

27 January 2017

Original: English

**Committee on the Peaceful Uses
of Outer Space
Scientific and Technical Subcommittee
Fifty-fourth session**

Vienna, 30 January - 10 February 2017

Item 13 of the provisional agenda*

Long-term sustainability of outer space activities

**Proposals for the Guidelines for 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**

At its fifty-ninth session in June 2016, the Committee on the Peaceful Uses of Outer Space extended the mandate of the Working Group on the Long-term Sustainability of Outer Space Activities for a further two years, and agreed on a related programme of work (A/71/20, para. 137). In accordance with this programme of work, a third intersessional meeting of the Working Group was arranged and held in Vienna from 19 to 23 September 2016.

Participants of the intersessional meeting requested that the Chair of the Working Group work with interested delegations in the period between the intersessional meeting and the fifty-fourth session of the Scientific and Technical Subcommittee to develop a proposal for streamlining the preambular text. That proposal is found in Section I of the present document. Participants of the intersessional meeting also suggested that the Chair work on new options for striking a balance between alternative formulations of similar ideas found in the guidelines document. Those proposals are found in Section II of the present document.

As the Working Group had previously agreed that the ideas contained in draft guideline 29 would be best expressed not as a guideline, but rather in a section devoted to implementation and updating, Section III of the present document proposes such a text.

The present conference room paper is an updated version of an informal working document that was circulated to delegations in December 2016 for review and consideration. Interested delegations provided written comments on the proposals contained in that informal document. All written comments received were reviewed

* A/AC.105/C.1/L.355



closely and taken into careful consideration when developing the present conference room paper.

Where there were multiple overlapping suggestions for edits, where delegations introduced substantive changes and/or new texts, and/or where there were proposals for extensive deletions of texts, it was very challenging to reconcile the various inputs in the present document. In such instances, the text in the Chair's initial proposal has been modified to a lesser degree. The Chair believes that the Working Group will benefit from collective discussions of these various proposals at the fifty-fourth session of the Scientific and Technical Subcommittee.

I. A proposal for a streamlined preamble

The Chair of the Working Group proposes that the structure of the preamble be simplified as follows. The subheadings “Context of the guidelines for the long-term sustainability of outer space activities” and “Guidelines for the long-term sustainability of outer space activities” found in Part B of A/AC.105/C.1/L.354/Rev.1 could be removed and the twenty-two preambular paragraphs could be reduced to sixteen paragraphs. The following proposed revision attempts to reduce length and redundancies while retaining the key elements.

A. Background, definition and concepts

1. Space science and space applications improve our fundamental knowledge of the universe and the daily lives of people worldwide through environmental monitoring, management of natural resources, early warning systems for disaster management and mitigation, meteorological forecasting, climate modelling, satellite navigation and communications. Therefore, space science and technology make a major contribution to the well-being of humanity, supporting the goals of the United Nations and playing a vital role in various aspects of economic, social and cultural development on Earth. Hence, the long-term sustainability of outer space activities is of interest and importance not only for current and aspiring participants in space activities, but also for the international community as a whole.
2. The space environment is being used by an increasing number of States, international intergovernmental organizations and non-governmental entities. The proliferation of space debris and the increased risks of collision and interference with the operation of space objects raise concerns about the long-term sustainability of space activities, particularly in low Earth orbit and geostationary orbit environments.
3. The long-term sustainability of outer space activities is defined as the conduct of space activities in a manner that balances the objectives of access to the exploration and use of outer space by all States and governmental and non-governmental entities only for peaceful purposes with the need to preserve the outer space environment for operationally safe, stable and conflict-free use in such a manner that takes into account the needs of current and future generations.
4. The objective of ensuring the long-term sustainability of outer space activities should be understood by States and international intergovernmental organizations to require a holistic approach that entails a number of measures that may be individually and collectively pursued for the continuous improvement of space policy design and implementation and that provide a strong rationale, as well as practical opportunities and incentives, for achieving this objective across all sectors of their space activities.

