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THE CONCEPT OF LONG – TERM SUSTAINABILITY OF OUTER SPACE ACTIVITIES AND THE INTERNATIONAL RESPONSIBILITY OF STATES FOR SPACE ACTIVITIES

Abstract

The concept of long-term sustainability of outer space activities is based on rational assumptions regarding outer space as a limited resource, which will inevitably shrink in the long term if States do not take appropriate preventive measures. The arguments for this are all the stronger as it concerns a real threat to the safety of space operations, and what is more, to their continuation in the future. The legal status of outer space determines the responsibility of States for the activities of both governmental and non-governmental entities. The UN COPUOS Guidelines for the Long-term Sustainability of Outer Space Activities strongly remind of this. This is an important element of this document, which should be considered not only in the context of liability for damage caused as a result of space activities, but also in the context of liability for violating the principles adopted in the key treaty of international space law, which is the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies of 27 January 1967.

The main purpose of this article is to present the assumptions of the concept and, in their light, to refer to its structural treaty connotations in the field of generally recognized international responsibility of the State for space activities. The study is also intended to show workable solutions adopted in national law that implement the COPUOS Guidelines,

as a necessary and inevitable direction of national activity of countries wanting to explore and use outer space safely and responsibly.

KEYWORDS

international responsibility for national activities in outer space, long-term sustainability of outer space activity, space debris

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odpowiedzialność międzynarodowa za narodową działalność w przestrzeni kosmicznej, długoterminowa trwałość działań w przestrzeni kosmicznej, śmieci kosmiczne

I. THE ESSENCE OF THE CONCEPT OF LONG-TERM SUSTAINABILITY OF OUTER SPACE ACTIVITIES AND ITS SOURCE

The concept of long-term sustainability of outer space activities was born out of real concerns about the future of space exploration and use. As to its essence, its goal is to reduce the negative impact of space activities on the outer space environment, recognizing its extremely significant role in shaping the standard of life on Earth and ensuring its safety. In addition to the benefits of modern technologies applied with the use of outer space, extraction of natural resources from celestial bodies may become quite realistic in the next few years. The opportunities and benefits that space exploration and use give us, therefore, sufficiently justify the postulate of the concept, according to which space activity must be "sustainable over the long term".[1]

Work on the relevant guidelines for long-term sustainability of outer space activities began several years ago within the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). On 18 February 2010, the Scientific and Technical Subcommittee of COPUOS established the Working Group on the Long-term Sustainability of Outer Space Activities.[2] It was entrusted with the preparation of a document whose main goal would be the sustainable use of

[1] UNOSA, *Long-term Sustainability of Outer Space Activities*, https://www.unoosa.org/oosa/en/ourwork/topics/long-term-sustainability-of-outer-space-activities.html (accessed 10.10.2022).

[2] UNGA, Report of the Scientific and Technical Subcommittee on its forty-seventh session, held in Vienna from 8 to 19 February 2010, A/AC.105/958, para. 181.

outer space to guarantee the durability, stability and security of space activities of States. As noted by Peter Martinez, chairman of the Working Group in 2011-2018, referring to the terminology used in the Guidelines, "the term 'space sustainability' has entered into common use in the English-speaking space community as a way to refer to (...) concerns relating to outer space as an environment for carrying out space activities safely and without interference, as well as to concerns about ensuring continuity of the benefits derived on Earth from the conduct of such space activities".[3]

As a result of the work undertaken, in 2016, COPUOS approved the Guidelines for the Long-term Sustainability of Outer Space Activities: first set.[4] Some new guidelines were adopted in 2019 with a preamble and nine additional paragraphs.[5] The introduction to the document states that the space environment is a limited resource used by an increasing number of States and non-governmental entities. It was noted that the increase in the number of space debris, the complexity of space operations, the formation of large constellations may affect the long-term sustainability of space activities, and these play an important role in achieving the goal of sustainable development, from the perspective of current and future participants of this activity, in particular developing countries. Increasing the safety of space operations was considered an essential element of this concept.[6] It was emphasized that outer space "should remain an operationally stable and safe environment that is maintained for peaceful purposes and open for exploration, use and international cooperation by current and future generations".[7] The very concept of long-term sustainability of outer space activities was also 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".[8]

To clarify the objectives and scope of the adopted guidelines, reference was made to the Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space of 13 December 1963 and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer

[3] P. Martinez, *The UN COPUOS Guidelines for the Long-term Sustainability of Outer Space Activities*, 'Journal of Space Safety Engineering' 2021, No. 8, p. 99.

