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ENVIRONMENTAL PROTECTION IN *CORPORE IURIS SPATIALIS* (MAPPING THE ISSUE)*

The scientific, commercial and military potential of outer space has resulted in the growing interests of not only States but also of natural and juridical persons in outer space activities. Nowadays, with the advancement in technology more State and individual operators than ever are capable of conducting outer space activities which have led the international community to a growing concern about the pollution of the outer space environment. The scientific, commercial, and military activities hitherto have contributed to environmental threats of outer space such as e.g. orbital space debris, damage caused on or to other planets, environmental damage caused on Earth as a result of man-made objects falling from space, to mention just a few of them. It is a commonly shared opinion, that the protection of the outer space environment and its sub-systems become very important issues for humanity ensuring that outer space can be used for activities for the present and future generations[1].

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[1] For the comprehensive view on the problems see: Viikari, L., *The Environmental Element in Space Law. Assessing the Present and Charting the Future*, Martinus Nijhoff Publishers, Leiden–Boston 2008; V. Gupta, *Critique of the International Law on Protection of the Outer space Environment*, "Astropolitics" 2016, Vol. 14, No. 1, pp. 20–43. Comp. also M. Williamson, *Protecting the Space Environment*, "Earth and Space Review" 2000, Vol. 9, No. 4, pp. 4–5; Although the above mentioned opinion has been shared by majority of writers, there are also quite different views on that issue. For example W. Block and J. H. Huebert in the article "*Space Environmentalism Lacks Any Justification"*, http://fee.org/freeman/detail/environmentalists-in-outer-space (visited January 14, 2017), argue that they find proposed environmental programs for outer space wholly unjustified and they propose pure private property rights as a approach to the issue. In their view, space environmentalism lacks any justification and private subjects should be free to use space only within the limits of private property rights.

1. THE ENVIRONMENT OF OUTER SPACE – PROBLEMS OF NOTIONS AND DEFINITIONS

Defining key issues related to the protection of the environment in the context of outer space law requires the definition of many categories that are not easily defined in terms of both subjective and objective scope, mainly because of the lack of a reference point clearly defined for them, if only to bring up the issue of a legal definition of the outer space, the outer space environment, the definition of the categories of risks for the environment, or harm to the environment, which should be defined by law so that their effects would be subject to legal protection[2].

The situation is further complicated by the lack of a legal definition of the term "protection" for the outer space environment, which is seen in general terms as related to conservation of the environment and the protection of species, as well as to restoring the environment to its original condition, for example when dealing with damage to the environment. These categories are hard to apply to the situation in outer space.

In legal writing, outer space is commonly referred to as the space above the air space surrounding earth. It is also believed that the determination of the point at which it begins, in physical terms, is hard to do. In the subject literature, it is also believed that the issue of the delimitation of airspace and outer space is more of a political and legal nature rather than a technical one. As a result, the literature points out to two general approaches to this problem, namely the technical and the functional[3].

The technical approach permits the construction of the definition based on the distance parameters tied with the parameters of physico-chemical composition of the atmosphere and the experience acquired from mankind's activities in the airspace and outer space. According to the technical approach, the height of about 80−100 kilometers is proposed as being the point from where the outer space starts, taking into account the composition of the atmosphere as well as the aeronautical and astronautical experience of man.

The more complicated functional approach requires defining, among others, such concepts as human activities in outer space. L. Viikari points out one of the examples of the difficulties faced by the functional approach, which is the case of the space shuttle launched into outer space by rocket, while returning to Earth

[2] In this context it is worthwhile quoting the NASA Quest Space Team on Line, "The Outer Space Environment", in which one may find the most accurate and inspiring non- legal definition of outer space: "Outer space is just what its name implies. It is the void that lies beyond the uppermost reaches of the atmosphere of Earth and between all other objects in the universe"; at http://quest.nasa.gov/spce/teachers/suited/3outer.html (visited May 21, 2015).

[3] Comp. Report of the Legal Subcommittee of the UN Committee on the Peaceful Uses of Outer Space (COPUOS), Session 44/2005, Anex I.

using the mechanisms proper for airplanes. According to functional approach, the space shuttle should be classified as both an aircraft and a spacecraft. Here both air space law and outer space law would be applied, depending on the phase of flight, which is – in turn – associated with the issue of state jurisdiction in both the air space and outer space[4].

As regards the definition of environment in terms of outer space, similarly as in the case of international environmental law, there is no general definition of the outer space environment. In general, in international environmental law the definition derived from the French term – environ, which means what surrounds us, namely the environment, has been used. More precisely to the term environment refer those instruments of international environmental law, which define the concept for the specific needs of a given instrument[5]. Similarly, for the needs of the issue of the environmental protection of outer space, the term *"environ"* could be used, with some limitations (resulting *inter alia* from the lack of a reference point defining it), as describing what surrounds the Earth's environment and the air space above it. Some authors believe that in connection with the geocentric character of these elements, the environment of space can only be named as para-environment[6].

