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Committee on the Peaceful Uses of Outer Space

Thematic priority 3. Enhanced information exchange on space objects and events

Note by the Secretariat

I. Introduction

1. In its resolution 71/90, the General Assembly, emphasizing that the fiftieth anniversary of the United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE+50), to be commemorated in 2018, would be an opportunity to consider the current status and chart the future of the contribution of the Committee on the Peaceful Uses of Outer Space to global governance of outer space activities, noted with satisfaction that the Committee at its fifty-ninth session had agreed on seven thematic priorities of UNISPACE+50, including their objectives and mechanisms (A/71/20, para. 296).

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

3. The present note is provided to assist consideration of this thematic priority and takes into consideration the ongoing process on the long-term sustainability of outer space activities. The report has been prepared by the Office for Outer Space Affairs of the Secretariat in its role of discharging the Secretary-General's obligations under the United Nations treaties governing outer space activities. The present note describes present practices of States and international intergovernmental organizations in registering space objects with the Secretary-General, and other relevant mechanisms for information exchange relating to space objects and events.

4. On the basis of existing mandates, the Office for Outer Space Affairs is implementing enhancements to existing registration practices and information exchanges, and intends to implement further such enhancements. Given that the

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number of space objects launched each year is increasing significantly, the Office also underlines, in the present note, measures to increase transparency and improve the efficiency of the registration mechanism, which has been in use for over half a century. Some recommendations are also proposed for consideration by Member States. The set of activities and proposals described in this note is non-exhaustive, and they are put forward without prejudice to the work of the Committee on the Peaceful Uses of Outer Space and its Subcommittees.

II. Background

5. In six decades of outer space activities, approximately 8,000 functional or formerly functional space objects have been launched into Earth orbit or beyond. Nearly 4,650 of those objects remain in Earth orbit, and a further 170 functional objects have been launched beyond Earth orbit into orbits around the Sun, Mercury, Venus, Mars, Jupiter, the Moon, asteroids or comets or have landed/impacted on Venus, Mars, the Moon, Jupiter, Saturn, comets or asteroids. The remaining 3,500 space objects have re-entered the Earth's atmosphere and are no longer in Earth orbit.

6. Of the functional objects currently in Earth orbit, approximately 1,700 are presently operational.

7. The following States operate or have operated objects in Earth orbit or beyond: Algeria, Argentina, Australia, Austria, Azerbaijan, Bangladesh, Belarus, Belgium, Bolivia (Plurinational State of), Brazil, Bulgaria, Canada, Chile, China, Colombia, Czechia, Democratic People's Republic of Korea, Denmark, Ecuador, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Italy, Japan, Kazakhstan, Lao People's Democratic Republic, Latvia, Lithuania, Luxembourg, Malaysia, Mexico, Morocco, Netherlands, Nigeria, Norway, Pakistan, Papua New Guinea, Peru, Philippines, Poland, Portugal, Republic of Korea, Romania, Russian Federation, Saudi Arabia, Singapore, Slovakia, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, Turkmenistan, Ukraine, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay, Venezuela (Bolivarian Republic of) and Viet Nam.

8. In addition, the following international intergovernmental organizations operate or have operated space objects: Arab Satellite Communications Organization (Arabsat), European Space Agency (ESA), European Union, European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), European Telecommunications Satellite Organization (EUTELSAT), International Maritime Satellite Organization (INMARSAT), International Telecommunications Satellite Organization and the Regional African Satellite Communication Organization (RASCOM).

9. Born from the belief of Member States that "the United Nations should provide a focal point for international cooperation in the peaceful exploration and use of outer space",[1] the registration of space objects with the Secretary-General of the United Nations was originally conceived as a mechanism to assist the work of the Committee on the Peaceful Uses of Outer Space.

