

28 January 2016

English only

**Committee on the Peaceful
Uses of Outer Space**
Scientific and Technical Subcommittee
Fifty-third session
Vienna, 15-26 February 2016
Item 14 of the provision agenda*
Long-term sustainability of outer space activities

**Ideas for the way forward on the draft set of 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-eighth session in June 2015, the Committee on the Peaceful Uses of Outer Space noted that the Working Group on the Long-term Sustainability of Outer Space Activities agreed to work intersessionally. The Committee also noted that the Chair of the Working Group would explore the idea of holding an informal working meeting in Vienna during the intersessional period, as this could be an effective mechanism to advance the work on the draft guidelines (A/70/20, para. 172). Such a meeting was arranged and held at the Vienna International Centre from 5 to 9 October 2015, and was supported with existing Secretariat resources.

At the intersessional meeting, the Chair of the Working Group was requested to develop a working paper for the fifty-third session of the Scientific and Technical Subcommittee in 2016, in which he would propose new ideas and possible ways forward for the Working Group, particularly in regard to those draft guidelines that require further discussions by the Working Group. This working paper was developed in response to that request and should be read in conjunction with document A/AC.105/C.1/L.348, which represents the current official version of the draft guidelines.

* A/AC.105/C.1/L.336.



This working paper is structured as follows:

Section I contains a proposal for a possible condensation of the preambular material in the current compilation of draft guidelines.

Section II contains an assessment by the Chair of the Working Group of the current state of discussion of the draft guidelines, in which they are grouped into three categories:

- (i) Category I — those draft guidelines for which the Working Group is very close to achieving consensus;
- (ii) Category II — those draft guidelines for which the Working Group may reasonably expect to achieve consensus within the current work plan; and
- (iii) Category III — those draft guidelines for which the Working Group may find it difficult to achieve consensus on all their constituent elements within the current work plan.

Section III contains an analysis of elements in the Category II guidelines that require further discussion before consensus may be achieved.

Section IV contains a summary by the Chair of the Working Group of the principal elements of the Category III guidelines, together with an attempt by the Chair to paraphrase the various views expressed by delegations during Working Group discussions of these draft guidelines. Although the paraphrasing of the comments made by delegations does not correspond exactly with the position of any one delegation, it represents the main essence of the views expressed. It is the hope of the Chair of the Working Group that this analysis may assist delegations to find points of agreement on a certain number of these elements, and that this may provide a basis for making progress towards achieving consensus on those elements that may be broadly acceptable to the Working Group.

I. Proposal for a more succinct version of the introduction to the draft set of guidelines

The most recent official version of the updated set of draft guidelines (A/AC.105/C.1/L.348) contains twenty introductory paragraphs. There is a section on the context of the draft guidelines, with subsections on background and scope and implementation, as well as six paragraphs that open the section of the document containing the guidelines. At the intersessional meeting of 5 to 9 October 2015, it was suggested that these texts could be streamlined. With a view to reducing the overall length of the guidelines document, the following ten paragraphs show one way of creating a single series of preambular paragraphs, which would lead directly to the guidelines. The text proposed below reduces the length and number of subsections in the document while retaining the key concepts and substance.

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 to help mitigate disasters and support disaster management, 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 major United Nations conferences and summits, 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 possibilities of collisions and interference with the operation of space objects raise concerns about the long-term sustainability of space activities, particularly in the low-Earth orbit and geostationary orbit environments.

3. The international community wishes to see outer space activities conducted in a manner that balances the objectives of equitable access to the exploration and use of outer space by all States and intergovernmental and non-governmental entities only for peaceful purposes with the need to preserve and protect the outer space environment in such a manner that takes into account the needs of future generations. Over the years, the Committee on the Peaceful Uses of Outer Space has considered different aspects of the long-term sustainability of outer space activities from various perspectives. Building on those previous efforts and relevant related efforts by other entities, the Working Group on the Long-term Sustainability of Outer Space Activities of the Scientific and Technical Subcommittee has proposed a set of voluntary guidelines with a view to providing a holistic approach to promoting the long-term sustainability of outer space activities.

4. The following set of voluntary guidelines is premised on the understanding that outer space is to remain an operationally stable, safe and conflict-free environment for future generations, open for peaceful uses and international cooperation. The guidelines address the policy, regulatory, operational, safety, scientific, technical, international cooperation and capacity-building aspects of space activities. As such, they support the objectives of various transparency and confidence-building measures in outer space activities proposed by the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities.¹

5. The guidelines are based on a substantial body of knowledge, as well as the experiences of States, international intergovernmental organizations, and national and international non-governmental entities. Therefore, the guidelines are relevant to both governmental and non-governmental entities. They are also relevant to all space activities, whether planned or ongoing, and to all phases of a mission life cycle, including launch, operation and end-of-life disposal.

