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Draft final report of the Working Group on the Long-term Sustainability of Outer Space Activities

Working paper by the Chair of the Working Group on the Long-term Sustainability of Outer Space Activities

[*Note: The following text is an edited version of the text resulting from the informal online meeting of the Working Group on the Long-term Sustainability of Outer Space Activities, held on 7 and 8 April 2025.*]

I. Introduction

1. At its sixty-second session, in 2019, the Committee on the Peaceful Uses of Outer Space adopted the Guidelines for the Long-term Sustainability of Outer Space Activities (A/74/20, annex II). At that session, the Committee encouraged States and international intergovernmental organizations to voluntarily take measures to ensure that the Guidelines were implemented to the greatest extent feasible and practicable (A/74/20, para. 163).

2. At the same session, the Committee decided to establish, under a five-year workplan, a working group under the agenda item on the long-term sustainability of outer space activities of the Scientific and Technical Subcommittee (A/74/20, para. 165).

3. The Committee also decided that the working group would agree on its own terms of reference, methods of work and dedicated workplan, and that the working group would be guided by the following framework (A/74/20, para. 167):

(a) Identifying and studying challenges to the long-term sustainability of outer space activities and considering possible new guidelines for the long-term sustainability of outer space activities. This could be done by taking into consideration existing documents, including, inter alia, documents A/AC.105/C.1/L.367 and A/AC.105/2019/CRP.16;

(b) Sharing experiences, practices and lessons learned from voluntary national implementation of the adopted Guidelines;

(c) Raising awareness and building capacity, in particular among emerging space nations and developing countries.

4. In accordance with its terms of reference (A/AC.105/1258, annex II, appendix, para. 9), the Working Group on the Long-term Sustainability of Outer Space Activities was tasked with producing a thorough report on the long-term sustainability of outer space activities, containing the following:

(a) Information on the identification and study of challenges to the long-term sustainability of outer space activities, and corresponding recommendations, as well as possible new guidelines for the long-term sustainability of outer space activities;

(b) Information on experiences, practices and lessons learned from voluntary implementation of the adopted Guidelines and recommendations for their further practical implementation;

(c) Information on and recommendations for capacity-building and awareness-raising activities, including those related to improving international cooperation in capacity-building, taking into particular consideration the requirements of emerging space nations and developing countries;

(d) Recommendations on future activities and work [on the long-term sustainability of outer space activities].

5. The Working Group followed a multi-year workplan (A/AC.105/1258, annex II, appendix, para. 18), working during the annual sessions of the Scientific and Technical Subcommittee as well as in the intersession period, as needed, and attaching equal importance to each of the three elements of its terms of reference.

6. Many ideas and concepts considered by the Working Group were interconnected. For instance, some experiences in implementing the adopted Guidelines included or revealed a challenge or a related opportunity for capacity-building.

II. Results of the work of the Working Group

A. Information on the identification and study of challenges to the long-term sustainability of outer space activities, and corresponding recommendations, as well as possible new guidelines for the long-term sustainability of outer space activities

1. Information

7. Repeated themes or groupings of challenges, taken from the tables of compiled input on challenges provided by members of the Working Group, include:

(a) Large constellations, including related regulation, registration, operational contact points and need for a definition;

(b) Space situational awareness, including related information-sharing and coordination;

(c) Spacecraft manoeuvring – rules and requirements;

(d) Design and operation of small-sized space objects;

(e) Active debris removal and on-orbit operations;

(f) Ensuring that all nations, including emerging spacefaring nations, can participate, in an inclusive manner, in space activities and implementation of the Guidelines;

(g) Capacity-building and international cooperation.

8. There are risks and challenges involved in outer space activities and difficulties in implementation of the voluntary Guidelines for the Long-term Sustainability of Outer Space Activities, and there are proposals to update existing guidelines or

develop new ones in areas that are not currently covered, for instance the safety [and security] of space operations. [Some of these include:[1]

(a) Implementation of operational and technological measures of self-restraint related to States' space activities in order to prevent adverse developments in outer space;

(b) Preclusion of interference with the operation of foreign space objects;

(c) Refrain from modifications of the space environment;

(d) Respect for the safety and security of foreign space-related ground and information infrastructure;

(e) Development and implementation of criteria and procedures for the preparation and conduct of space activities aimed at the active removal of space objects from orbit;

(f) Safe [and responsible] conduct of operations for the destruction of space objects[, taking into account the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space, in particular guideline 4 (Avoid intentional destruction and other harmful activities)];

(g) Appropriate solutions for the active removal and destruction of non-registered space objects.]

2. [Possible] Recommendations

9. Related recommendations include:

(a) Study further the repeated themes within the challenges, including discussion of challenges that appear in multiple guideline areas (see sections A–D in the adopted Guidelines);

(b) Give additional consideration to the following thematic areas:

(i) Space situational awareness, including related information-sharing and coordination [and spacecraft manoeuvring], if not addressed through a different action group of the [Committee on the Peaceful Uses of Outer Space] [Subcommittee];

(ii) [Design and operation of [small-sized] space objects taking into account space sustainability, including manoeuvrability, trackability etc.];

(iii) Space debris issues, including [mitigation, remediation and] active debris removal;

(iv) [Other on-orbit operations];

(v) [Spacecraft manoeuvring [and other on-orbit missions]];

(vi) Sustainability of deep space missions;

(vii) Safety considerations with respect to sustainability for human space flight;

(viii) Potential findings on dark and quiet skies and large constellations.