10. With the elaboration of international space law, the nature of registration evolved, and the obligations associated with a space object's registration were first codified in the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. A State of registry's rights and obligations pertaining to a space object were further developed and addressed in the Convention on Registration of Objects Launched into Outer Space. The Registration Convention sought to make provision for the national registration by launching States of space objects launched into outer space and provide for States Parties additional means and procedures to assist in the

[1] Preamble of the General Assembly resolution 1721B (XVI) of 20 December 1961.

identification of space objects, with the belief that a mandatory system of registering objects launched into outer space would, in particular, assist in their identification and would contribute to the application and development of international law governing the exploration and use of outer space.[2]

11. The Registration Convention entered into force on 15 September 1976, and presently 64 States are party to the Convention, and three international intergovernmental organizations have declared their acceptance of the rights and obligations provided for in the Convention.

12. Of the functional objects[3] launched since 1957, approximately 92 per cent have been registered with the Secretary-General in accordance with General Assembly resolution 1721B (XVI) and/or the Registration Convention.

13. The following launching States[4] have submitted information for inclusion in the United Nations Register of Objects Launched into Outer Space: Algeria, Argentina, Australia, Austria, Azerbaijan, Belarus, Belgium, Bolivia (Plurinational State of), Brazil, Canada, Chile, China, Czechia, Democratic People's Republic of Korea, Denmark, Egypt, France, Germany, Greece, Hungary, India, Indonesia, Israel, Italy, Japan, Kazakhstan, Lithuania, Luxembourg, Malaysia, Mexico, Nigeria, Norway, Pakistan, Papua New Guinea, Peru, Philippines, Poland, Republic of Korea, Russian Federation, Saudi Arabia, Slovakia, South Africa, Spain, Sweden, Thailand, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay and Venezuela (Bolivarian Republic of).

14. In addition, the following international intergovernmental organizations have registered space objects launched into Earth orbit or beyond: ESA and EUMETSAT.[5]

15. In 2007, the General Assembly adopted its resolution 62/101, entitled "Recommendations on enhancing the practice of States and international intergovernmental organizations in registering space objects". The conclusion of a three-year workplan by the Legal Subcommittee, the resolution drew on the best registration practices of States and made concrete proposals on issues relating to the harmonization of required information, as well as recommendations on types of additional information, to be provided voluntarily by a State of registry, that would be beneficial to the global community.

16. At its fifty-second session, in 2009, the Committee on the Peaceful Uses of Outer Space agreed that an item entitled "Long-term sustainability of outer space activities" should be included in the agenda of the Scientific and Technical Subcommittee (A/64/20, para. 161). The Working Group established under the item was tasked with identifying potential risks to the long-term sustainability of outer space activities and with producing a compendium of voluntary guidelines to reduce those risks.

17. In 2012, pursuant to General Assembly resolution 65/68, the Secretary-General established the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities. The Group agreed on a set of transparency and confidence-building measures for outer space activities and recommended that States consider implementing them on a voluntary basis (A/68/189). The Group also recommended that the General Assembly decide how to further advance transparency and confidence-building measures and provide for their universal consideration and support, including by referring the Group's recommendations to the Committee on the Peaceful Uses of Outer Space, the Disarmament Commission and the Conference on Disarmament for consideration, as

[2] Preamble of the Convention on Registration of Objects Launched into Outer Space.

[3] The customary practice of States has been to register space objects capable of independent operation, regardless of actual operation.

[4] See General Assembly resolution 59/115.

[5] In accordance with article VII of the Registration Convention, an international intergovernmental organization can declare its acceptance of the rights and obligations provided for in the Convention.

appropriate. The Group recommended that coordination be established between the Office for Outer Space Affairs of the Secretariat, the Office for Disarmament Affairs of the Secretariat and other appropriate United Nations entities on matters related to transparency and confidence-building measures in outer space activities.