6. The guidelines provide a foundation for the development of national and international practices and safety frameworks for conducting outer space

¹ Report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities, A/68/189.

activities, while allowing for flexibility in adapting such frameworks to specific national circumstances and organizational structures.

7. The legal framework relevant to the guidelines includes the existing United Nations treaties and principles on outer space. 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 regulatory requirements.

8. The guidelines themselves are not legally binding under international law, but any action taken towards their implementation should be consistent with the principles and norms of international law.

9. The implementation of the guidelines is considered a prudent and necessary step towards preserving the outer space environment for future generations. States, international intergovernmental organizations and national and international non-governmental entities should voluntarily take measures, through their own applicable mechanisms, to ensure that the guidelines are implemented to the greatest extent feasible and practicable.

10. The guidelines reflect an international consensus on measures needed to enhance the long-term sustainability of outer space activities, based on current knowledge and established practices. As a deeper understanding of the various factors influencing the long-term sustainability of outer space activities develops, the guidelines should be reviewed, and could be revised in the light of new findings.

II. Analysis of the current state of discussion of the draft guidelines

Following the discussions on the draft guidelines in the Working Group and during the informal intersessional meeting, it is the view of the Chair of the Working Group that the current set of draft guidelines may be grouped into three categories:

- (i) Category I — those draft guidelines for which the Working Group is very close to achieving consensus;
- (ii) Category II — those draft guidelines for which the Working Group may reasonably expect to achieve consensus within the current work plan; and
- (iii) Category III — those draft guidelines for which the Working Group may find it difficult to achieve consensus on all their constituent elements within the current work plan.

This categorization is presented in Table 1 below.

Category I contains eleven draft guidelines that already enjoy broad agreement, both on content and formulation, and the Working Group should be able to achieve consensus on these draft guidelines within the existing workplan. For each of the ten Category II draft guidelines, there is general acceptance of the spirit of the guideline, but work remains to be done to reach consensus on all the

constituent points and on the final language. The Working Group should, however, be able to complete this work within the existing workplan. For the seven draft guidelines in Category III, delegations have expressed divergent views, and it does not seem likely that the Working Group will achieve consensus on all constituent elements in those draft guidelines within the current workplan. (There is also one draft guideline contained in A/AC.105/C.1/L.348, draft Guideline 5, which will most likely be merged into another draft guideline, draft Guideline 6.)

Table 1
Categories of draft guidelines

<i>Category I</i>	<i>Category II</i>	<i>Category III</i>
Guideline 1	Guideline 4	Guideline 6
Guideline 2	Guideline 7	Guideline 8
Guideline 3	Guideline 11	Guideline 9
Guideline 12	Guideline 13	Guideline 10
Guideline 14	Guideline 15	Guideline 21
Guideline 16	Guideline 18	Guideline 22
Guideline 17	Guideline 19	Guideline 29
Guideline 24	Guideline 20	
Guideline 25	Guideline 23	
Guideline 26	Guideline 28	
Guideline 27		
11 Guidelines	10 Guidelines	7 Guidelines

III. Analysis of elements within the Category II guidelines for which decisions remain to be taken

Given the general agreement on the spirit of the Category II draft guidelines, the Chair of the Working Group is of the view that the Working Group should be able to reach consensus on these draft guidelines within the existing workplan. This section, therefore, aims to highlight for delegations the main areas where the Working Group needs to take decisions in order to reach the desired consensus.

Guideline 4 [formerly guideline 4], Ensure the equitable, rational and efficient use of the radio frequency spectrum and the various orbital regions used by satellites

Paragraphs 4.1 and 4.2

Analysis: There are some varying views on the concepts of equitable access to orbits and the special needs and positions of particular countries, and how these ideas should and will be interpreted in the draft guidelines. As it may be easier to reach consensus if the language in paras 4.1 and 4.2 closely reflects the language of International Telecommunication Union instruments, the latest draft of these paragraphs attempts to do this.

Paragraph 4.5

Analysis: Varying views have been expressed as to where in the text the ideas covering end-of-life disposal would best be captured. The Working Group will need to decide whether the bracketed text in paragraph 4.5 is to remain there, or be moved elsewhere within the document. It is the Chair's view that the idea fits well within the current paragraph 4.5.

Guideline 7 [formerly guideline 38], Commit, in national legal and/or policy frameworks, to conducting space activities solely for peaceful purposes

Paragraph 7.2

Analysis: Some delegations have expressed concern that the prevention of an arms race in outer space (PAROS) elements of this draft guideline should be dealt with in other international forums. It is the Chair's view that it may be easier to reach consensus on this draft guideline if the last two sentences of paragraph 7.2 are omitted.