5. In line with this objective, the outer space interests of States and international intergovernmental organizations, as they have or may have defence or national security implications, should be fully compatible with preserving outer space for peaceful exploration and use, as well as safeguarding its status pursuant to article I of the Outer Space Treaty and the relevant principles and norms of international law. Such an approach should be reflected in the policies and regulations by means of which States and international intergovernmental organizations conduct space operations, leverage space capabilities, manage their own space assets or those related to them on legal grounds and overcome unforeseen events or circumstances in outer space.

6. The safe conduct of space operations requires States and international intergovernmental organizations to undertake a range of measures at the political, regulatory, technical and organizational levels that allow them to protect their own space objects and related ground infrastructure from risks, hazards, threats and encroachments. By the same token, States and international intergovernmental organizations should ensure that their own space objects and related ground infrastructure do not give rise to risks, hazards and threats to and encroachments upon foreign space objects and their related ground infrastructure.

B. Scope and application

7. The following set of voluntary guidelines establishes the concept of and defines the basic criteria for national and international practices for ensuring and enhancing the long-term sustainability of outer space activities. The guidelines are premised on the understanding that outer space should remain an operationally stable, safe and conflict-free environment for current and future generations, open for peaceful exploration, use and international cooperation in the interest of all countries, irrespective of their degree of economic or scientific development, without discrimination of any kind.

8. The guidelines reflect international consensus on the measures needed to enhance the long-term sustainability of outer space activities, based on current knowledge and established practices. They address the policy, regulatory, operational, safety, scientific, technical, international cooperation and capacity-building aspects of space activities and are relevant to both governmental and non-governmental entities. They are also relevant to all space activities, whether planned or ongoing, as practicable, and to all phases of a mission life cycle, including launch, operation and end-of-life disposal.

9. The guidelines are intended to support the development of national and international practices and regulatory and safety frameworks for conducting outer space activities, and to accommodate the needs of developing countries and countries with emerging space programmes, while allowing for flexibility in adapting such practices and frameworks to specific national circumstances. Current practices, operating procedures, technical standards, policies and experiences gained through the conduct of space activities are also taken into consideration, as the guidelines are intended to supplement guidance already available in existing standards and regulations.

10. The existing United Nations treaties and principles on outer space provide the fundamental governance framework for the guidelines. The guidelines also take into account the recommendations contained in the report of the Group of Governmental

Experts on Transparency and Confidence-Building Measures in Outer Space Activities¹, which are instrumental to the application of the guidelines.

11. The guidelines are not legally binding under international law, but any action taken towards their implementation should be consistent with the applicable principles and norms of international law. They are formulated in the spirit of enhancing the practice of States and international organizations in applying the relevant principles and norms of international law. Nothing in the guidelines should constitute a revision, qualification or reinterpretation of those principles and norms.

12. Member States and international organizations should voluntarily take measures, through their national or other applicable mechanisms, to ensure that the guidelines are implemented to the greatest extent feasible and practicable and in accordance with their national conditions and capabilities as a prudent and necessary step towards preserving the outer space environment for current and future generations. States and international intergovernmental organizations should implement the guidelines in accordance with their existing obligations under international law, including the provisions of applicable United Nations treaties and principles on outer space.

13. The general understanding should be that the greater the technical and other relevant capabilities at the disposal of a particular State or international intergovernmental organisation, the greater the emphasis it should place on the implementation of these guidelines in support of collective efforts to enhance the safety of space operations. In cases where the development and enactment of regulations, standards and procedures required for the implementation of these guidelines may prove to be a difficult task, provision should be made to build indigenous capacity in this regard.

14. In order to apply the guidelines, States and international intergovernmental organizations should establish and use regulations and international cooperation mechanisms that would allow them to perform tasks related to ensuring and enhancing the long-term sustainability of outer space activities. As reflected in the 1996 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, States and international intergovernmental organizations are free to determine all aspects of their participation in international cooperation in the exploration and use of outer space on an equitable and mutually acceptable basis.