18. At its fifty-seventh session, in 2014, the Committee on the Peaceful Uses of Outer Space agreed that States members of the Committee should be invited to submit their views on the modalities of making practical use of the recommendations contained in the report of the Group of Governmental Experts as they related to and/or could prove instrumental in ensuring the safety of space operations (A/69/20, para. 374). Replies from Germany, Italy, the Russian Federation and the United States were received[6] and were considered at the fifty-second session of the Scientific and Technical Subcommittee and the fifty-eighth session of the Committee on the Peaceful Uses of Outer Space, held in 2015.

19. At its fifty-eighth session, in 2015, the Committee on the Peaceful Uses of Outer Space requested the Secretariat to issue a special report by the Inter-Agency Meeting on Outer Space Activities (UN-Space)[7] on the implementation of the report of the Group of Governmental Experts, which was to include information on how United Nations entities supported the implementation of transparency and confidence-building measures in outer space activities in accordance with their existing mandates, on how United Nations entities could assist Member States in implementing the recommendations of the Group, and on means to coordinate the work of United Nations entities in that regard (A/70/20, para. 339).

20. The resulting special report by UN-Space on the role of United Nations entities in supporting Member States in the implementation of transparency and confidence-building measures in outer space activities (A/AC.105/1116) incorporated contributions received from the Office for Disarmament Affairs and the Department of Field Support of the Secretariat, the International Atomic Energy Agency (IAEA), the International Telecommunication Union (ITU), the United Nations Institute for Disarmament Research and the World Meteorological Organization.

21. The special report addresses the role of United Nations entities in supporting Member States in the implementation of transparency and confidence-building measures in outer space activities and provides an overview of the work of United Nations entities in relation to the main recommendations contained in the report of the Group of Governmental Experts (see section A, below (“Existing mechanisms for information exchange on space objects and events”)).

22. At its fifty-ninth session, in 2016, the Committee on the Peaceful Uses of Outer Space agreed that States members of the Committee should be invited to submit their views on transparency and confidence-building measures in outer space activities, on the report of the Group of Governmental Experts and on the special report by UN-Space (A/AC.105/1116) (A/71/20, para. 272).

23. The views provided by member States were made available in document A/AC.105/1145 and addenda.[8]

24. In its resolution 70/53, the General Assembly requested the Secretary-General to submit to it, at its seventy-second session, a report on the coordination of transparency and confidence-building measures in outer space activities in the United Nations system.

25. In response to that request, A/72/65 and addenda reproduced the substantive text of the special report by UN-Space (A/AC.105/1116), incorporating updates received

[6] A/AC.105/1080, A/AC.105/1080/Add.1 and A/AC.105/1080/Add.2.

[7] UN-Space is a mechanism that was first set up in the mid-1970s to promote collaboration, synergy, the exchange of information and the coordination of plans and programmes between United Nations entities in the implementation of activities involving the use of space technology and its applications. Further information is available at www.unoosa.org/oosa/en/ourwork/un-space/.

[8] A/AC.105/1145, A/AC.105/1145/Add.1 and A/AC.105/1145/Add.2.

from contributing entities, as well as views by States (Brazil, Brunei Darussalam, Canada, China, Cuba, El Salvador, France, Jordan, Paraguay, Peru, the United Kingdom and the United States).

26. At its fifty-ninth session, the Committee on the Peaceful Uses of Outer Space also endorsed seven thematic priorities of UNISPACE+50, including thematic priority 3, on enhanced information exchange on space objects and events (A/71/20, para. 296).

A. Existing mechanisms for information exchange on space objects and events

1. Mechanisms for information exchange and notifications under the United Nations treaties on outer space

27. Under the five international treaties and five sets of legal principles governing space activities, [9] the Secretary-General has been delegated a number of responsibilities which primarily involve the timely dissemination of information received from States. The types of information disseminated by the Secretary-General include space object registration data; recovery and return of astronauts and space objects; notifications relating to the launch and re-entry of nuclear-powered space objects; and notifications relating to lunar exploration and habitation, remote sensing, direct broadcasting and outer space activities (including the discovery of harmful phenomena). A more comprehensive overview of the role of United Nations entities in supporting Member States in the implementation of transparency and confidence-building measures in outer space activities can be found in document A/AC.105/1116.