Guideline 11 [formerly guideline 20], Provide contact information and [develop procedures for the] exchange [of] information on space objects and orbital events

Paragraphs 11.3 [Alternatives 1 and 2] and 11.4

Analysis: The Working Group will need to come to an agreement on the language for these paragraphs, including selecting either "procedures" or "mechanism" in order to move forward.

Paragraph 11.5 [Alternatives 1 and 2]

Analysis: The Working Group will need to decide whether the idea of a unified centre or platform under the auspices of the United Nations should be included in this draft guideline. If the Working Group is unable to reach consensus on the inclusion of this element, it will need to decide whether a modified text, which retains the central ideas of the guideline, namely focusing attention on enhanced information exchange and notification procedures/mechanisms, but not including the centre/platform proposal, could be acceptable.

Guideline 13 [formerly guideline 21], Promote the collection, sharing and dissemination of space debris monitoring information

Paragraph 13.2

Analysis: As the idea of establishing an international space debris fund has proven contentious, the Working Group will need to decide whether the final version of the guidelines will retain this concept. It is the Chair's view that it may be easier to reach consensus on this draft guideline if the idea of establishing an international space debris fund is omitted.

Paragraph 13.3

Analysis: The Working Group will need to agree on whether to move paragraph 13.3 to draft guideline 25, as was suggested at the intersessional meeting.

Guideline 15 [formerly guideline 41], Develop practical approaches for pre-launch assessment of possible conjunctions of newly launched space objects with space objects already present in near-Earth space

Paragraphs 15.1 to 15.3

Analysis: The key concepts within this guideline appear to be agreeable to the Working Group. The Working Group will, however, need to decide whether the current formulation of the ideas is clear enough for the final document.

Guideline 18 [formerly guideline 35], Respect the security of foreign space-related ground and information infrastructures and guideline 19 [formerly guideline 37], Ensure the safety and security of terrestrial infrastructure that supports the operation of orbital systems

Draft guideline 18 as a whole

Analysis: The ideas included in draft guidelines 18 and 19 appear generally agreeable to most delegations. While the ideas in the two guidelines are related, the focus of the two guidelines is not the same. The Working Group will need to come to a final agreement on whether the two guidelines can be merged. If it is decided that they cannot be merged, both guidelines may need to be further edited so as to minimize overlap and eliminate duplication.

Guideline 20 [formerly guideline 34], Develop and implement criteria and procedures for the preparation and conduct of space activities aimed at the active removal of space objects from orbit

Draft guideline 20 as a whole

Analysis: There is general agreement that any space activities conducted with the objective of active debris removal should only be done in conformity with international law and should be properly authorized and supervised by the relevant States and international intergovernmental organizations. There are differences of opinion on whether a guideline dealing with this issue is necessary at the current time, or whether the current state of knowledge is sufficient to formulate such a guideline. The Working Group will need to agree on whether this topic should be included in the final set of guidelines and/or whether the current formulation of the guideline needs to be amended.

Guideline 23 [formerly guidelines 16 and 18], Promote and facilitate international cooperation in support of the long-term sustainability of outer space activities

Paragraphs 23.2 to 23.4 [Alternatives I and II]

Analysis: The Working Group will need to select between the two alternative formulations for these three paragraphs, or find a compromise somewhere between the two. Following the discussions at the intersessional meeting, the Chair of the Working Group is of the view that it may be easier to reach consensus on the second proposed alternative.

Guideline 28 [formerly guideline 36], Investigate and consider new measures to manage the space debris population in the long term

Paragraphs 28.1-28.2

Analysis: While there appears to be support for the spirit of this draft guideline, the Working Group needs to consider the amendments and bracketed text in these two paragraphs proposed during the intersessional meeting.

IV. Analysis of elements within the Category III Guidelines

This section summarizes the main constituent elements of the seven Category III draft guidelines. This analysis is offered with a view to finding common ground that may be used as a basis for building consensus. The succinct summaries of the draft guidelines contained in this section are not intended to be reformulations of those texts — they simply describe the content of the relevant texts of the draft guidelines. To facilitate cross-referencing with the original texts contained in A/AC.105/C.1/L.348, the paragraph numbering used here is as used in that document.

Guideline 6 [formerly guideline 40], Enhance the practice of registering space objects

Main constituent elements for further consideration (with a focus on proposed actions)

Paragraph 6.1 [*Alternative I*]

- Encourage compliance with the Registration Convention and relevant General Assembly resolutions to enhance registration practice.

Paragraph 6.1 [*Alternative II*]

- States and international intergovernmental organizations should adopt policies and procedures for enhancing registration practice and for communication of expanded information on space objects.
- States and international intergovernmental organizations should recognize that registration is important to safety and security in outer space and should act responsibly in this regard.

- Ensure all registration commitments and arrangements are in place prior to a launch. (Also dealt with in paragraph 6.3 — Alternative 2.)