[4] UNGA, Guidelines for the Long-term Sustainability of Outer Space Activities: first set, Report of the Committee on the Peaceful Uses of Outer Space, Fifty-nine session, 8–17 June 2016, Vienna, Annex, UN Doc. A/71/20, 26.06.2016, pp. 56-67.

[5] UNGA, Guidelines for the Long-term Sustainability of Outer Space Activities: first set, Report of the Committee on the Peaceful Uses of Outer Space, Sixty-second session, 12–21 June 2019, Vienna, Annex II, UN Doc. A/74/20, 3.07.2019, pp. 54-69.

[6] *Ibid.*, p. 50, paras 1-3.

[7] *Ibid.*, p. 50, para. 4.

[8] *Ibid.*, p. 50, para. 5.

Space, including the Moon and Other Celestial Bodies of 27 January 1967, with a particular reference to Articles I and III.[9]

The content of the Guidelines is divided into four parts, namely, A. "Policy and regulatory framework for space activities", B. "Safety of space operations", C. "International cooperation, capacity-building and awareness", D. "Scientific and technical research and development".

II. THE ISSUE OF INTERNATIONAL RESPONSIBILITY OF STATES IN GUIDELINES FOR THE LONG–TERM SUSTAINABILITY OF OUTER SPACE ACTIVITIES

The issue of international responsibility of States is one of the key elements of the UN COPUOS Guidelines for the Long-term Sustainability of Outer Space Activities. The document deals with it in the first section relating to the policy and regulatory framework for space activities. It opens with a guideline entitled "Adopt, revise and amend, as necessary, national regulatory frameworks for outer space activities". It recalls the responsibility of the State as a launching State of a space object into outer space and the responsibility of the State as a subject of international law, which is responsible for the actions of non-governmental entities. It is emphasized that States, considering their international obligations, when adopting, revising, amending or implementing national regulatory frameworks should consider ensuring and strengthening in national law the long-term sustainability of space activities (Guideline A.1.1). In turn, States as entities bearing international responsibility for the space activities of non- governmental entities should "adopt, revise or amend regulatory frameworks to ensure the effective application of relevant, generally accepted international norms, standards and practices for the safe conduct of outer space activities" (Guideline A.1.2). The guidelines therefore remind States, as subjects of international law, of a fairly obvious and fundamental obligation resting on them, which is international responsibility for space activities. At the same time, they indicate the obligation's connection with long-term sustainability and safety of operations in space. In addition, the document refers to the Resolution adopted by the General Assembly on 11 December 2013 on recommendations on national legislation relevant to the peaceful exploration and use of outer space, the provisions of which should be considered by States when shaping national law. At the same time, it is recommended that States should consider not only the existing space projects and ongoing space activities,

[9] *Ibid*., p. 51, paras 5, 7 and 8. See the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies of 27 January 1967 (UNTS 1967, vol. 610, No. 8843, p. 205).

but also the potential development of national space sector (Guideline A.1.3). It is further emphasized that when enacting new regulations or amending them, States should bear in mind the obligations arising from Article VI of the 1967 Outer Space Treaty, and as new regulations are developed, States should consider regulations that enhance the long-term sustainability of outer space activities. This is to be a new issue beside those traditionally included in national law, such as safety, liability, reliability and cost (Guideline A.1.4). It is indicated that while developing, revising or amending regulatory measures applicable to the long-term sustainability of outer space activities, countries should not only implement international obligations, including those arising from space treaties to which they are parties, but they should also implement space debris mitigation measures, such as the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space, and the guidance contained in the Safety Framework for Nuclear Power Source Applications in Outer Space and satisfy the intent of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space (Guideline A.2.1 and A.2.2, p. 2(b) and (e)). Guideline A.3 entitled "Supervise national space activities" states that States should ensure that entities subject to their jurisdiction and/or control should have the appropriate structures and procedures for planning and conducting space activities in a manner that supports the objective of enhancing the long-term sustainability of outer space activities, and have the means to comply with relevant national and international regulatory frameworks, requirements, policies and processes in this regard (Guideline A.3.1). Attention is also drawn to the responsibility for the authorization and continuing supervision of national activities. Therefore, it is up to the States to encourage each entity conducting space activities to establish and maintain all the necessary technical competencies required to conduct the outer space activities in a safe and responsible manner, and to develop specific requirements and procedures to address the safety and reliability of outer space activities, to assess all risks to the long-term sustainability of outer space activities associated with the space activities and to take steps to mitigate such risks to the feasible extent. It is also noted that States should enable compliance with relevant governmental and intergovernmental regulatory frameworks, requirements, policies and processes (Guideline A.3.2). It is also marked that the responsibility of the States to ensure that the management of an entity that conducts outer space activities establishes structures and procedures for planning and conducting space activities in a manner that supports the objective of promoting the long-term sustainability of outer space activities (Guideline A.3.4) and the assurance that appropriate communication and consultation mechanisms are in place within and among the competent bodies that oversee or conduct space activities (Guideline A.3.5).