Therefore, one should rather talk about environmental policy in this matter, than about legal regime. One can also apply the above-mentioned way of constructing the definition for the needs of the particular regulation and refer to any of the international treaties constituting the *corpus iuris spatialis*. So far, none of the treaties of the *corpus iuris spatialis* contains such a definition. It can only be found in the proposals of the Committee of Space Law of the International Law Association (ILA) 1994; namely the draft of the international legal instrument on the protection of the environment against the effects of damage caused by space debris[7]. Article 1 of this document defines, for the purposes of this document, the term environment, as including both outer space and the terrestrial environment within and beyond the national jurisdiction. The consequence of this kind of definition, if included into a legally binding instrument, would be an almost total lack of certainty as to the possible effects of regulated activities in space and time, if one points just only to the issue of the so-called space debris.

Generally speaking, the above-mentioned attempts to draw up a definition of the environment of outer space, including the ILA proposals, are based on

[4] L. Viikari, *The Environmental Element*..., p. 1 and next.

[5] See on the issues: M. M. Kenig-Witkowska, *Międzynarodowe Prawo Środowiska. Wybrane zagadnienia systemowe* [*International Environmental Law. A Systemic Issues Approach*], Warszawa 2011, p. 13 and next.

[6] See: J.-F. Mayence, *Protection: Towards a Space Environmental Law*, The 5th Eilene M. Galloway Symposium on Critical Issues in Space Law, Washington D.C., December 2, 2010, *passim*.

[7] Buenos Aires International Instrument on the Protection of the Environment from Damage Caused by Space Debris. See Final Report to the Sixty-sixth ILA Conference, Buenos Aires 1994.

the structures of concepts analogous to the concept of the environment as it is understood in international law; however with the reference rather to the policy issues than to legal standards[8]. If that assumption is to be taken, the following basic dimensions of issues related to environment of outer space are to be taken into consideration in the future regulatory processes *ie*. the health and welfare of humans, animals and plants; the socio-economic dimension, and the ethical dimension. One should however bear in mind that the catalogue of possible dimensions is open and limited by the present stage of our knowledge in this field.

In connection with the above, J. F. Mayence points out four fields that are partly covered and to be covered by the policy and law on environmental protection of outer space: 1) planetary protection; 2) protection in respect of activities in Earth orbit; 3) protection from near-Earth objects (NEOs); 4) protection associated with the management of the exploitation of natural resources of celestial bodies[9].

Planetary protection applies to preservation of fields of scientific research.

Protection in respect of activities in Earth orbit concerns the protection of the interests of operators in outer space (as J. F. Mayence writes, it is more about protecting the interests of operators than the protection of human life on earth)[10].

Protection from near-Earth objects (NEOs) means the protective shield for human life in relation to specific threats. It is not about threats to the environment that we speak about in connection with the protection of the environment on earth, or threats to ecosystem.

Protection associated with the management of the exploitation of natural resources of celestial bodies is related with the idea of the sustainability of space activities in order to protect the scientific and exploiting interests of mankind. Therefore, the pioneers of extraterrestrial ecology will be researchers and explorers of the space.

2. THE ENVIRONMENTAL THREATS IN RESPECT TO HUMAN ACTIVITIES IN OUTER SPACE

From an environmental perspective, the doctrine of international environmental law recognizes numerous problems related to human activities in outer space,

[8] It is worth noting that elements of the notion of environment used in international law but also in national laws are based on anthropo- and geo-centric axiological approaches. Some authors point out also the cosmo-centric aspect of this issue. See for example T. U. Aganaba, *Towards Space Sustainability: Lesson from Environmental Liability Regimes*, Institute of Air and Space Law, McGill University, Montreal–Quebec, October 2011, p. 38 and next.

[9] Supra, note 6.

[10] *Ibidem*.

which should be taken into account in the development of rules of international law of *lex spatialis*, bearing in mind not only the possibility of damage to the outer space environment caused by human exploratory activities in outer space, but also damage to the environment of the Earth associated with that activity. It should then be emphasized that it always concerns damage to the environment caused by human activities.