Analysis: The first formulation of elements in paragraph 6.1 [Alternative 1] could be broadly acceptable.

Paragraph 6.2

- Non-registration of space objects may have serious negative implications for ensuring the safety of space operations.
- States and international intergovernmental organizations should not condone practices inconsistent with the Registration Convention.
- Solutions should 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. (Also dealt with in paragraph 6.3 — Alternative 2.)

Analysis: Paragraph 6.2 could be broadly acceptable if formulated in a more affirmative (positive) manner.

Paragraph 6.3 [*Alternative 1*]

- This paragraph is about the presumption of non-compliance with registration obligations by some States or international intergovernmental organizations and about requesting those States and international intergovernmental organizations to disclose their intent behind such presumed non-compliance.

Paragraph 6.3 [*Alternative 2*]

- Prior to a launch, determine which State or international intergovernmental organization should register the space object.
- If there is reason to believe that a space object has not been (or will not be) registered, coordinate to determine which State or international intergovernmental organization should register the space object.
- Registration inquiries should be responded to as soon as practicable to determine which State/international intergovernmental organization should register the space object.

Analysis: The elements in both formulations of paragraph 6.3 appear to be acceptable, with a preference for the second alternative formulation of this paragraph.

Paragraph 6.4

- The Office for Outer Space Affairs should be authorized to encourage and ensure adherence of States and international intergovernmental organizations to the provision of enhanced registration information.

- Specifically, the Office for Outer Space Affairs should be tasked to collate information on orbital launches and to assign international designators to orbital launches and space objects.

Analysis: Paragraph 6.4 refers to the provision of enhanced registration information. Some delegations believe that the current formulation of this draft guideline goes beyond the provisions of General Assembly resolution 62/101. Other delegations are of the view that tasking certain functions to the Office for Outer Space Affairs may have budgetary implications, and that therefore the guidelines should not directly task the Office for Outer Space Affairs, but rather refer such a matter to the Committee on the Peaceful Uses of Outer Space or to its Scientific and Technical Subcommittee.

Paragraph 6.5

- Launching States and international intergovernmental organizations should be responsible to request space launch service providers and users to meet all registration requirements and should encourage them to provide expanded registration information.
- Where registration is not in the national security interests of a State, that State should forward an official statement to the Office for Outer Space Affairs identifying the circumstances of non-registration.

Analysis: In paragraph 6.5, the idea of requiring launch providers to meet all requirements under the Registration Convention is broadly acceptable, but there is less support for language suggesting that enhanced registration information should be provided beyond what is required for national licensing purposes, and some States would be unable to agree to inclusion of the bracketed text that refers to non-registration of space objects because of security considerations. Some delegations have remarked that the guidelines should avoid language that presumes non-compliance with treaty obligations and should emphasize that these guidelines should apply to all space activities.

Paragraph 6.6

- To ensure safety of space operations, States and international intergovernmental organizations should provide information on the status of space objects and changes in their orbital parameters.
- The rest of this draft guideline elaborates in (a)-(e) the possible circumstances envisaged in paragraph 2 (b) (ii) of General Assembly resolution 62/101: “*Any change of status in operations (inter alia, when a space object is no longer functional)*”.

Analysis: Paragraph 6.6 deals with the provision of updated information. Some delegations have pointed out that the mechanisms established under the registration process are not equipped to deal with real-time space operational safety issues and that the level of detail of information provision proposed in this paragraph could impose burdensome compliance requirements for operators and relevant regulatory authorities.

Paragraph 6.7

- This paragraph provides in (a)-(d) an indicative list of potential conditions envisaged to fall under the scope of paragraph 4 (a) (iii) of General Assembly resolution 62/101: “*Any change of orbital position*”.

Analysis: Similar considerations apply to paragraphs 6.6 and 6.7.

Paragraph 6.8

- Addresses the situation where a space object to be registered contains elements planned for future separation and independent orbital flight.
- Any names/designations provided prior to separation should be retained during subsequent registration.

Analysis: Paragraph 6.8 addresses space objects (subsattellites) that may be released at some future time. There are diverse views about the appropriateness of including this issue in a guideline at this stage, largely because of legal questions raised.

Paragraph 6.9

- States and international intergovernmental organizations should provide information to the Office for Outer Space Affairs on all space activities that utilize nuclear power sources.

Analysis: The idea contained in paragraph 6.9 appears in principle to be acceptable to delegations, but some have noted that this is already a requirement of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space and the Safety Framework for Nuclear Power Source Applications in Outer Space.