Separate focus is given in the Guidelines to ensuing the equitable, rational and efficient use of the radio frequency spectrum and the various orbital regions used by satellites (Guideline A.4) and to enhancing the practice of registering space

objects (Guideline A.5). Guideline A.4 refers to the obligations arising for States from the Constitution and the Radio Regulations of the International Telecommunication Union. Among other things, attention is paid to not causing harmful interference with the reception and transmission of radio signals related to the space activities of other States and international intergovernmental organizations (Guideline A.4.3) and to removing spacecraft and launch vehicle orbital stages after completing the operational phase with orbits that pass through the low-Earth (LEO) and the geosynchronous Earth orbit (GEO) region (Guideline A.4.6). Referring to the obligations arising from Article VIII of the Outer Space Treaty and the 1975 Convention on Registration of Objects Launched into Outer Space, the Guidelines remind stakeholders to implement effective and comprehensive registration practices, noting that proper registration of space objects is of key importance for the safety and the long-term sustainability of space activities, and inadequate registration practices can have negative implications for ensuring the safety of space operations (Guideline A.5.1). Mention is made of the need to adopt appropriate national or other relevant policies and regulations to harmonize and sustain over the long term registration practices based on the widest possible international basis. It is emphasized that States should bear in mind the need to provide timely information that contributes to the long-term sustainability of outer space activities as well as information on space objects, their operation and their status (Guideline A.5.2). States should also request all necessary information from space launch service providers and users under their jurisdiction and/or control to meet all registration requirements under the Registration Convention (Guideline A.5.6). They also should consider providing information on any change of status in operations and, following the change in supervision of a space object in orbit, information about changes in the orbital position (Guideline A.5.7).

The subsequent parts of the Guidelines focus on desirable actions that should be taken by States to maintain availability of the environment for space operations and their safety. From a practical point of view, however, they contain important guidelines. Their application would not only ensure the safety of space operations and would limit the effects of space activities, which have been quite expansive so far, but it would also minimize the risk of State liability for space activities. Some of them are worth highlighting here. In particular, the Guidelines mention, among other things, the need to exchange information between States on space objects and actual or potential situations in near-Earth space (Guideline B.1.3), the implementation of a dedicated consultative process, preferably under the auspices of the Committee on the Peaceful Uses of Outer Space, taking into account the work of relevant technical bodies, in order to achieve harmonized and standardized record-keeping on space objects and events in outer space (Guideline B.1.4), the development of techniques and methods to improve the accuracy of orbital data for spaceflight security (Guideline B.2.1), making conjunction assessments during all orbital phases of controlled flight for their current and planned spacecraft

trajectories (Guideline B.4.1), and designing space objects in a way that limits the formation of space debris (Guideline B.8.2). The document also suggests ways to minimize space pollution, pointing to the need to look for new technologies to extend the operational lifetime, to prevent collisions and to implement advanced measures for spacecraft passivation and post-mission disposal and designs to enhance the disintegration of space systems during uncontrolled atmospheric re-entry (Guideline D 2.3).

As it is seen, on the one hand, the Guidelines try to remind States about their role in shaping responsibly conducted space activities, and on the other hand, this document is a kind of collection of "good advice and obligations". Its content is based on the conclusions drawn from the current practice of States. It refers to the developed treaty standards regarding the exploration and use of space and the soft law standards that supplement them.

