

THE UN COPUOS GUIDELINES FOR THE LONG-TERM SUSTAINABILITY OF OUTER SPACE ACTIVITIES

A SECURE WORLD FOUNDATION FACT SHEET

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In June 2019, the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS) adopted a set of 21 voluntary consensus Guidelines for the Long-Term Sustainability (LTS) of Outer Space Activities. This Fact Sheet provides a general overview of the UN COPUOS process, the resulting consensus guidelines, and the next steps to promote their implementation by governmental and non-governmental space actors.

The UN and Space Sustainability

The United Nations has addressed the concept of sustainable development on Earth in a number of global summits and fora for the past 40 years. The Sustainable Development Goals (SDGs) are a set of 17 global goals set by the United Nations in 2015 to address the world's most pressing problems. Extending the concept of sustainability to outer space is a more recent development, arising from the realization that the Earth's orbital space environment constitutes a finite resource that is being used by an increasing number of space actors that include States, commercial actors and other non-governmental entities. The proliferation of space debris, the increasing complexity of space operations, the emergence of large constellations of satellites, and the increased risks of collisions and interference with the operation of satellites raise concerns about the safety of space operations and the long-term sustainability of space activities. Addressing these developments and risks requires international cooperation.

The United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS) is the leading international forum for discussion among States regarding cooperation in space activities and for the progressive development and codification of international space law and norms for behavior. Over the years, UN COPUOS has considered different aspects of the long-term sustainability of outer space activities from various perspectives. Building on those previous efforts and other relevant related efforts, in 2010, COPUOS established a Working Group on the Long-term Sustainability (LTS) of Outer Space Activities under its Scientific and Technical Subcommittee and under the Chairmanship of Dr. Peter Martinez of South Africa (currently Executive Director of Secure World Foundation).²

THE LONG-TERM SUSTAINABILITY OF OUTER SPACE ACTIVITIES IS DEFINED AS *the ability to maintain the conduct of space activities indefinitely into the future in a manner that realizes the objectives of equitable access to the benefits of the exploration and use of outer space for peaceful purposes, in order to meet the needs of the present generations while preserving the outer space environment for future generations.*¹

— Definition developed in the UN process described in this Fact Sheet



The guidelines are grouped into four categories:

- Policy and regulatory framework for space activities
- Safety of space operations
- International cooperation, capacity-building, and awareness
- Scientific and technical research and development

The titles of the 21 agreed guidelines are indicated in the box below. The full text of the guidelines is available in UN document A/74/20, Annex II.¹⁰

UN COPUOS Guidelines for the Long-term Sustainability of Outer Space Activities

A. Policy and regulatory framework for space activities

- Guideline A.1 Adopt, revise and amend, as necessary, national regulatory frameworks for outer space activities
- Guideline A.2 Consider a number of elements when developing, revising or amending, as necessary, national regulatory frameworks for outer space activities
- Guideline A.3 Supervise national space activities
- Guideline A.4 Ensure the equitable, rational and efficient use of the radio frequency spectrum and the various orbital regions used by satellites
- Guideline A.5 Enhance the practice of registering space objects

B. Safety of space operations

- 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
- Guideline B.3 Promote the collection, sharing and dissemination of space debris monitoring information
- Guideline B.4 Perform conjunction assessment during all orbital phases of controlled flight
- Guideline B.5 Develop practical approaches for pre-launch conjunction assessment
- Guideline B.6 Share operational space weather data and forecasts
- Guideline B.7 Develop space weather models and tools and collect established practices on the mitigation of space weather effects
- Guideline B.8 Design and operation of space objects regardless of their physical and operational characteristics
- Guideline B.9 Take measures to address risks associated with the uncontrolled re-entry of space objects
- Guideline B.10 Observe measures of precaution when using sources of laser beams passing through outer space

C. International cooperation, capacity-building and awareness

- Guideline C.1 Promote and facilitate international cooperation in support of the long-term sustainability of outer space activities
- Guideline C.2 Share experience related to the long-term sustainability of outer space activities and develop new procedures, as appropriate, for information exchange
- Guideline C.3 Promote and support capacity-building
- Guideline C.4 Raise awareness of space activities

D. Scientific and technical research and development

- Guideline D.1 Promote and support research into and the development of ways to support sustainable exploration and use of outer space
- Guideline D.2 Investigate and consider new measures to manage the space debris population in the long term

Implementation and Updating

States and international intergovernmental organizations are encouraged to implement these guidelines to the greatest extent feasible and practicable, in accordance with their respective needs, conditions and capabilities, and with their existing obligations under applicable international law.