Guideline 8 [formerly guideline 39], Implement operational and technological measures of self-restraint to forestall adverse [developments] [impacts] in outer space

Main constituent elements for further consideration (with a focus on proposed actions)

Paragraph 8.1

- States and international intergovernmental organizations should ensure that entities under their jurisdiction and/or control have a basic awareness of

relevant obligations under international law applicable to outer space activities, especially with regard to non-interference and the provision in Article IX of the Outer Space Treaty which relate to avoiding potentially harmful interference with the space activities of other States or international intergovernmental organizations, and consultations in this regard.

Analysis: The idea contained in this paragraph is broadly acceptable as it reaffirms a key principle in the Outer Space Treaty. With regard to the bracketed text, it is suggested to be guided by the language used in the Outer Space Treaty.

Paragraph 8.2

- When conducting space operations that entail close approaches and fly-bys, provide safeguards to forestall adverse impacts on the safety and security of foreign space objects, and select alternatives that satisfy the safety and security needs of foreign space objects.

Analysis: Several delegations believe that this issue requires further discussion before a guideline dealing with close-proximity operations can be formulated.

Paragraph 8.3

- Refrain from applying to foreign space objects any techniques that would not be deemed acceptable if applied to a State's own space objects.
- The use of unacceptable methods could necessitate responses in the context of United Nations Charter Article 2, paragraph 4 on refraining from threat/use of force and Article 51 on the inherent right of self-defence.

Analysis: While the general principle of "not doing to others what you would not like done to you" is certainly broadly acceptable, several delegations have pointed out that this is too general a statement to be implementable as a guideline, and that methods and techniques that are acceptable to some States may not be acceptable to other States.

Paragraph 8.4

- States and international intergovernmental organizations should file with the Office for Outer Space Affairs annual statements containing their assessment of the situation in outer space as an operating environment, specifically regarding trends, phenomena and events that influence the security of outer space and pose threats and hazards for space activities.

Analysis: The idea of sharing such information is broadly supported, but more discussion is required on the nature of the information to be provided and the modality for provision of such information.

Guideline 9 [formerly guideline 43], Implement policy aimed at precluding interference with the operation of foreign space objects through unauthorized access to their on-board hardware and software

Main constituent elements for further consideration (with a focus on proposed actions)

[There are two alternative formulations of guideline 9]

[Alternative 1]

Paragraph 9.1

- States and international intergovernmental organizations should not engage in or facilitate activities that enable or constitute unauthorized interference with on-board hardware or information systems of foreign space objects.
- States and international intergovernmental organizations should require entities under their jurisdiction and/or control to provide guarantees against such practices.
- States or international intergovernmental organizations exercising jurisdiction or control over suppliers/manufacturers of spacecraft/components should officially attest to the absence of any embedded instruments or software as part of safety and security validation and quality assurance processes.
- Interference with the operation of foreign space objects through unauthorized access to their on-board hardware and software could endanger the safety of space operations.

Analysis: The idea of precluding unauthorized access to, or interference with, on-board software is broadly supported. However, several delegations have pointed out that it is unclear how such a guideline might be implemented by States, and also how, by what standards, and by whom such implementation would be judged. Moreover, it is not clear how a State would be able to distinguish between intentional and unintentional interference.

Paragraph 9.2

- Interference with the operation of foreign space objects through unauthorized access to their on-board hardware and software is considered to be in violation of the principles and norms of international law and commercial integrity.

Analysis: Some States consider that this paragraph provides a particular interpretation of the principles and norms of international law and remark that it is not the purpose of these guidelines to provide such interpretations.

Paragraph 9.3

- Consider how the understanding of this guideline could be reinforced through practical actions at the institutional and technical levels.
- Such efforts should be undertaken with a view to consolidating international regulation in this regard, perhaps through a high-level policy instrument.

Analysis: Some States consider that that more discussion is needed on the necessity for international regulation to preclude interference with the operation of foreign space objects through unauthorized access to their on-board hardware and software, and that in view of this, the current draft guideline is too prescriptive.

[*Alternative 2*]

Paragraph 9.1

- States should take steps to ensure the integrity of the supply chain so that end users have confidence in the security of ICT products.
- States should seek to prevent the proliferation of malicious ICT tools and techniques.

Analysis: This more succinct expression of the main ideas in Alternative 1 appears to be a broadly acceptable formulation of the ideas, with perhaps some further discussion required on the language in the present formulation of Alternative 2.

Guideline 10 [formerly guideline 42], Refrain from intentional modifications of the natural space environment

Main constituent elements for further consideration (with a focus on proposed actions)

Paragraph 10.1

- States and international intergovernmental organizations should support a clear understanding that intentional modification of the natural space environment may pose threats to, or cause vulnerabilities in, space systems.
- In their compliance with the provisions of the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, States and international intergovernmental organizations should prioritize those aspects and/or criteria that meet the safety needs of space operations.
- Modification techniques for peaceful purposes not formally prohibited by the Convention (see Article III) may, unless supported by the above criteria and procedures, pose serious hazards to space operations and/or result in debris proliferation.