III. IMPLEMENTATION OF THE ASSUMPTIONS OF THE LONG–TERM SUSTAINABILITY CONCEPT OF OUTER SPACE ACTIVITIES

The Guidelines for the Long-term Sustainability of Outer Space Activities as soft law standards are not a source of obligations for States. However, as the document itself emphasizes, "the existing United Nations treaties and principles on outer space provide the fundamental legal framework for the guidelines".[10] Thus, the COPUOS Guidelines are rooted in hard law, and their voluntary implementation means the implementation of legally binding standards. A more far-reaching conclusion could also be drawn, based on the interpretation of the 1967 Outer Space Treaty. Although the very concept of long-term sustainability of activities in outer space concerns essentially the preservation of the availability of the outer space environment for current and future space operations, it finds strong support in the regulations of the said Treaty. Although it does not speak about the interests of current and future generations, which is a characteristic element of the concept, it decides in Article I that the exploration and use of outer space and celestial bodies "shall be carried out for the benefit and in the interests of all countries (…) and shall be the province of all mankind". It is undoubtedly in the interest of States to maintain a stable space environment that guarantees the exploration and use of outer space. However, this thought cannot be closed only in the current perspective. Nothing would justify a logic which is fundamentally irrational. Moreover, the treaty-guaranteed right to explore and use outer space and celestial bodies is addressed to all States, whereby nothing would justify such activities by some of

[10] *Ibid*., p. 52, para. 14.

them which would limit or make it impossible for other States to exercise their rights. A similar argument has been used in the scientific literature to justify Article II's prohibition of appropriation of outer space and celestial bodies, linking it with Article I's right to use space by all States on an equal footing. As noted by Górbiel, the content of these regulations "imposes the conclusion that States may make use of the materials found in space – regardless of the form in which they occur – only in such a way that it will not infringe or limit analogous rights of other States".[11] It should be remembered that outer space is subject to the international law regime. Therefore, its exploration and use should be done for the benefit of all States, and should not restrict the rights of any State, as "the province of all mankind" recognized in the Outer Space Treaty, even if they do not currently have any space activities. On the contrary, every effort should be made to ensure that the activity of States in space does not prevent other States from developing their own space activities when they are ready. Otherwise, the allegation of violation of the provisions of the Outer Space Treaty would be justified, which could be the basis for the international responsibility of States. The implementation of the COPUOS Guidelines can protect States from such an effect. In addition, by creating an appropriate regulatory framework and adopting appropriate technical standards for the conduct of space activities, as recommended by the Guidelines, States protect themselves against international liability for damage caused as a result of activities conducted in outer space.

As may be seen, from the point of view of responsibility of States themselves, the Guidelines for the Long-term Sustainability of Outer Space Activities are a set of recommendations, the implementation of which would ensure compliance of space activities with the provisions of the Outer Space Treaty. British legislation may be an interesting and useful point of reference for regulatory actions taken by States. The UK is the undisputed leader when it comes to national regulations on space activities, where the issue of sustainable operations in space is treated as one of the principles of granting consent to conduct space activities. This is also related to the ambitions of this State. We can read on one of the government websites that the national space strategy is a plan that will allow the United Kingdom to take a leading role on the international stage.[12] Space sustainability and space security are elements of this strategy. It is emphasized that "the UK will work coherently across the UN Committee on the Peaceful Uses of Outer Space (…). The Government will meet the challenges of an increasingly contested and congested environment in space through targeted and robust diplomacy".[13]

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[11] See A. Górbiel, *Międzynarodowe prawo kosmiczne*, Warsaw 1985, p. 132.

[12] Policy Paper. National Space Strategy, 1 February 2022, https://www.gov.uk/government/publications/national-space-strategy/national-space-strategy (accessed 14.10.2022).

[13] HM Government, *National Space Strategy*, September 2021, p. 35, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1034313/national-space-strategy.pdf (accessed 14.10.2022).

It is worth noting that this country is building its space power through, among other things, modern regulations that meet COPUOS expectations. The Outer Space Act,[14] adopted in 1986, already in its original version stipulated that the licence to conduct space activities may include, in particular, the condition requiring the licensee to conduct his operations in such a way as to prevent the contamination of outer space and governing the disposal of the payload in outer space on the termination of operations under the licence and requiring the licensee to notify the Secretary of State as soon as practicable of its final disposal (Section 5.2(e)(i), 5.2(g)). The Act refers quite extensively to conditions for granting the licence and to issues related to its transfer, change, suspension and withdrawal. As a result of the introduced amendments, the application of the 1986 Act was limited to activities conducted abroad by British entities, while space activities conducted in or from the United Kingdom are currently regulated by the Space Industry Act 2018.[15] It sets high standards for commercial spaceflight operations.[16]