15. States and international intergovernmental organizations should make full use of opportunities to steadily increase, through dedicated practical measures, the predictability and transparency of and the building of confidence in space activities, as those features are instrumental in the application of the guidelines for the long-term sustainability of outer space activities.

16. The guidelines reflect international consensus on the measures needed to enhance the long-term sustainability of outer space activities, based on current knowledge and established practices. As understanding of the various factors influencing the long-term sustainability of outer space activities deepens, the set of guidelines should be reviewed, and, if necessary, revised in the light of new findings.

¹ A/68/189.

II. Proposals for reducing alternative texts throughout the guidelines

Part B of A/AC.105/C.1/L.354/Rev.1 contains a number of guidelines with alternative formulations for certain paragraphs. At the intersessional meeting in September 2016, it was agreed that the Chair would take into consideration all the views expressed on the various alternative formulations and draft new text for these guidelines. This section of the present document contains possible new formulations of guidelines 6, 11, 21, 23 and 30 for the consideration of delegations. In drafting these texts, the Chair has attempted to strike a balance of the ideas contained in the various alternative formulations and also to remove text that duplicates ideas expressed elsewhere in the same guideline, or in another guideline.

Guideline 6

Enhance the practice of registering space objects

6.1 States and international intergovernmental organizations should ensure the effective and comprehensive implementation of registration practices in accordance with the provisions and in support of the objectives of the Convention on Registration of Objects Launched into Outer Space. In doing so, States and international intergovernmental organizations should also take into consideration the enhanced registration practices recommended by the General Assembly in its resolution 62/101. To that end, States and international intergovernmental organizations should adopt appropriate policies and regulations for enhancing their registration practices. Such policies and regulations should cover the communication of expanded information on space objects, their operation and their status, with a view to making registration practices subject to broad international acceptance and sustained over the long term. States and international intergovernmental organizations should act responsibly to that end, considering the proper registration of space objects as a determining factor of safety and security in outer space and, therefore, as a condition for the long-term sustainability of space activities.

6.2 It should be understood and/or provided for in regulatory instruments enforced by States and international intergovernmental organizations that States and international intergovernmental organizations should not, in any formal or practical way, neglect or unduly perform the procedure of registration, as this may have serious negative implications for ensuring the safety of space operations. States and international intergovernmental organizations should not support or allow practices inconsistent with obligations under the Registration Convention. Solutions should also be sought whenever specific launches of space objects give rise to legal or technical issues that call for diligence in the implementation of registration procedures.

6.3 Prior to the launch of a space object, the State from whose territory or facility a space object will be launched should, in the absence of prior agreement, contact the States or international intergovernmental organizations that could qualify as the launching States of that space object to jointly determine as to how to proceed with the registration of that particular space object. Following the launch of a space object, and considering relevant criteria in the Registration Convention, should States and/or international intergovernmental organizations that were involved in the launch of that space object, have reason to believe that it might not be registered, those States and/or international intergovernmental organizations should coordinate among themselves and with those States and international intergovernmental organizations that have jurisdiction and control over the non-registered space object, to determine which State or international intergovernmental organization should register the space

object. In the event that a State or international intergovernmental organization receives a registration enquiry, that State or international intergovernmental organization should respond as soon as practicable in order to facilitate the clarification and/or resolution of a particular registration issue.

6.4 The Office for Outer Space Affairs of the Secretariat should be effectively engaged in executing integrated functions pertaining to: (a) the accumulation of information on orbital launches performed (i.e., completed launches resulting in the placement of objects into Earth orbit or beyond) and on orbital objects (i.e., space objects that have been launched into Earth orbit or beyond); and (b) the assignment of international designations to orbital launches and orbital objects in accordance with Committee on Space Research notation, as well as the provision of such designations to the States of registry. The Office should be committed to promoting initiatives that would enable States to satisfactorily adhere to accepted practice by furnishing expanded registration information in accordance with General Assembly resolution 62/101.