Analysis: While the idea underpinning this draft guideline is broadly acceptable, some States point out that the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques already prohibits such activities, and question the benefit of a voluntary guideline dealing with this issue. It is proposed that perhaps the guidelines on the long-term sustainability of outer space activities should simply refer to this issue and encourage accession to the Environmental Modification Convention.

Paragraph 10.2

- A working definition of intentional modification of the characteristics of the space natural environment is proposed to encompass: electron concentration and temperature of the ionosphere, density and chemical composition of the upper atmosphere, intensity of electromagnetic emissions, and characteristics of radiation belts, including the creation of artificial radiation belts.
- When planning and conducting outer space activities, do not use modification techniques that impact the space environment in a way that would negatively influence operational spacecraft or ground infrastructure to a degree comparable to that described in Article I of the Environmental Modification Convention (presumably referring to “widespread, long-lasting or severe effects”).

Analysis: See comment 10.1 above.

Paragraph 10.3

- States should provide preventative and reactive regulation on this matter, and:
 - (a) Enhance awareness of the risks associated with deliberate environmental manipulation and advance an approach to assessing and controlling such risks;
 - (b) Establish administrative and technological restraints on the conduct of such activities;
 - (c) Define the scale and effect of allowable manipulations to safety-critical parameters of the space environment to avoid damaging phenomena.

Analysis: See comment 10.1 above.

Paragraph 10.4

- States and international intergovernmental organizations should be open for consultation and provision of information in cases where safety-critical values of space environment parameters have been reached.

Analysis: See comment 10.1 above. Some States point out that such consultations are already addressed within the Environmental Modification Convention and that the provision of information exchanges is provided for in Article V of the Outer Space Treaty.
--

Guideline 21 [formerly guideline 44], Establish procedures and requirements for the safe conduct, in extreme cases, of operations resulting in the destruction of in-orbit space objects

Main constituent elements for further consideration (with a focus on proposed actions)

[There are two alternative formulations of guideline 21]

[*Alternative 1*]

Paragraph 21.1

- While adhering to the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space, States and international intergovernmental organizations are entitled to preserve their options to destroy space objects under their own jurisdiction/control when other alternatives have far more negative consequences.
- Notwithstanding the concept outlined above, it should be generally understood that the intentional destruction of space objects in near-Earth orbits is to be contemplated only as an unavoidable measure to avert immediate or potential serious threat to human life, the environment or property.
- Do not contemplate any operation that could damage space objects under foreign jurisdiction, or cause damage, unless explicitly agreed to by the States or international intergovernmental organizations that have jurisdiction/control over such objects.

Analysis: The idea that the intentional destruction of space objects may at times be necessary is broadly accepted, but some States have suggested that the language in this draft guideline could be streamlined and also better aligned with the consensus text in the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space, especially guideline 4 which addresses intentional breakups.

Paragraph 21.2

- In legitimate cases of the destruction of an in-orbit space object, keep the international community appropriately informed, through the Office for Outer Space Affairs and other appropriate channels, of circumstances warranting such an operation and assessments of the evolving situation.
- Information should be nuanced according to the predicted side-effects of any contemplated operation.
- Where practicable, information should be provided expeditiously or in real time.
- Safety assurance measures and safeguards should be included in decisions on the destruction of a space object, to the extent that such measures are deemed practicable and satisfactory.

Analysis: Some States suggest reviewing the text of paragraph 45 the report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities, which addresses the matter of intentional destruction of space objects, and propose the use of that consensus text in this draft guideline.

[*Alternative 2*]

Paragraph 21.1

- Avoid intentional destruction of spacecraft and launch vehicle orbital stages that would generate long-lived debris.
- When intentional break-ups are necessary, inform affected States of the plans, including measures to ensure that intentional destruction is conducted at sufficiently low altitudes to limit the orbital lifetime of resulting fragments.
- All actions should conform with the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space.

Analysis: See comments above for Alternative 1.

Guideline 22 [formerly guideline 45], Develop criteria and procedures for the active removal of space objects, and under exceptional circumstances, for the intentional destruction of space objects, specifically as applied to non-registered objects

Main constituent elements for further consideration (with a focus on proposed actions)

Paragraph 22.1

- States and international intergovernmental organizations should align their activities in regard to active debris removal and the intentional destruction of space objects under exceptional circumstances with this guideline, which also provides guidance for such activities when applied to non-registered space objects.
- States and international intergovernmental organizations should ensure that such operations are comprehensively regulated in order to avoid loopholes that may be abused.

Analysis: A number of delegations have remarked that expert group B reached the conclusion that it would be premature at this stage to have a guideline on active debris removal, but that the matter should be a topic for consideration by the Scientific and Technical Subcommittee.