28. The Office for Outer Space Affairs assumes the above-mentioned responsibilities on behalf of the Secretary-General. The treaty implementation mechanisms of the Office have thus been oriented towards information-gathering, verification, information dissemination and exchange, with information-gathering relating to the near-Earth space environment (including artificial space objects, near-Earth objects, and orbital events) conducted on a daily basis. Presently, the primary mechanism used by the Office for information exchange and dissemination is its website. The website of the Office provides access to all documents containing information submitted by States and international intergovernmental organizations under the five international treaties and five legal principles.

2. Risk reduction notifications within the scope of the United Nations treaties on outer space

29. The Secretary-General's obligations under international space law already include the requirement for the immediate and effective dissemination of information comparable to the risk reduction notifications recommended by the Group of Governmental Experts. Historically, States have used the existing treaty mechanisms to convey information on controlled and uncontrolled re-entries of high-interest space objects, emergency situations related to nuclear power sources and intentional orbital

[9] The five outer space treaties are: the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies; the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space; the Convention on International Liability for Damage Caused by Space Objects; the Convention on Registration of Objects Launched into Outer Space; and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies. The five declarations and sets of legal principles are: the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space; the Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting; the Principles Relating to Remote Sensing of the Earth from Outer Space; the Principles Relevant to the Use of Nuclear Power Sources in Outer Space; and the Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries.

break-ups. Depending on the circumstances, such notifications have been processed on a priority basis and disseminated immediately.

30. Past examples of notifications to the Secretary-General of the uncontrolled re-entry of high-interest space objects can be found in documents A/AC.105/648, A/AC.105/803 and A/AC.105/803/Add.1, and A/AC.105/1150. The Secretary-General has been informed of other events that have been considered of potentially high risk, such as the Earth flyby of a nuclear-powered probe, and has also been informed of controlled high-risk re-entry events (see, for example, A/AC.105/759 and A/AC.105/759/Add.1).

31. The Secretary-General has been notified of emergency situations concerning nuclear-powered space objects. Those notifications were made under article IV, paragraph 2, of the Registration Convention, prior to the adoption of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space (General Assembly resolution 47/68) in 1992.[10]

3. Other risk reduction notification mechanisms

32. With regard to mechanisms for information exchange and notification within the United Nations system, the Office for Outer Space Affairs is part of the Joint Radiation Emergency Management Plan of the International Organizations, the purpose of which is to coordinate the arrangements of relevant international organizations to prepare for and respond to nuclear or radiological emergencies. The Office's role is to facilitate information exchange on the possible re-entry of a nuclear-powered space object, and the Office maintains a communication channel with the IAEA Incident and Emergency Centre for that purpose.

33. That mechanism is also used by the Office to provide pre-launch notifications of nuclear-powered space objects to the Incident and Emergency Centre, based on information provided by States under the Outer Space Treaty and the Principles Relevant to the Use of Nuclear Power Sources in Outer Space.[11] It has also been used to provide information on the launch of non-nuclear-powered high-interest deep-space missions. The mechanism has been used by the Incident and Emergency Centre following the notification by a State of the recovery of a possible space object. In such cases, the Office has utilized in-house technical resources and/or requested assistance from States in identifying the space object and the responsible State.

III. Present and future trends of space activities

34. As noted above, approximately 8,000 functional space objects (satellites, planetary probes, landers and rovers, crewed spacecraft and space station flight elements) have been launched by over 70 States and intergovernmental organizations. Approximately 41 per cent of those objects have re-entered the Earth's atmosphere, leaving approximately 4,650 functional or formally functional objects in outer space. Of those, nearly 92 per cent have been registered. Presently, approximately 1,700 space objects are still operational, while the remainder orbit the Earth in their operational orbits or in graveyard/disposal orbits.