Speaking of State responsibility for space activities, it is worth noting that British law provides for licensing requirements for an orbital operator in relation to procuring the launch of a space object into orbit, operating a space object in orbit or conducting any other activity in outer space, also lunar activities. Similarly, a licence is required for both a launch operator (in relation to launching a launch vehicle, or a carrier aircraft and a launch vehicle) and a return operator (in relation to returning a launch vehicle, launched elsewhere than the UK, to land in the UK or UK territorial waters). The regulations also speak of a spaceport licence and a range controls licence.[17]

The UK licensing procedure is related to the Guidance for Orbital Operator Licence Applicants and Orbital Operator Licensees,[18] which apply to any person or organization wishing to conduct spaceflight activities from the UK. These guidelines identify four core principles to consider when evaluating applications for an orbital operator licence.[19] These are safety, security, sustainability, and responsi-

[14] The Outer Space Act 1986, https://www.legislation.gov.uk/ukpga/1986/38/contents/enacted (accessed 14.10.2022).

[15] The Space Industry Act 2018, https://www.legislation.gov.uk/ukpga/2018/5/contents (accessed 14.10.2022).

[16] *Spaceflight Legislation and Guidance. Learn About Legislation and Insurance Requirements for UK Spaceflight*, https://www.gov.uk/guidance/spaceflight-legislation-and-guidance (accessed 14.10.2022).

[17] J. Wheeler, *The Space Law Review: United Kingdom*, 'The Law Reviews', 9 December 2021, https://thelawreviews.co.uk/title/the-space-law-review/united-kingdom (accessed 14.10.2022).

[18] CAA, Guidance for Orbital Operator Licence Applicants and Orbital Operator Licensees, CAP 2210, 21 July 2021, https://publicapps.caa.co.uk/docs/33/Guidance%20for%20Orbital%20Operator%20licence%20applicants%20and%20Orbital%20Operator%20Licensees%20(CAP2210).pdf (accessed 14.10.2022).

[19] Potential operators, before they start applying for a licence, can use the so-called "Traffic Light System" to help decide whether to complete a licence application and prepare for application. It also allows for the assessment of the risk associated with the planned space activity based on the

bility (Section 5(5.1)). The document explains what is meant by each of them. The principle of safety requires the applicant to take all measures to ensure that risks to the health, safety and property of persons are as low as reasonably practical and that the level of those risks is acceptable (Section 5(5.5)). The security principle focuses on ensuring that activities licensed in orbit are secure, both to the operator and third parties by mitigating the likelihood and impact of malicious events that might occur as a direct or indirect result of a licensed activity. It requires demonstrating that the activity will not actively interfere with the activities of others in the peaceful exploration and use of outer space, and a potential operator has an appropriate security system to prevent loss of control over activities in orbit (Section 5(5.8-5.9)). As part of the sustainability principle, it is noted that "a sustainable activity (or mission) is one that meets the requirements of the present without compromising the ability of subsequent generations to embark on activities (or missions) to meet their own requirements in the future" (Section 5(5.10)). The applicant is to demonstrate how he will comply with orbital sustainability by demonstrating solutions aimed at collision prevention, on-orbit break-ups, either from collisions with other objects in orbit or fragmentation, limiting the number of objects released during normal operations and removing spacecraft and orbital stages that have reached the end of their operations from the most used, useful and densely populated orbital regions (Section 5(5.11)). Responsibility refers to, among other things, avoiding breaches of the UK's international obligations, including international registration and liability obligations (Section 5(5.13)). The annex to the Guidance includes a list of best practices that may be applicable to the operator in the management, design or operation of a spacecraft or mission. They refer to, for example, the IADC Space Debris Mitigation Guidelines, the COPUOS Space Debris Mitigation Guidelines and the European Code of Conduct for Space Debris Mitigation. It is also worth noting that the principles of safety, security, sustainability and responsibility, used in the procedure of applying for an orbital operator's licence, are workable for the assessment of the satellite's payloads that are planned to be launched from the UK, but not operated from the UK. This is provided by the separate Guidance for Launch Operator and Return Operator Licence Applicants and Licensees.[20]

An important element of the long-term sustainability concept of outer space activities is space debris mitigation. Therefore, the implementation of the COPUOS Guidelines also requires the implementation of guidance relevant in this

principles of safety, security and sustainable operation. CAA, *Applying for a Licence. Pre-Application Engagement and How to Apply for a Licence*, https://www.caa.co.uk/space/orbital-satellite-operator/applying-for-a-licence (accessed 17.10.2022).