6.5 The launching States and, where appropriate, international intergovernmental organizations should assume responsibility for requesting space launch service providers and users to meet all registration requirements under the Registration Convention and for encouraging their receptiveness to, and urging them to contemplate, the provision of expanded registration information. States and international intergovernmental organizations, having institutionalized the practice of providing expanded registration information, should strive to sustain such practice and identify circumstances complicating the achievement of that task.

6.6 States and international intergovernmental organizations should act in line with subparagraph 2 (b) (ii) of General Assembly resolution 62/101 by considering providing information describing the status of a space object and changes in orbital location of a space object. For the purpose of systemizing understanding in terms of the information required in accordance with subparagraph 2 (b) (ii) of General Assembly resolution 62/101, the following list contains information on changes of status of operations that may be used:

- (a) Termination or renewal of the functioning of a space object;
- (b) Loss of functionality of a space object owing to technical flaws or other reasons;
- (c) Loss of ability to control the flight of a space object, with simultaneous emergence of the risk of harmful radio frequency interference with the radio links of other functioning space objects and/or the risk of potentially hazardous conjunctions with other functioning space objects;
- (d) Separation (if envisaged) of subsatellites and/or technological elements of space objects;
- (e) Deployment (if envisaged) of technological elements that change the properties of a space object that influence its orbital lifetime.

6.7 States and international intergovernmental organizations, acting in the same manner, should consider providing the information referred to in paragraph 4 (a) (iii) of General Assembly resolution 62/101, describing changes in the orbital location of the space object, in accordance with the following list:

- (a) Change of the orbital parameters of a space object as a result of which the space object moves to a different region of near-Earth space;
- (b) Placement of a space object into a graveyard orbit or an orbit with reduced ballistic lifetime;

- (c) Change in location in geostationary orbit;
- (d) Repositioning (not entailing significant changes in basic orbital parameters) of a spacecraft operating as part of a satellite constellation among nominal slots within the orbital structure of the constellation.

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

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

Guideline 11

Provide updated contact information and share information on space objects and orbital events

11.1 States and international intergovernmental organizations should exchange and/or make readily available regularly updated contact information on their designated entities authorized to engage in exchanges of appropriate information on, inter alia, space operations, conjunction assessments and the monitoring of objects and events in outer space, in particular those entities that are responsible for processing incoming incident reports and forecasts and adopting precautionary and response measures. States and international intergovernmental organizations should establish appropriate means to enable timely coordination to reduce the probability of and/or to facilitate effective responses to orbital collisions, orbital break-ups and other events that might increase the probability of accidental collisions or may pose a threat to human lives, property and/or the environment, in the case of uncontrolled re-entries.

11.2 States and international intergovernmental organizations should exchange, as mutually agreed, relevant information on space objects and information related to actual or potential situations in near-Earth space that may affect the safety and security of outer space operations.

11.3 The information exchanged should be, to the extent practicable, reliable, accurate and complete. Its time reference and period of applicability should be noted. The information should be exchanged in a timely manner to enable precautionary actions.

11.4 To implement the present guideline, States and international intergovernmental organizations should, through a dedicated consultative process, consider, acquire specific understanding of and develop shared positions on the practical issues and modalities relating to the exchange of relevant information on space objects and events in near-Earth space obtained from different authorized sources, in order to ensure harmonized and standardized record-keeping on objects and events in outer space.

11.5 As part of identifying pragmatic approaches to collaborative information-sharing, States and international intergovernmental organizations should consider the options for effectively accumulating and providing access to information on objects and events in outer space on a timely basis and for achieving consistency in the interpretation and use of such information as one of the means to support their activities aimed at maintaining the safety of space operations. The options for consideration could include standards and data formats to enable the interoperability of information shared on a voluntary basis, bilateral arrangements to exchange information, regional or multilateral coordination among providers of information to enable cooperation and interoperability and the establishment of a United Nations information platform. Those options could serve as a basis for a distributed international information system for multilateral cooperation in sharing and disseminating multi-source information on objects and events in near-Earth space.