35. Unfortunately, the above-stated statistics do not reflect the actual space object population in Earth orbit. Only 24 per cent of objects presently being tracked in Earth orbit are or were functional. The remaining tracked object population consists of more than 2,100 rocket stages and related objects, while a further approximately 12,000 space objects are referred to collectively as "space debris".[12]

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[10] See, for example, ST/SG/SER.E/72, ST/SG/SER.E/72/Add.1, ST/SG/SER.E/72/Add.2, ST/SG/SER.E/72/Add.3 and ST/SG/SER.E/72/Add.4, and ST/SG/SER.E/176, ST/SG/SER.E/176/Add.1, ST/SG/SER.E/176/Add.2, ST/SG/SER.E/176/Add.3, ST/SG/SER.E/176/Add.4, ST/SG/SER.E/176/Add.5 and ST/SG/SER.E/176/Add.6.

[11] Principle 4 (Safety assessment) of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space.

[12] An additional 21,000 tracked non-functional objects have re-entered the Earth's atmosphere since 1957.

36. Although the Registration Convention makes no reference or distinction between functional and non-functional objects or space debris, article I states that "the term 'space object' includes component parts of a space object as well as its launch vehicle and parts thereof". Some States of registry presently provide information on certain types of non-functional space objects, such as launcher upper-stages, payload adapters and other mission-related debris.

37. Eighty-seven per cent of the satellite population in the geostationary satellite orbit has been registered. However, only a few States provide information on when a geostationary satellite is placed in a graveyard orbit or suffers a critical failure. Similarly, 88 per cent of satellites that are presently in low- or medium-Earth orbit have been registered. All deep space/planetary missions and space objects carrying nuclear power sources have been registered.

38. On the basis of information provided by States on their national space activities as well as open-source information, it is estimated that approximately 1,000 satellites will be launched in the next two years.[13] Over 200 satellites are presently scheduled to be launched in 2018, and it is expected that other satellite launches will also take place. The number of satellites launched annually has tripled over the past decade (111 satellites in 2007 and over 370 satellites in 2017), and that trend is expected to continue in the future.

39. In addition to single launchers deploying multiple satellites (such as India's PSLV-C37 mission which placed 104 satellites in Earth orbit on 23 June 2017), hundreds of satellites have been transported as cargo to the International Space Station in station supply craft such as the ATV, Cygnus, Dragon, HTV and Progress spacecraft. These satellites are subsequently deployed into Earth orbit from the space station months after leaving the Earth.

40. Plans for the exploration, exploitation and utilization of space resources, as well as human habitation of celestial bodies are being actively pursued by governmental and non-governmental organizations. Such activities will involve substantive and sustained space activities around celestial bodies other than the Earth for the first time.

41. Plans are also in development for the launch of space objects to celestial bodies outside the solar system. The Breakthrough Starshot initiative intends to use ground-based lasers[14] to propel a thousand "ultra-light nanocraft"[15] to 20 per cent of the speed of light with the intent of reaching exoplanet Proxima Centauri b[16] within 20 years.

IV. Recommendations for enhanced information exchange and notification procedures under the United Nations Register of Objects Launched into Outer Space

42. To effectively maintain the Register of Objects Launched into Outer Space, implement the other treaty obligations of the Secretary-General under international

[13] In addition to nominal space operations, including upgrading/replenishment of existing large satellite constellations, such as imagery (Planet Labs), communications (Iridium, Globalstar, Orbcomm) or global navigation satellite systems (Galileo, Global Navigation Satellite System (GLONASS) and Navstar), private corporate entities intend to launch megaconstellations into Earth orbit. For example, OneWeb intends to launch 10 satellites in 2018, over 600 more in 2019 and an additional 2,000 in future years. Similarly, SpaceX has announced its intent to launch 4,425 satellites between 2019 and 2024. Plans for constellations of hundreds or thousands of satellites are presently being developed by various other entities.