The Working Group examined the long-term sustainability of space activities within the broader context of sustainable development on Earth; considered current practices, operating procedures, technical standards, and policies relevant to space sustainability and safety; and took as its legal framework the existing UN treaties and principles governing space activities.³ The Working Group established four expert groups that considered sets of related topics. These expert groups were deliberative fora comprising experts nominated by COPUOS member States. The experts were mandated to discuss the topics within the remit of their respective groups and to propose candidate guidelines for the consideration of the Working Group. The four expert groups carried out their work from 2011 to 2013 and in 2014 they presented their reports to the Working Group containing proposed guidelines and topics for further consideration by the Working Group.^{4, 5, 6, 7} SWF contributed to the expert group process through the participation of SWF experts, through providing written submissions, and through supporting the participation of experts in those discussions.

In addition to the draft guidelines proposed by the expert groups, a number of COPUOS member States also proposed draft guidelines. All these draft guidelines were discussed by the Working Group from 2014 onwards. Because COPUOS reaches decisions by absolute consensus of all its member States, progress was slow. In 2016, at its 59th session, the Committee agreed on the first 12 LTS Guidelines, and extended the Working Group's mandate for another two years, to June 2018.⁸ Discussions on a preamble and additional draft guidelines continued in 2017 and 2018. The Working Group concluded its work in June 2018 with agreement on a preamble and a further 9 guidelines, bringing to 21 the total number of agreed guidelines. In addition to the 21 agreed guidelines, the Working Group also held discussions on another seven draft guidelines, but was not able to achieve consensus on those during its mandate.⁹ When the Working Group's mandate came to an end in June 2018, with no consensus on the remaining draft guidelines or how to advance the work of LTS in COPUOS, the 61st session of COPUOS ended in a stalemate, with no agreed report of the working group. However, in 2019 delegations returned to the negotiations with renewed vigor and were able to reach agreement on the way forward.

At its 62nd session in June 2019, COPUOS adopted the 21 LTS guidelines by absolute consensus of its 92 member States. The 21 guidelines are prefaced by a politically significant context-setting preamble that includes the definition of space sustainability quoted above. The full text of the preamble and guidelines is annexed to the report of the 62nd session of COPUOS.¹⁰

The LTS Guidelines

The 21 agreed guidelines comprise a collection of internationally recognized measures for ensuring the long-term sustainability of outer space activities and for enhancing the safety of space operations. They address the policy, regulatory, operational, safety, scientific, technical, international cooperation, and capacity-building aspects of space activities. They are based on a substantial body of knowledge, as well as the experiences of States, international intergovernmental organizations, and relevant 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, as practicable, and to all phases of a space mission, including launch, operation, and end-of-life disposal.

The purpose of the guidelines is to assist States and international intergovernmental organizations, both individually and collectively, to mitigate the risks associated with the conduct of outer space activities so that present benefits can be sustained and future opportunities realized. Consequently, the implementation of the guidelines should promote international cooperation in the peaceful use and exploration of outer space.

The guidelines are intended to support the development of national and international practices and safety frameworks for conducting outer space activities while allowing for flexibility in adapting such practices and frameworks to specific national circumstances. They are also intended to support States and international intergovernmental organizations in developing their space capabilities in a manner that avoids causing harm to the outer space environment and the safety of space operations.

The guidelines are voluntary and not legally binding under international law. The existing United Nations treaties and principles on outer space provide the fundamental legal framework for these guidelines. However, despite their non-binding status under international law, the guidelines can have a legal character in the sense that States may choose to incorporate elements of the guidelines into their national legislation, as has been the case with the UN COPUOS space debris mitigation guidelines.¹¹

International cooperation is required to implement the guidelines effectively and to monitor their impact and effectiveness. However, COPUOS recognizes that not all space actors have equal capability or capacity to implement these guidelines. Therefore the guidelines place strong emphasis on international cooperation and information sharing. States and international intergovernmental organizations with extensive experience in conducting space activities are encouraged to support developing countries to strengthen their national capacities to implement the guidelines.

COPUOS also recognizes that these guidelines should be a “living document” that is periodically updated to ensure that, as space activities evolve, the guidelines continue to reflect the most current state of knowledge of pertinent factors influencing the long-term sustainability of outer space activities. This “living document” aspect of the guidelines is especially important given that the rapid evolution in space activities makes space sustainability a dynamic, multi-scale problem.