Guideline 21

Establish procedures and requirements for the safe conduct of operations resulting in the destruction of in-orbit space objects

21.1 Recognizing that space debris poses a threat to space operations, the intentional destruction of any on-orbit spacecraft and launch vehicle orbital stages or other harmful activities that generate long-lived debris should be avoided. However, under certain exceptional circumstances, States and international intergovernmental organizations may need to consider the destruction of a space object under their jurisdiction and/or control because those circumstances afford no other technical option, and because the alternatives to such an action would have far more negative consequences. Such a course of action should be duly substantiated as an unavoidable measure to avert an immediate or potential serious threat to human life, the environment or property in outer space or on the ground, in the air or at sea in case of re-entry of the space object.

21.2 When the intentional destruction of a space objects is determined to be necessary/unavoidable, States and international intergovernmental organizations contemplating such an action should inform the international community well in advance, through the Office for Outer Space Affairs or other appropriate channels, of the circumstances that warrant such an action, their plans for carrying out such an operation, and the measures that will be taken to ensure that intentional destruction is conducted at sufficiently low altitudes to limit the orbital lifetime of resulting fragments. It should be a general principle that the greater the probability of side effects from such an operation, the more detailed should be the information made available at different stages of the operation's preparation and implementation. Where practicable, the prerequisites for organizing the provision of information in an expeditious reactive mode or in a near real-time mode should be properly considered.

21.3 Any operation that could result, through mechanical impact or the use of other means, in direct or indirect damage to or destruction of a space object under foreign jurisdiction and control should not be contemplated unless explicitly agreed to by the States or international intergovernmental organizations that exercise jurisdiction and control over that space object.

21.4 Any operations resulting in the intentional destruction of an in-orbit space object should be carried out in conformity with the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space as they relate to the need to avoid the generation of long-lived debris.

Guideline 23**Promote and facilitate international cooperation in support of the long-term sustainability of outer space activities**

23.1 States and international intergovernmental organizations should promote and facilitate international cooperation in the exploration and peaceful uses of outer space among governmental and non-governmental, commercial and scientific entities, at the global, multilateral, regional and bilateral levels and among countries at all levels of development, as one of the means to support the long-term sustainability of outer space activities. Such cooperation should take place on the basis of equality, mutual benefit and non-discrimination, and in accordance with international law, national regulations, processes and requirements, and applicable international non-proliferation obligations.

23.2 States and international intergovernmental organisations engaging in such cooperative activities for the exploration and use of outer space should pay particular attention to the benefits for and interests of developing countries and countries with emerging space programmes. States and international intergovernmental organisations are free to determine all aspects of their participation in cooperative activities for the exploration and use of outer space on a mutually acceptable basis. The terms of such cooperative activities, for example in contracts and other legally binding mechanisms, should be fair and reasonable.

23.3 States and international intergovernmental organizations should consider promoting international technical cooperation as one of the means to enhance the long-term sustainability of outer space activities. In this regard, States and international intergovernmental organizations should promote technology safeguard arrangements that may facilitate space capacity-building, while respecting intellectual property rights, relevant international non-proliferation obligations and national legislation and regulations.

23.4 States undertaking, authorizing or intending to undertake or authorize international space activities involving the use of controlled items (objects, materials, manufactured items, equipment, software or technology) whose unauthorized disclosure and onward transfer are prohibited and thus warrant appropriate levels of control, should ensure that such activities are conducted in accordance with multilateral commitments, non-proliferation norms and principles and international law, irrespective of whether such activities are carried out by governmental or non-governmental entities or through international intergovernmental organizations to which such States belong. In cases where controlled items are exported or imported, States should provide, by means of agreements or other arrangements, for the implementation of measures that are institutionalized appropriately under their national legislation for the safeguarding of imported controlled items while they are in the territory or under the jurisdiction of the importing State.

23.5 States and international intergovernmental organisations could consider the establishment of a voluntary international space debris fund under the auspices of the Office for Outer Space Affairs in order to support international cooperative activities to reduce the risks posed by space debris to the safety of space activities and to prevent the creation of future space debris. Member States, especially the leading States in space activities, might be encouraged to consider allocating a percentage of their budget for space activities to such a voluntary fund in order to enhance the long-term sustainability of outer space activities, support sustainable development on Earth and support the sustainable utilization of outer space.