[1] The Working Group on the Long-term Sustainability of Outer Space Activities discussed the option of moving the substantive details of paragraph 8 under the heading "Recommendations" or redrafting the text and keeping it under the heading "Information". As there was no agreement, proposed changes have been added to the existing paragraph 8, with the Working Group noting that it would need to return to the matter.

B. Information on experiences, practices and lessons learned from voluntary implementation of the adopted Guidelines and recommendations for their further practical implementation

1. Information

10. Working Group members have voluntarily reported on experiences, practices and lessons learned from voluntary implementation of the adopted Guidelines. Such information can be found [in documentation for the Committee, the Subcommittee and the Working Group, as well as] in the Long-term Sustainability of Outer Space Activities Information Repository developed by the Office for Outer Space Affairs (see A/AC.105/1279, annex II, paras. 17–21, and https://spacesustainability.unoosa.org).

2. [Possible] Recommendations

11. Related recommendations include:

(a) Continue voluntary implementation of, and share information about, the adopted Guidelines and, where appropriate, conduct outreach activities to promote implementation globally and motivate new space actors to implement the Guidelines;

(b) Use the Long-term Sustainability of Outer Space Activities Information Repository to collect information regarding voluntary implementation;

(c) [Undertake an assessment of implementation mechanisms that could be relevant to addressing the long-term sustainability of outer space activities[, noting that a number of guidelines in the adopted Guidelines mention non-governmental bodies but do not specify which ones or how they should be engaged];]

(d) Guideline-specific recommendations, including:

(i) States should be aware of the location, orbital parameters, physical characteristics and status of their in-orbit space objects, including activities undertaken by non-governmental entities supervised or authorized by States Members, in accordance with article VI 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 (see guideline B.1 (Provide updated contact information and share information on space objects and orbital events) and guideline B.2 (Improve accuracy of orbital data on space objects and enhance the practice and utility of sharing orbital information on space objects));

(ii) Communication, coordination and collaboration between existing or developing space situational awareness systems, including their harmonization, in different regions of the world should be promoted. That could be achieved through the routine exchange of information on space objects and events in order to improve space safety and sustainability. [In that regard, further consideration should be given to the establishment of a United Nations database on space objects and events] (see guideline A.5 (Enhance the practice of registering space objects), guideline B.1 (Provide updated contact information and share information on space objects and orbital events), guideline B.2 (Improve accuracy of orbital data on space objects and enhance the practice and utility of sharing orbital information on space objects), and guideline B.3 (Promote the collection, sharing and dissemination of space debris monitoring information));

(iii) Awareness-raising should be encouraged to sensitize all space operators to the risk of collision in an increasingly congested outer space environment and to the importance of inter-operator coordination (see guideline B.1 (Provide updated contact information and share information on space objects and orbital events) and guideline B.4 (Perform conjunction assessment during all orbital phases of controlled flight));

(iv) States should [cooperate with each other through international cooperation and technical transfer to avoid collisions] [consider implementing navigation

and anti-collision mechanisms] [to safeguard] [to ensure] the sustainability of current and future outer space activities. [Establishing an innovative financial compensation framework for damages incurred to space objects of developing countries should be further examined [, [also] by the Legal Subcommittee]] (see guideline B.4 (Perform conjunction assessment during all orbital phases of controlled flight) and guideline C.4 (Raise awareness of space activities));[2]

(v) States should consider ongoing monitoring and regular reporting to assess the effectiveness of measures for mitigating space debris (see guideline D.2 (Investigate and consider new measures to manage the space debris population in the long term)), taking into account that there is related ongoing work being undertaken, in particular under the agenda item on space debris of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space and by the Inter-Agency Space Debris Coordination Committee;

(vi) States [Space-service providers] should [consider] [be provided with] incentives for the development of new technologies and innovative practices to help mitigate the creation of new space debris (see guideline D.2 (Investigate and consider new measures to manage the space debris population in the long term));

(vii) [Public-private partnerships, where appropriate, should be encouraged to accelerate the adoption and implementation of new space debris mitigation and remediation technologies (see guideline D.2 (Investigate and consider new measures to manage the space debris population in the long term)).]