States and international intergovernmental organizations are encouraged to share their practices and experiences with COPUOS regarding the implementation of the guidelines. States are also encouraged to promote and/or conduct research on topics relevant to these guidelines and their implementation.

The Committee envisages that it may periodically review, revise or add to these guidelines to ensure that they continue to provide effective guidance to promote the long-term sustainability of outer space activities. Proposals for revising this set of guidelines, or for new guidelines, may be submitted by any COPUOS member State for consideration by the Committee.

LTS 2.0 – Next Steps in COPUOS

While the 21 consensus LTS guidelines represent a significant step forward to promote space sustainability, COPUOS member States agree that the work of COPUOS on this issue is far from over. Building on the lessons learnt from the LTS discussions, the Committee has initiated a new phase of the LTS discussions in COPUOS – LTS 2.0.

At its 62nd session in June 2019, the Committee noted that it should serve as the principal forum for continued institutionalized dialogue on issues related to the implementation and review of the guidelines. The Committee also decided to establish a working group with a five-year workplan under its Scientific and Technical Subcommittee to continue the LTS discussions in COPUOS. The Committee decided that this new working group would be guided by the following framework:

- a) Identifying and studying challenges and considering possible new guidelines for the long-term sustainability of outer space activities. This work could also take into consideration draft guidelines that were discussed, but for which consensus could not be reached, during the term of the first LTS Working Group.⁹
- b) Sharing experiences, practices and lessons learned from voluntary national implementation of the 21 already adopted guidelines;
- c) Raising awareness and building capacity, in particular among emerging space nations and developing countries, to implement the guidelines.

As COPUOS takes this work forward, it will have to explore new methods of work, including ways of incorporating inputs from non-governmental organizations, industry, and the private sector. See the box on the role of the private sector in space sustainability.

Apart from the agreed guidelines, one of the main benefits of the LTS discussions in COPUOS is that it has raised the general level of awareness in the international community about the importance and urgency of addressing space sustainability as an international issue. Since the start of the LTS discussions in COPUOS in 2010, the membership of the Committee has grown from 70 to 92 States, and the level of engagement of States in the LTS debates has increased significantly. Participation in the LTS process is the latest example of increased interest by UN member States in the work of COPUOS. The current membership of COPUOS represents not only a greater geographical diversity, but also a much greater diversity of space capabilities than was the case previously. This has naturally made it harder to reach consensus in the Committee than would have been the case for a smaller number of States. Nevertheless, regardless of their level of development, or how invested they are in space systems, all the COPUOS member States share a common belief in the importance of ensuring a sustainable future for space activities and recognize that such a future is achievable only through international dialogue and cooperation.

Mainstreaming the LTS Guidelines in the Commercial Space Sector The Role of the Private Sector in Space Sustainability

The LTS guidelines will only have the intended effect if they are implemented by the widest possible number of space actors. In this regard, the commercial space actors have a major role to play in socializing the issue of space sustainability, demonstrating their adherence to these guidelines as a minimum standard of behavior, and leading by example.

Indeed, the private sector is already taking steps to promote responsible behaviors in outer space. In September 2019, the Space Safety Coalition was established, with Secure World Foundation as one of its founding members.¹² This industry-led initiative is an ad hoc coalition of companies, organizations, and other government and industry stakeholders that actively promotes responsible space activities through the adoption of relevant international standards, guidelines, and recommended practices. In particular, the members of the coalition commit themselves to implementing the guidance contained in the coalition's document *Best Practices for the Sustainability of Space Operations*.¹² These best practices are orbit-regime-agnostic and are generally applicable to all spacecraft, regardless of their physical size, orbital regime or constellation size, and directly address many aspects of the 21 consensus LTS Guidelines adopted by COPUOS in June 2019. In this regard, the Space Safety Coalition represents an important step in industry commitment to ensuring the sustainable use of the Earth's orbital environment.

The private sector is already thinking beyond the scope of the LTS Guidelines to develop standards for commercial close-proximity operations in orbit, something which is not addressed by the 21 already adopted LTS guidelines. The ability to conduct cooperative on-orbit close proximity operations (such as inspections or on-orbit servicing) will enable the growth of the orbital space economy. However, the lack of clear, widely accepted technical and safety standards for responsible performance of such operations involving commercial satellites could lead to mishaps that would put the long-term sustainability of space activities at risk, and this lacuna remains a major obstacle to the development of a satellite servicing industry.