[14] Phased arrays that could potentially be scaled up to the 100 gigawatt level.

[15] A fully functional space probe with an estimated mass of two grams carrying a light sail, cameras, photon thrusters, power supply, navigation and communication equipment.

[16] Discovered in August 2016, Proxima Centuari b is considered to be the closest exoplanet orbiting within the habitable zone of a star and is estimated to be approximately 4.2 light-years from our solar system.

space law, and support the work of the Committee on the Peaceful Uses of Outer Space and its Subcommittees, the Office for Outer Space Affairs continues to monitor the practices of States and international intergovernmental organizations in implementing the treaties and principles governing outer space activities. On issues relating to the application of the treaties and principles, the Office communicates with States parties to clarify their interpretation of the relevant articles.

43. In its capacity as the secretariat of the Legal Subcommittee, the Office has prepared background reports, questionnaires and other material relating to the work of the Subcommittee, including aerospace objects, the definition and delimitation of outer space and the registration of space objects.

44. Most recently, pursuant to General Assembly resolution 70/82, the Legal Subcommittee began consideration of the agenda item entitled “General exchange of views on the application of international law to small-satellite activities”. The Subcommittee noted that the item would provide valuable opportunities for addressing a number of topical issues relating to international and national policy and regulation measures regarding the use of small satellites by various actors.

45. The Subcommittee requested the Secretariat to prepare a questionnaire for States members and permanent observers of the Committee containing a set of questions addressing the practice of the development and use of small satellites, and policy and legal aspects of their use. The Secretariat submitted the draft questionnaire on the application of international law to small-satellite activities to the Subcommittee at its 2017 session, and it was adopted by the Subcommittee.

46. The following activities and proposed measures are based on similarly sourced information, as well as the accumulated institutional knowledge relating to the implementation of the obligations of the Secretary-General relating to outer space activities. The measures are based on existing practices of States and international intergovernmental organizations in registering space objects and are non-exhaustive. The proposed measures are made without prejudice to the work of the Committee on the Peaceful Uses of Outer Space and its Subcommittees.

A. Possible measures to be taken by States for the enhancement of the registration of space objects

47. In the decade since the adoption of General Assembly resolution 62/101, many States of registry have modified their registration practices to incorporate recommendations concerning the harmonization of the types of information to be provided to the Secretary-General.

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

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

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

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

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

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

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

(a) The geostationary orbit location, where appropriate;

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

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

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

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

50. Although the Registration Convention states that a State of registry should provide information on a space object "as soon as practicable", consideration could also be given to improving national notification mechanisms so that information is provided to the Secretary-General sooner.

51. Given the growing number of space missions that involve multiple launching States, consideration could be given to providing pre-launch notifications to establish, in advance, which launching State is the State of registry. Doing so would help avoid the present situation where one or more space objects (or entire constellations of space objects) remain unregistered. It is noted that information on objects that are intended to be launched is regularly provided by Governments to ITU. Similarly, under the Hague Code of Conduct against Ballistic Missile Proliferation, information concerning future space launches is regularly provided by most States with indigenous space launch capabilities to subscribing States.

52. Launcher States could ensure that foreign private sector clients (such as corporations and academic institutions) are aware of registration requirements and that under international law the State in which they are incorporated (or established) is required to authorize, supervise and register the object.

53. Expansion of the network of national space object registration focal points established in accordance with General Assembly resolution 62/101 to facilitate information exchange on registration-related matters would aid in resolving registration-related issues.