C. Information on and recommendations for capacity-building and awareness-raising activities, including those related to improving international cooperation in capacity-building, taking into particular consideration the requirements of emerging space nations and developing countries

1. Information

12. Relevant international and regional cooperation is supported through a number of organizations, initiatives and forums, including the following: African Space Agency; European Space Agency; Asia-Pacific Space Cooperation Organization; Subcommittee on Space Technology and Applications of the Association of Southeast Asian Nations; Brazil, China, Egypt, Ethiopia, India, Indonesia, Iran (Islamic Republic of), Russian Federation, South Africa and United Arab Emirates (BRICS Plus); Commonwealth of Independent States; European Union; European Organization for the Exploitation of Meteorological Satellites; Inter-Agency Space Debris Coordination Committee; International Committee on Global Navigation Satellite Systems; International Space Exploration Coordination Group; Committee on Earth Observation Satellites; Group on Earth Observations; International Organization for Standardization; Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters; International Space Weather Initiative; International Space Environment Service; Committee on Space Research; International Astronautical Federation; Asia-Pacific Regional Space Agency Forum and its National Space Legislation Initiative; European Cooperation for Space Standardization; World Meteorological Organization; International Telecommunication Union; International Civil Aviation Organization; Office for Outer Space Affairs; and the regional centres for space science and technology education, affiliated to the United Nations.

[2] The Working Group noted that it would need to further consider, in particular, this sub-item.

2. [Possible] Recommendations

13. Related recommendations include:

(a) Ensure that international and regional cooperation efforts are as inclusive as possible, with particular efforts being made to include developing countries;

(b) Encourage, where appropriate, multi-stakeholder dialogue in international cooperation. This includes public, commercial and academic representatives, in addition to Governments;

(c) Encourage capacity-building and awareness-raising activities, which may take many forms, including the following: training courses, fellowships, webinars, workshops, international conferences, forums at the ministerial level, industry events, the provision of technical assistance, technology transfer on a voluntary and mutually agreed basis, academic articles, digital outreach programmes, social media efforts, podcasts and monthly question-and-answer opportunities with subject matter experts from the space sector, fostering the development of relevant and appropriate space capabilities in interested States;

(d) Continue, within available resources, support from the Office for Outer Space Affairs for capacity-building and awareness-raising activities in areas linked to the long-term sustainability of outer space activities;

(e) Encourage developed space nations to continue to share insights into and know-how related to operational and design approaches to addressing challenges related to the sustainability of outer space activities;

(f) A common approach to registering constellations to improve efficiency and completeness, based on the work of the Working Group on the Status and Application of the Five United Nations Treaties on Outer Space of the Legal Subcommittee, could be shared by the Office for Outer Space Affairs;

(g) A glossary to facilitate the understanding and harmonization of specific terminology shared by all member States could be developed;

(h) Conduct, at the national level, outreach with industry and academia to promote the development and use of techniques and methods to improve knowledge and share that knowledge with the international community. This includes participation in conferences, workshops and exercises;

(i) Develop a list of frequently asked questions and factsheets on specific aspects of Guideline implementation/the long-term sustainability of outer space activities, as appropriate, if they could help with capacity-building among emerging and established countries.

D. Recommendations on future activities and work

14. [Possible] Recommendations include:

(a) Leverage opportunities through the Scientific and Technical Subcommittee, the Legal Subcommittee and the Committee on the Peaceful Uses of Outer Space to bring experts together, under specific agenda items, to exchange best practices related to the challenges identified, as appropriate;

(b) Advance capacity-building and international cooperation related to the long-term sustainability of outer space activities;

(c) [*Note: The following are four options for subparagraph (c) for the consideration of Working Group members.*]

[*Option one*]

[Consider the next steps under this agenda item at the conclusion of the present mandate;]

[*Option two*]

[Establish a new, third iteration of the Working Group on the Long-term Sustainability of Outer Space Activities at the conclusion of the present mandate with a workplan that [includes] [may include] expert groups. The duration and the chairing of the Working Group are to be decided;]

[*Option three*]

[Consider forming [an] [expert group(s)][, as needed, and closing it/them also, as needed] [mechanisms] [a subsidiary open-ended expert group under the Working Group on the Long-term Sustainability of Outer Space Activities] [, deconflicting with other ongoing work,] [,if not addressed through a different subcommittee [working group] [expert group] [action team] [mechanism] on the peaceful uses of outer space] to discuss possible thematic areas or potential new guidelines;]

[*Option four*]

[Extend the existing Working Group on the Long-term Sustainability of Outer Space Activities and draft a new workplan;]

(d) [Clearly define the criteria, structure and procedure (see in this connection, as examples, conference room papers A/AC.105/2022/CRP.11, A/AC.105/C.1/2023/CRP.4 and A/AC.105/C.1/2025/CRP.7) whenever a new guideline is proposed;]

(e) [Continue work towards a Committee on the Peaceful Uses of Outer Space compendium on the long-term sustainability of outer space activities, [to be] [which could be] [the precise nature of which could be defined at a later point.] structured as follows:

(i) Preamble;

(ii) Definition and terms;

(iii) Challenges and [threats] [risks];

(iv) Set of guidelines;

(v) Update of procedures:

a. Introducing proposals related to the creation of new guidelines or the update of existing ones, including the criteria for and structure of guidelines and related procedures;

b. Considering and adopting proposals, including on the scope and methods of work and drafting the text of a guideline;

c. Update of the compendium, including revision and decision-making;

(vi) Guideline implementation feedback];

(f) [Establish a group of governmental experts or an open-ended working group on dedicated long-term sustainability of outer space activities topics, as appropriate.]

Annex

Compiled substantive inputs by Working Group members

[*Note: A separate working file will be made available to Working Group members showing options for the annex to the final report*.]