Paragraph 22.2

- The legitimacy of any planned removal/destruction operation is contingent on the reliability of the identification of the space object to be removed/destroyed.
- Positive identification is a pre-requisite for any removal/destruction operation. No such operations should be contemplated until the origin and status of a given space object are established beyond doubt.
- States and international intergovernmental organizations should coordinate their efforts to establish procedures and mechanisms to serve individual and collective needs for the identification of objects in orbit.

Analysis: See comment in 22.1 above. The idea that no removal/destruction operations should be contemplated unless the origin and status of a given space object can be established beyond doubt, and with the approval of the owner and launching State(s) and/or State of registry, is broadly acceptable.

Paragraph 22.3

- Removal/destruction operations should be preceded by a thorough analysis of all feasible methods and an assessment of risks entailed by each method.
- Disclosure of technical details is at the discretion of the States and international intergovernmental organizations conducting such operations.
- State(s)/international intergovernmental organizations carrying out such an operation are to provide overall information on the operation to the international community through the Office for Outer Space Affairs and other relevant channels.
- Other States and international intergovernmental organizations should provide informational and analytical support for such operations, including support in the identification of space objects through analysis of monitoring information, to the extent that it is practicable to do so.

Analysis: See comment in 22.1 above. The idea that States or international intergovernmental organizations that conduct or authorize and supervise the conduct of such activities by entities under their jurisdiction and control, should provide information to the international community through the Office for Outer Space Affairs and other relevant channels, is broadly supported, and would constitute a transparency and confidence-building measure.

Paragraph 22.4

- When applying guidelines for the removal/destruction of space objects, consider the following:
 - (a) The provisions of Articles VII and VIII of the Outer Space Treaty apply to component parts of space objects and launch vehicles, and also to non-functioning space objects, whether they are registered or not;
 - (b) Non-registration of component parts should not in itself be grounds for considering the component parts devoid of title, taking into account the Liability Convention. The absence of information on given objects or component parts should not substantiate the divesting of jurisdiction and control over such components or objects;
 - (c) States and international intergovernmental organizations could develop policies that would allow them to voluntarily waive their authority over non-registered component parts of space objects or non-functioning space objects, so as to make it possible to develop a framework for taking decisions on the clearing of space debris;
 - (d) The approach outlined in (c) would allow States and international intergovernmental organizations to enter into joint decisions and arrangements

on space debris removal operations, where such decisions and arrangements are determined to be a priority by the parties involved.

Analysis: See comment in 22.1 above.

Paragraph 22.5

- Technological components of space objects and fragments resulting from the breakup of space objects may not be subject to registration due to the nature of their origin, their physical condition and the impossibility of determining and regularly updating the parameters of their orbital motion.
- The feasibility of registration depends on the degree of reliability with which a particular fragment/object may be identified with a particular space object of origin and/or event that led to its appearance/formation in orbit.
- States and international intergovernmental organizations intending to register fragments which they regard as relevant to their own previously registered objects should indicate their intention to the Office for Outer Space Affairs, for suitable dissemination/posting.
- Other States and international intergovernmental organizations should have a limited period of time to object to such proposed registrations.
- When such a request encounters objections, international consultations should take place.
- States and international intergovernmental organizations planning to direct such requests for registration may update the information they have provided on the orbital parameters of fragments.

Analysis: See comment in 22.1 above.

Paragraph 22.6

- States and international intergovernmental organizations should allow adjustments to the status of space objects under their jurisdiction and/or control which have ceased to function (including fragments or technological elements that originated from such space objects), so as to provide definitive eligibility with regard to potential international efforts to clear outer space of space debris.
- Lifting of constraints on the removal of non-functional space objects could be the best solution to clear outer space of such debris.
- States and international intergovernmental organizations should make specific announcements when the need for such an adjustment of status is anticipated, while maintaining their obligations and liabilities under international law.
- Any decisions should explicitly state the context in which certain specific rights pertaining to such objects would be assigned or waived.

- The validity and feasibility of such practices should be determined on a case-by-case basis and with due regard to the corresponding interests of other States, as per Article IX of the Outer Space Treaty.
- States and international intergovernmental organizations should work on integrating the different aspects of such activities in cooperative agreements to provide for specific solutions in this area.
- Such agreements should define and allocate liabilities and duties to all participants in planned activities.
- Such agreements should prescribe procedures for regulating access to a space object and its component parts, and measures to protect technology, as feasible and practicable.

Analysis: See comment in 22.1 above.

Draft guideline 22 as a whole

Analysis: The Chair of the Working Group is of the view that the Working Group will not be able to reach consensus on a detailed guideline on active debris removal at this stage. However, in view of the fact that active debris removal activities are contemplated by several non-governmental entities, what may be acceptable to most States at this stage is the idea that, if such activities are conducted, they should be conducted in conformance with international law, with the agreement of the owner/operator and State of registry, and that States should have the national mechanisms in place to authorize and supervise any non-governmental active debris removal activities to ensure that such activities are carried out in conformance with international law. These ideas could perhaps be accommodated in draft guideline 20.