54. With the possibility of significant space operations involving multiple space objects being conducted in, around or on other celestial bodies, consideration could be given to ensuring that information on the space objects and their status is communicated to the Secretary-General. As most plans in development include the deployment of space objects from a central "station/hub" orbiting the particular celestial body, information on the deployment of such objects could also be provided to the Secretary-General.[17]

B. Review of technical criteria for assigning of Committee on Space Research international designators

55. The Committee on Space Research (COSPAR) international designator is the most widely used designator system used by States and international intergovernmental organizations for registering space objects with the Secretary-General.

56. In addition, the COSPAR international designator is the only specified identifier of a nuclear-powered space object to be used when a State is required to provide information should a malfunction with a risk of re-entry of radioactive materials to the Earth occur.[18]

[17] That practice is presently observed by States deploying space objects from the International Space Station.

[18] Principle 5 (Notification of re-entry) of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space.

57. The international designator has been in effective use since 1963, and technical criteria for assigning designators have been updated only a few times over the last six decades.

58. Over that period, the United States has provided its national space monitoring and tracking facilities to effectively and efficiently assign international designators to space objects once they are tracked in Earth orbit.

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

60. COSPAR, with the support of the Office for Outer Space Affairs and under the responsibility of the Committee, in conjunction with States, could review existing criteria and revise accordingly.

C. Efficiency measures for dissemination of information by the Secretariat[19]

61. Present space object registration procedures derive from the Secretary-General's obligations which require that "there shall be full and open access to the Register".[20] Additionally, article XI of the Outer Space Treaty requires that the Secretary-General "immediately and effectively" disseminate information provided by States.

62. The present mechanism for implementing the above-stated treaty requirements and ensuring the integrity and provenance of information provided to the Secretary-General requires that the information be provided via permanent missions accredited to the United Nations under cover of a letter or note verbale.[21] The information is subsequently disseminated to all Member States in English and French. Originally, these documents were made available in hard copy to all permanent missions and to academic institutions.

63. With the rapid increase in the number of space objects being launched into Earth orbit or beyond, the Secretariat believes that consideration should be given to making the registration/notification procedure more efficient for States of registry. The Secretariat notes that the present notification mechanism does not fully exploit advances made in information technology.

64. Presently, the website of the Office for Outer Space Affairs serves as the primary dissemination mechanism using weblinks to electronic versions of registration submissions and other notifications. Since 2000, links to registration documents are accessible through dedicated pages categorized by State of registry and year of registration. Additionally, dedicated States of registry pages also include links to indices of their registered functional objects.

65. Within existing resources and to improve services provided under existing mandates, the Secretariat would therefore adapt its website to allow States of registry to submit registration data to the Secretariat via an online registration form based on the model registration information submission form developed in accordance with General Assembly resolution 62/101. At the request of a permanent mission, each State of registry would be provided with unique password access (for single or multiple users) to the online form. The online form would allow States to register

[19] The proposed efficiency measures are aimed at improving the Secretariat's information dissemination mechanisms that have been established to implement existing mandates.

[20] Article III, paragraph 2, of the Registration Convention.

[21] In cases of international intergovernmental organizations, the heads of the entity or the heads of their legal departments transmit the information under cover of a letter.

their space objects in the working languages of the Secretariat and also provide additional information, including notifications in change in status. For States providing registration data on multiple space objects (“bulk registration”), the online form would allow the upload of datasets using standard formats (i.e., tab-delimited text format).

66. Following completion of existing review and verification procedures, the information would be immediately disseminated electronically in the working languages of the Secretariat to national space object registration focal points and other Member States wishing to receive such information. The information would also be made publicly available on the Office’s website in an online version of the Register to be based on the present Online Index of Objects Launched into Outer Space.[22] The online Register would include registration data on both functional and non-functional objects. To facilitate the review of registration information, online reporting and visualization tools could also be developed.

67. A consolidated quarterly report of registration information over the previous quarter would be produced in the working languages of the Secretariat and transmitted electronically to permanent missions. Similarly, an annual report would be disseminated to Member States during the sessions of the Committee and its Subcommittees.

