position:	Applicable only to space objects in the geostationary orbit. Planned and/or actual location of space object in \pm degrees East along the equator from the Greenwich meridian (e.g. for 10.5 degrees West, use -10.5 degrees East).
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Additional Information

Website:	Address on the World Wide Web for information on the space object/mission/operator.
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Part C: Information relating to the change of supervision of a space object, as recommended in General Assembly resolution 62/101

Change of supervision of the space object

Date of change in supervision:	The date using Coordinated Universal Time (UTC) (also referred to as Greenwich Mean Time (GMT)) when the new owner or operator takes supervision of the space object.
Identity of the new owner or operator:	The identity of the new owner or operator of the space object.
Change of orbital position in the geostationary orbit	
Previous orbital position:	The previous operational location of the space object in \pm degrees East along the equator from the Greenwich meridian.
New orbital position:	The new operational location of the space object in \pm degrees East along the equator from the Greenwich meridian.
Change of function of the space object:	The function of the space object following change in supervision.

Part D: Additional voluntary information for use in the United Nations Register of Objects Launched into Outer Space

Basic information

Space object owner or operator:	The entity that owns or operates the space object.
Launch vehicle:	The launch vehicle used to launch the space object into Earth orbit or beyond.
Celestial body space object is orbiting:	The body that the space object is in orbit around, if not Earth (i.e. the Moon, the Sun, Mars, Jupiter, etc.).
Other information:	Information relating to the space object that the State of registry may wish to furnish to the United Nations.



**THE UNITED NATIONS OFFICE
FOR OUTER SPACE AFFAIRS (UNOOSA)**

IS RESPONSIBLE FOR ADVANCING INTERNATIONAL COOPERATION
IN THE PEACEFUL USES OF OUTER SPACE AND HELPS ALL COUNTRIES
USE SPACE SCIENCE AND TECHNOLOGY TO ACHIEVE
SUSTAINABLE DEVELOPMENT.



**BRINGING THE BENEFITS
OF SPACE TO HUMANKIND**