The Consortium for Execution of Rendezvous and Servicing Operations (CONFERS) is an industry-led initiative that aims to leverage best practices from government and industry to research, develop, and publish non-binding, consensus-derived technical and operations standards for on-orbit servicing and rendezvous and proximity operations.¹³ The consortium currently comprises over 30 industry members from different countries, with Secure World Foundation providing coordinating and administrative support for this initiative under contract to DARPA. In November 2018, the members agreed to Guiding Principles. In February 2019, the Consortium adopted its first Recommended Design and Operational Practices to enhance the operational safety and success of rendezvous and proximity operations and on-orbit satellite servicing. The Consortium also submitted a formal request to Subcommittee 14 of the International Organization for Standards (ISO) to add a new work item on satellite servicing and begin discussions of an initial draft standard based on the CONFERS principles and practices. In October 2019, the members published a set of baseline mission phases for on-orbit servicing missions. The development and codification of standards for commercial rendezvous and close-proximity operations and on-orbit satellite servicing could pave the way for UN COPUOS to discuss and adopt best-practice international guidelines on these topics in the future.

This fact sheet supercedes the SWF UN COPUOS LTS Guidelines Fact Sheet published in August 2018.

Endnotes

1. This definition of space sustainability was developed in the UN process described in this Fact Sheet and appears in paragraph 5 of the UN document containing the full texts of the LTS guidelines (see Note 10 below). It has obvious parallels with the definition of sustainable development in the Report of the Brundtland Commission: Our Common Future, which is available at <http://www.un-documents.net/our-common-future.pdf>.
2. For a discussion of the origin of the LTS discussions in COPUOS, refer to the articles by Brachet (Space Policy, Vol. 28, pp 161-165, 2012) and Martinez (Space Policy, Vol. 43, pp 13-17, 2018).
3. The terms of reference and scope of the Working Group are available in the Report of the Committee on the Peaceful Uses of Outer Space, fifty-fourth session (1–10 June 2011), UN General Assembly document A/66/20, Annex II.
4. Report of LTS expert group A — Sustainable space utilization supporting sustainable development on Earth, COPUOS session document A/AC.105/C.1/2014/CRP.13, available on the website of the UN Office for Outer Space Affairs www.unoosa.org.
5. Report of LTS expert group B — Space debris, space operations and tools to support collaborative space situational awareness, COPUOS session document A/AC.105/C.1/2014/CRP.14, available on the website of the UN Office for Outer Space Affairs www.unoosa.org.
6. Report of LTS expert group C — Space weather, COPUOS session document A/AC.105/C.1/2014/CRP.15, available on the website of the UN Office for Outer Space Affairs www.unoosa.org.
7. Report of LTS expert group D — Regulatory regimes and guidance for new actors in the space arena, COPUOS session document A/AC.105/C.1/2014/CRP.16, available on the website of the UN Office for Outer Space Affairs www.unoosa.org.
8. The full text of the first 12 LTS Guidelines is contained in the Report of the Committee on the Peaceful Uses of Outer Space, Fifty-ninth session (8–17 June 2016), UN General Assembly document A/71/20, Annex.
9. The remaining seven draft guidelines that did not reach consensus during the mandate of the Working Group are contained in document A/AC.105/C.1/L.367. The progress made in the discussions of those draft guidelines will help to inform the direction of future LTS discussions in COPUOS.
10. The full text of the preamble and LTS guidelines is contained in the Report of the Committee on the Peaceful Uses of Outer Space, Sixty-second session (12–21 June 2019), UN General Assembly document A/74/20, Annex II, available on the website of the UN Office for Outer Space Affairs at http://www.unoosa.org/oosa/en/oosadoc/data/documents/2019/a/a7420_0.html.
11. Several States have implemented space debris mitigation measures in their national legislation. A compendium of space debris mitigation standards adopted by States and international organizations is available on the website of the UN Office for Outer Space Affairs at the following URL: <http://www.unoosa.org/oosa/en/ourwork/topics/space-debris/compendium.html>.
12. More information about the Space Safety Coalition, as well as the text of the Coalition's *Best Practices for the Sustainability of Space Operations*, can be found on their website <https://spacesafety.org>.
13. More information about CONFERS, the Consortium for Execution of Rendezvous and Servicing Operations, as well as the *CONFERS Recommended Design and Operational Practices* is available on their website at <https://www.satelliteconfers.org>.



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