D. Capacity-building, outreach and advocacy by the Office for Outer Space Affairs

68. To ensure the widest possible application of the international space treaties, the Office for Outer Space Affairs provides “treaty implementation” technical advisory and capacity-building services to Member States and international intergovernmental organizations.

69. In its resolution 71/90, the General Assembly encouraged the Office to continue to conduct capacity-building and outreach activities associated with space security and transparency and confidence-building measures in outer space activities, as appropriate, and within the context of the long-term sustainability of outer space activities.

70. Primary technical advisory services provided by the Office include the verification of information submitted by States of registry, which is facilitated by a network of space object registration national focal points. Additionally, upon request, the Office provides information to States and international intergovernmental organizations on past and present practices of States in the implementation of the treaties and principles.

71. In cooperation with ITU, the Office developed the publication entitled “Guidance on space object registration and frequency management for small and very small satellites”[23] as a capacity-building/technical advisory tool to address practical questions asked by prospective satellite operators.

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

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

[22] The Online Index is a reference tool designed to facilitate access to information on space objects provided by States under the space treaties. As it is not possible to develop a coherent searchable database solely using information provided by States of registry, the Online Index is a synthesis of official and unofficial information. The Online Index should not be considered to be the United Nations Register of Objects Launched into Outer Space.

[23] Available at www.unoosa.org/oosa/en/spaceobjectregister/resources/index.html.

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

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

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

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

73. The overall capacity-building programme of the Office for Outer Space Affairs, covering space science and technology applications as well as space law and policy, constitutes a foundation for promoting transparency and confidence-building measures in outer space activities. The related activities of the Office and the United Nations System are highlighted in document A/AC.105/1116.

74. Such activities of the Office for Outer Space Affairs include maintaining a compendium of space debris mitigation standards adopted by States and international organizations;[24] organizing voluntary familiarization visits to space launch locations and facilities, which could be considered using the model provided by the visit organized by China in April 2017;[25] dissemination of information from Member States concerning re-entries of high-interest space objects and recovery of meteorites; and promotion of the work of the Committee and its Subcommittees.

75. Further capacity-building measures that would facilitate the work of the Committee, include the following:

(a) Development of an online consolidated list of present and future space debris removal projects (active and passive measures);[26]

(b) Enhancement of the archives of national and multinational legal instruments presently available on the website of the Office for Outer Space Affairs;

(c) Development of an online consolidated list of the operational status of global navigation satellites in the framework of the International Committee on Global Navigation Satellite Systems.

V. Conclusion

76. Fifty years after the first United Nations Conference on the Exploration and Peaceful Uses of Outer Space, outer space activities have dramatically increased in both scope and number. Significant advances in space technology allow governmental and non-governmental entities unprecedented access to outer space for a myriad of applications, ranging from disaster management and response to deep-space art.

77. With plans for future space activities that include megaconstellations of satellites in Earth orbit, the sustained and substantial exploration of asteroids, moons and planets by robotic and crewed missions within the solar system, and even missions to neighbouring star systems, UNISPACE+50 serves as an ideal opportunity for States to consider the current status of global governance of outer space activities and chart its future.

[24] Available at www.unoosa.org/oosa/en/ourwork/topics/space-debris/compendium.html.

[25] In April 2017, the Director of the Office for Outer Space Affairs and six permanent representatives to the United Nations (Vienna) participated in a familiarization visit to the Wenchang Space Launch Centre, Hainan, China.

[26] Information on such projects is sometimes provided by States of registry.

78. The above-mentioned measures are provided without prejudice to the work of the Committee and its Subcommittees on enhanced information exchange relating to space objects and events and will help improve the dissemination of information to Member States.

79. The Office for Outer Space Affairs also notes that, within its existing resources, the efficiency measures described in this report related to registration practices are already being implemented, or will be implemented, to ensure that the Secretary-General's obligations under the treaties and principles governing outer space activities will be met in the years to come.