Various writers point to different environmental risks associated with the human activities in outer space. The most frequently listed risks are as follows: 1) so-called space debris, which is the most famous example of littering the extra-terrestrial environment; 2) radioactive/nuclear contamination. From the point of view of humankind, the most dangerous is the risk of radioactive contamination by space objects, for example those colliding in space or returning to earth (the case of satellite Kosmos 954)[11]. Similarly dangerous are the possible effects of the deployment of nuclear weapons in outer space; 3) satellites powered by solar energy. Scientists express the view that the transfer of solar energy to earth destroys the ozone layer and can affect life on earth. Especially in this context, one needs to pay attention to the long-term effects on humans of electromagnetic waves broadcast by satellite dishes and the so-called biota within the collection areas on Earth and in the sky. It is emphasized that many of the risks associated with it are not yet identified, such as those that may arise from the use of materials from the moon used for the construction of satellites powered by solar energy; 4) space stations, which by the fact of their stationary position and size may cause, among other things, the threat of collision. Similarly, the threat of collision can result from the cutting off of solar energy for powering satellites. Space stations can also be a source of threat to their nearest environment, among other things, by dumping the debris; and 5) organic contamination of outer space by organisms from Earth; 6) contamination of Earth by extraterrestrial organisms transferred e.g. by a spacecraft returning to Earth.

3. *CORPUS IURIS SPATIALIS* FROM AN ENVIRONMENTAL PROTECTION PERSPECTIVE

Because almost no environmental standards are directly related to these problems, their solutions must be sought primarily in the norms of international law relating to outer space. From the perspective of the rules of international environmental law on the protection of the atmosphere and climate, the standards for outer space appear only in a very rudimentary way.

[11] For details comp: www. hc-sc.gc.ca.

From the perspective of environmental protection of outer space there are only a few international treaties and non-binding legal instruments. These treaties were adopted before the outer space environmental issue became the subject of the particular axiological approach of international community. Thus, the standards contained in them are a reflection of general principles of international law and of the basic principle of the law of outer space.

In this matter, the most important from the perspective of international environmental law is the Treaty on Principles Governing the Activities of Sates in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies, of January 27, 1967 (the, so called, Outer Space Treaty)[12]. The Treaty states in art. I that the exploration and use of outer space, including the Moon and other celestial bodies, shall aim for the benefit and interests of all countries and should be applied to the whole of humanity. By the provision of art. IV of the Treaty, the parties are obliged to not place in orbit around the earth objects containing nuclear weapons or weapons of mass destruction and not to install such weapons on celestial bodies and not to place such weapons in outer space in any other way.

From the environmental perspective issues the most important is art. IX of the Treaty. The provision of art. IX provides *inter alia* that states conducting study and research of outer space, along with the Moon and other celestial bodies should conduct them in such a way as to avoid their harmful contamination and also adverse changes to the earth through the introduction of extraterrestrial substances and if there is the need, to take adequate measures. States parties are also obliged to take appropriate international consultations before undertaking the exploration or exploitation of outer space, which could have a detrimental effect on the activities of other States parties in this matter. In relation to the issue of space debris is the provision of art. V paragraph 3, which is of a particular interest because it states that the parties to the Treaty shall immediately inform the other states parties and the UN Secretary General of any phenomena they discover in outer space, including the Moon and other celestial bodies, which could constitute a danger to the life or health of astronauts.

To conclude, the analysis of the provisions of the Treaty shows that they indirectly address issues related to the protection of the terrestrial environment, but with a clear perspective of the general principles of law and of the principle of peaceful use of outer space. From the perspective of environmental law the provisions would qualify as those that in effect are aimed at the protection of mankind.

Another treaty on outer space, which can also be analyzed in the context of environmental law is the Agreement Governing the Activities of States on the Moon and other Celestial Bodies, December 5, 1979 (the, so-called, Moon Treaty), which received relatively limited support from the international com-

[12] For the text of the Treaty see: 610 UNTS 205.

munity[13]. The Agreement stipulates that the Moon and other celestial bodies belong to the category of the common heritage of mankind and can be exploited for exclusively peaceful purposes (art. 1, 3, 11). The exploration and exploitation of the Moon is the area of competence of all humankind and must bear in mind the interests of the present and future generations (art. 4).

The Agreement introduces the notion of environmental protection in relations to the Moon environment. The provision of art. 7 sets out the provision on the protection of the environment of the Moon and celestial bodies. It stipulates that States Parties to the Agreement shall take measures to prevent the violation of the existing balance of the environment of the Moon and the celestial bodies, causing irreversible changes in the environment, the introduction of harmful substances from outside the environment, or in any other way. Parties to the Treaty undertake not to introduce any substance of extraterrestrial origin. This provision also states that the parties to the Agreement undertake to protect the life and health of a man on the Moon.

Although in general the provisions of the Treaty do not prohibit the placement of radioactive materials on the Moon, nevertheless they oblige States Parties to the prior notification of their intention to the Secretary-General of the United Nations.