[20] CAA, Guidance for Launch Operator and Return Operator Licence, CAP 2213, 29 July 2021, http://publicapps.caa.co.uk/docs/33/Guidance%20for%20launch%20operator%20and%20return%20operator%20licence%20applicants%20and%20licensees%20(CAP2213)%20(PR).pdf (accessed 17.10.2022).

area. A good example of such practice may be the solutions adopted by the US government. Developed in 1997 and finally approved in 2001, the United States Government Orbital Debris Mitigation Standard Practices provide technical guidance on the mitigation of space debris and form the basis for specific orbital debris mitigation requirements issued by individual US Government departments and agencies.[21] In 2019, the Standard Practices were amended.[22] The text of the document draws attention to the adopted limits that make it necessary to implement appropriate technologies, to modify engineering methods and to design spacecraft and missions in a way that reduces pollution of the space environment. They establish limits for the risk of accidental explosions (para. 2.1) and the probability of collision with large objects during orbital lifetime and collision with small debris during mission operations (paras. 3-1, 3-2).[23] The use of appropriate technology is enforced by the "liability of disposal" rule adopted in the Standard Practices, which assumes that the probability of successful post-mission disposal should be no less than 0.9 with a goal of 0.99 or better (para. 4-2). The document also defines the time limit for the satellites to stay in Earth's orbit after the end of the mission, recognizing that this period may not exceed twenty-five years (paras 1-1, 4-1 and 5-2). Regardless of this, activities to reduce this time are encouraged and the preferred disposal options for immediate removal of structures from Earth orbit are established.[24]

The gravity of the problem of space debris is undoubtedly evidenced by the decision of the Federal Communications Commission of 29 September 2022 to shorten the time for disposal of satellites placed in low-Earth orbit from twenty-five to five years.[25] This is an important step in shaping the right policy of States towards orbital resources and space debris that limits them, a policy that meets the assumptions of the concept of long-term sustainability of activities in

[21] UNOOSA, Compendium of space debris mitigation standards adopted by States and international organizations. National Mechanism – United States of America, p. 2, https://www.unoosa.org/documents/pdf/spacelaw/sd/United_States_of_America.pdf (accessed 17.10.2022).

[22] U.S. Government Orbital Debris Mitigation Standard Practices, November 2019 Update, https://orbitaldebris.jsc.nasa.gov/library/usg_orbital_debris_mitigation_standard_practices_november_2019.pdf (accessed 17.10.2022).

[23] Standard Practices accept an explosion probability limit of less than 0.001. In the case of collisions with large objects (size 10 cm and more), the probability is to be 0.001, and in the case of small objects 0.01.

[24] J.-C. Liou, *The 2019 U.S. Government Orbital Debris Mitigation Standard Practices*, 57th Session of the Scientific and Technical Subcommittee. Committee on the Peaceful Uses of Outer Space, United Nations, 3-14 February 2020, Vienna, p. 7, https://www.unoosa.org/documents/pdf/copuos/stsc/2020/tech-24E.pdf (accessed 17.10.2022). See para. 2 of the preamble to the US Government Orbital Debris Mitigation Standard Practices.

[25] Space Innovation IB Docket No. 22-271, Mitigation of Orbital Debris in the New Space Age, IB Docket No. 18-313, Report and Order, Appendix. Federal Communications Commission, 29 September 2022, https://www.fcc.gov/document/fcc-adopts-new-5-year-rule-deorbiting-satellites-0 (accessed 20.10.2022).