Guideline 29 [formerly guideline 46], Establish normative and organizational frameworks for ensuring effective and sustained implementation of the guidelines and subsequent activity on their review and enhancement

[There are two alternative formulations for guideline 29]

[Alternative I]

Paragraph 29.1

- Establish a framework for the implementation of the guidelines and review of compliance.
- The guidelines should have the status of a standard-setting document establishing internationally recognized conditions for ensuring the safety and sustainability of space activities.
- Establish/administer procedures to meet operational requirements uniquely associated with the guidelines.
- Balance national security considerations with objectives and the requirements of international cooperation provided for by the guidelines.

- International intergovernmental organizations should likewise base their decisions and policies on the above understanding.

Analysis: At the intersessional meeting some delegations supported the idea of moving the ideas contained in this draft guideline to other introductory portions of the text. Some States question whether we need a guideline on the implementation of these guidelines, and note that the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space do not have a specific guideline to this effect. It is also suggested to use language similar to that used in Section 3 (Implementation) of the Space Debris Mitigation Guidelines along the lines: *“Member States and international organisations should voluntarily take measures, through national mechanisms or through their own applicable mechanisms, to ensure that these guidelines are implemented, to the greatest extent feasible, ...”*.

Paragraph 29.2

- The Committee on the Peaceful Uses of Outer Space should be the principal venue for States and international intergovernmental organizations to discuss the implementation of the guidelines and to develop common understandings and approaches in that regard.
- States and international intergovernmental organizations are encouraged to provide annual reports for the sessions of the Committee on the Peaceful Uses of Outer Space containing assessments of the status of implementation of the guidelines. Such reports should be corroborated with credible estimates and indicators.
- If warranted, such reports should also identify phenomena and/or developments in outer space activities that appear to be at variance with the guidelines and could possibly necessitate special consideration by the Committee at its immediate session.
- File exigency notifications with the Office for Outer Space Affairs on particular concerns in the context of implementation of the guidelines pertaining to safety of space operations, with an appeal to the Office for Outer Space Affairs to mediate in requesting clarifying information from the relevant States or international intergovernmental organizations.
- States and international intergovernmental organizations should report to the Office for Outer Space Affairs events resulting from actions (or omissions) of entities under their jurisdiction and/or control that may impact on the safety of space operations.

Analysis: There appears to be broad support for the idea that the Committee on the Peaceful Uses of Outer Space would be the appropriate venue to exchange information and to discuss matters related to the implementation of these guidelines, with the understanding that the existence of these guidelines this should not preclude discussions in other forums. The guidelines are voluntary and should not be too prescriptive about what kind of information should be reported. Moreover, it is not clear that the Office for Outer Space Affairs has either the capacity or mandate to play a mediatory role in the manner envisaged in this paragraph. Some delegations have also noted that the reports and assessments proposed in this paragraph may impose an unacceptable implementation burden (in terms of cost and effort) for some States.

[*Alternative 2*]

Paragraph 29.1

- States and international intergovernmental organizations should establish an implementing framework that results in adherence to the guidelines.
- States and international intergovernmental organizations should implement these guidelines to the greatest extent practicable and in accordance with national law.

Analysis: See comment in 29.1 above. Some delegations suggest placing these ideas concerning implementation in one of the preambular sections of the document, so as to be consistent with the style of previous guideline documents produced by the Committee on the Peaceful Uses of Outer Space.

Paragraph 29.2

- There should be clear requirements specified for the implementation of the guidelines and for demonstration thereof.
- Provide regular status reports to the Committee on the Peaceful Uses of Outer Space on the experience of applying regulatory measures for the implementation of the guidelines to address concerns pertaining the safety of space operations.

Analysis: The idea of voluntarily providing regular information to the Committee on the Peaceful Uses of Outer Space on the experiences of States in implementing the guidelines is broadly acceptable, but the idea of requiring demonstrations of implementation appears to go beyond the intention of voluntary guidelines.

Paragraph 29.3

- Continue research in order to address open questions.
- Review and revise guidelines periodically to ensure they continue to provide effective guidance.

Analysis: The ideas contained in this paragraph appear to be broadly acceptable. Some delegations propose locating these ideas in the preambular or concluding sections of the guidelines document.

Draft guideline 29 as a whole

Analysis: The Working Group will need to agree on whether it wishes to have a separate guideline on implementation. If a separate guideline on implementation is to be retained, the Chair of the Working Group is of the view that, of the two alternative formulations proposed, Alternative 2 appears to be more generally acceptable to more delegations than Alternative 1.