Guideline 30

Address approaches to the design and operation of small-size space objects

30.1 Given the safety challenges posed by untraceable objects in outer space, States and international intergovernmental organizations should give all due emphasis and regulatory attention to promoting design solutions that increase the detectability and observability of small-size space objects in the radar and optical bands, and also to design solutions that increase the accuracy of locations determined for small-size space objects during their operational phase in orbit, such as through the use of on-board navigation receivers that operate using global navigation satellite system (GNSS) signals.

30.2 States and international intergovernmental organizations should also give attention, through regulatory and policy measures, to the operations of small-size space objects in orbit, particularly with regard to the orbital regions used and the lifetimes of such objects in orbit. Such measures could include:

(a) Refraining, as practicable, from placing small-size space objects in orbits where their ballistic lifetime would exceed their operational lifetime by many times;

(b) Seeking to ensure that the period of ballistic lifetime of small-size space objects upon the completion of their operation is made as unprotracted as practicable, using technological solutions that provide for drag augmentation (including changing the eccentricity of the orbit to lower the perigee);

(c) Avoiding, as practicable, the placement of large groups of small-size space objects in the areas of those near-Earth orbits that are characterized by the highest spatial density of objects, so as to minimize the growth of the space debris population in those orbits over the long term.

III. A proposal for a text on implementation and updating

The Working Group has agreed that the ideas contained in what is currently draft guideline 29 in A/AC.105/C.1/L.354/Rev.1 would be best expressed not as a guideline, but rather in a section devoted to implementation and updating. The following is a proposal for such a text. As some of the ideas contained in draft guideline 29 were also represented in the preambular text, they are removed from this proposal in efforts to avoid duplication and streamline the text.

Implementation, review and updating of the guidelines

17. States and international intergovernmental organizations engaged in or intending to engage in space activities should establish an implementing framework that results in rigorous, consistent and comprehensive adherence to the present guidelines, to the greatest extent practicable and in accordance with applicable national law. The guidelines should be understood to comprise a compendium of internationally recognized measures for enhancing the safety of space operations and, in general, the long-term sustainability of outer space activities. As such, the guidelines serve to complement the principles and norms of international law applicable to outer space activities.

18. The United Nations should be regarded by States and international intergovernmental organizations as the principal forum for continued institutionalized

dialogue on issues related to the implementation of the guidelines. Compliance with the guidelines should be demonstrated in a transparent manner. In that respect, the Committee on the Peaceful Uses of Outer Space should consider inviting States and international intergovernmental organization to provide regular status reports on their experience applying the guidelines, perhaps in connection with the already longstanding transparency and confidence-building mechanism, annual reports on national space activities. Consistent with their responsibilities under the existing outer space treaties, conventions, principles and resolutions, States and international intergovernmental organizations should also work within the Committee on the Peaceful Uses of Outer Space, and with the Office of Outer Space Affairs as appropriate, to address concerns raised about the implementation of the guidelines.

19. The guidelines are based on the substantial body of knowledge that exists for conducting space activities in a safe and sustainable manner. However, the development of the guidelines has also revealed areas in which the state of scientific and technical knowledge, or the levels of experience gained, are not yet adequate for providing a sound basis for recommending a guideline. Research by States and international intergovernmental organizations on the sustainable use of outer space and on the development of sustainable space technologies, processes and services should continue, as recommended in the guidelines, in order to address those areas. As the conduct of space activities evolves, which it is doing rapidly, and as more knowledge is gained, the guidelines should be periodically reviewed and revised to ensure that they continue to provide effective guidance to States and all entities engaged in space activities to promote the long-term sustainability of outer space activities.

20. States and international intergovernmental organizations wishing to submit to the Committee proposals for new guidelines or amendments to existing guidelines should limit such proposals to those that address a generally recognized threat to the safety, security and long-term sustainability of outer space activities and are consistent with the norms and rules of international law.