outer space. It means that the Commission's licensing is conditioned on a shorter time to remove the spacecraft from orbit after the work has been done. It is worth noting that in 2004 the Commission adopted space debris regulations[26] according to which an entity applying for a licence to launch a satellite into space must declare that it has assessed and limited the amount of debris released in a planned manner during normal operations, the probability of the satellite becoming a source of debris by collisions, the probability of accidental explosions during and after completion of the mission operations, and a statement detailing the post-mission disposal plans for the satellite as it enters its end-of-life stage.[27] In practice, the Commission has consistently applied the twenty-five-year rule, even though it was not specifically codified in the 2004 Regulations.[28] Following successful consultations on reducing the time to remove orbiting satellites, the Commission adopted a five-year standard for inclusion it into the rules and regulations contained in the Code of Federal Regulations. In the introduction to the document containing the changes, the reasons for the decision were explained, in which the importance of the problem of the growing number of space debris was highlighted. The Commission noted that at the end of 2021 there were 4,800,000 satellites in low-Earth orbit, the vast majority of which were commercial and launched within the last two years. Therefore, the likelihood of a collision increases, and with it the risk to the satellite industry, estimated by the Commission at $279 billion a year, and to related jobs.[29] Attention was also drawn to the benefits of using Earth orbits for each sector of the economy. It was explained that the five-year rule is to help stabilize the orbital debris environment, and the adopted regulation is to "ensure that the Commission's actions concerning radio communications, including US spacecraft licensing and granting access to the US market for non-US spacecraft, promote the sustainable use of outer space without creating undue regulatory obstacles to new satellite ventures". It was also indicated that "this action by the Commission furthers the public interest in preserving viable options for future satellites and systems and the many services that those systems provide to the public".[30]

The adopted solutions show the scale of the problem of maintaining the stability of outer space and access to it, and how comprehensive the regulatory solutions adopted at the national level should be. Rational arguments support the full implementation of the COPUOS Guidelines. The practice of countries in this area can be traced on the basis of the Report on LTS Guidelines National Implemen-

[26] Mitigation of Orbital Debris, IB Docket No. 02-54, Second Report and Order, 19 FCC Rcd 11567, 9 June 2004, https://www.fcc.gov/document/mitigration-orbital-debris (accessed 20.10.2022).

[27] Space Innovation IB Docket No. 22-271 …, *op. cit.*, p. 3, para. 6.

[28] *Ibid.*, p. 3, para. 7.

[29] *Ibid.*, pp. 1-2, paras 2 and 3.

[30] *Ibid.*, p. 2, para. 4.

tation prepared by the Space Generation Advisory Council at the 60th session of the Legal Subcommittee, which was held in 2021. It shows that States implement most extensively the guidelines related to the policy and regulatory framework for space activities. However, the degree of implementation does not exceed 90 percent. States realize it beyond regulation and basic legislation implementing treaty provisions.[31] Unfortunately, only half of the countries surveyed have also adopted appropriate regulations regarding space debris mitigation standards.[32] It is worth noting that the research referred to 20 major and developing spacefaring nations.[33]

IV. CONCLUSIONS

The development and adoption of guidelines promoting the concept of long-term sustainability of activities in outer space is undoubted evidence of the UN's commitment to the protection of the outer space orbital environment seen through the prism of the multidimensional benefits that humanity derives from space activities. A state that wants to conduct space activities responsibly, bearing in mind both its international obligations and the rational and safe use of outer space, should undoubtedly implement COPUOS recommendations. Even if the need to act in the interest of future generations and to reduce threats to space missions are not very convincing arguments, although they should be, it is still in the interest of States to avoid the risk of international liability for space activities. In addition, a State that wants to be perceived as a serious, and at the same time safe and attractive partner for international cooperation in the space sector, should adopt regulations that would consider the relevant standards for licensing space activities in the broadest possible way. These standards and their extent are determined by the Guidelines for the Long-term Sustainability of Outer Space Activities, and the solutions adopted by some States may constitute a good reference point for the national regulatory practice. The key issue is to create appropriate procedures for verifying capabilities of applicant entities which would ensure durability, stability and safety of subsequent space missions. On the part of the State, this would mean not only minimizing the risk of international liability for space activities, but also

[31] Report on LTS Guidelines National Implementation Prepared for the 60th Legal Subcommittee, UNCOPUOS, In support of the United Nations Programme on Space Applications, Space Generation Advisory Council 2021, pp. 9-10, https://www.unoosa.org/documents/pdf/copuos/lsc/2021/tech-7E.pdf (accessed 20.10.2022).

[32] *Ibid*., p. 14.

[33] These countries include Australia, Belgium, Belarus, Brazil, Canada, China, Finland, Germany, India, Japan, Kazakhstan, Luxembourg, New Zealand, RSA, Russia, Spain, Ukraine, the United Arab Emirates, the United Kingdom and the United States of America. *Ibid*., p. 5.

minimizing the risk of real financial losses and of the loss of benefits that outer space activities may bring.

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