From an environmental perspective, there is an important provision on the permitted exploitation of natural resources, which will be subject to international control (art. 11). Although the provisions relating to the natural resources of the Moon do not contain standards for the protection of the environment, it seems that they should be interpreted in the light of the provisions of art. 7 of the Agreement.

In the context of the usefulness of *Corpus Iuris Spatialis* in the environmental protection of outer space discussed above, the Convention on International Liability for Damage caused by Space Objects of March 29, 1972 (the, so called, Liability Convention) is another one that can be used to put the foundations of the legal regime of outer space from the perspective of environmental protection[14]. The Convention refers to the common interest of mankind on the exploration and peaceful use of outer space and of the Moon and other celestial bodies. The primary objective of the Convention is to develop effective international-legal rules and principles governing the issues of liability for damage caused by space objects, including damage to the environment; hence they are not regulations devoted exclusively to liability for damage to the environment. Nevertheless, art. II applies to damage caused by space objects on the surface of earth or to a moving aircraft, which implies damage in both the earthly and outer space environments. Moreover, the Convention refers in the preamble to both the above-cited provisions of the Outer Space Treaty of 1967, as well as to the Moon Treaty

[13] For the Text of the Agreement see: 1363 UNTS 3, 18 ILM1434.

[14] For the Text of the Convention see: 961 UNTS187.

of 1979, making them simultaneously, in accordance with the Vienna Convention on the Law of Treaties of 1969, foundations for interpretation in the process of its application.

Another legal instrument of significant importance to the environmental protection of outer space is a resolution of the General Assembly – Principles Relevant to the Use of Nuclear Power Sources in Outer Space, developed by the UN Committee of the peaceful use of outer space, are considered by the doctrine of international law and practice of international relations as an expression of the norms of customary law in this matter (so called 1992 Outer Space Principles)[15]. In order to minimize the amount of radioactive material in space, Principle 3 stipulates that the use of nuclear power sources in space should be limited only to those projects that absolutely cannot do without it. This provision establishes the general purpose of radiation protection, which would result in significant contamination of outer space. The use of nuclear generators in space was limited to interplanetary missions, using appropriate orbits and using highly enriched uranium 235 as a fuel. The radioisotope generators can only be used in interplanetary travel. The Principles also regulate matters of security, notification, consultation, support, and liability for damages (art. 4, 5, 6).

In addition, to the above mentioned catalogue, one could also include in this category the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, as a relevant element mapping the issue of outer space environmental protection[16], general regulations of some international bodies such as the International Telecommunication Union, especially those relating to radio frequency and all kinds of rules of the so-called soft law developed by Inter-Agency Space Debris Coordination Committee, the United Nations Committee on Peaceful Uses of Outer Space. In this context the work of the International Law Association, which in 1994 published a draft Convention on the outer space debris, should also be mentioned

4. PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW FROM THE PERSPECTIVE OF THE FUTURE REGULATION *IURIS SPATIALIS*

Since the existing rules of *corpus iuris spatialis* are inadequate for the threats to the environment listed above, attention should be paid to the rules of international environmental law from the perspective of assessing the application of those standards to the outer space environment, especially because art. III

[15] UNGA Res.47/68, 34/68 ILM 917 (1993).

[16] For the text of the Agreement see: 672 UNTS 199.

of the Outer Space Treaty of 1967 provides that activities in space should be carried out in accordance with international law, the Charter of the United Nations, in the spirit of international cooperation and understanding. This provision *explicite* confirms the applicability of the norms of general international law, including international environmental law to action in outer space.

In this regard, the basic general principles of international environmental law should be pointed out from the perspective of their use in solving the environmental problems related to outer space. Amongst these principles, there is the principle of sustainable development, which would aim to ensure the sustainability and continuity of operations and exploitation of mankind in outer space. Others, related to the previous include, for instance, the principle *sic utere tuo, ut alienum non laedas*, the principle of good-neighborliness, the principle of due diligence, the precautionary principle, the principle of common but differentiated responsibility, and probably the polluter-pays principle.

There is no place here to examine those principles' possible position and role in solving the environmental problems connected with the exploration and exploitation of outer space. Pointing out these principles one should, however, bear in mind their limited normativity, because they are usually formulated in a general way, and their content and status are usually subject to interpretation. Consequently, it is not easy to derive obligations only from the content of those principles without relying on the standard contained in the given treaty or convention. Thus, the usefulness of the principles of international environmental law in setting standards for controlling activities in outer space is limited, unless they are introduced to the body of standards *legis spatialis*.

Therefore, the principles of international environmental law can and should serve as directives for necessary changes in *legis spatialis*. In addition, they can be considered for filling the gaps in the interpretation of existing law of outer space (consultative role). Having that in mind, however one should be aware of the diversity of interests relating to the exploration and exploitation of space associated on one hand with security and, on the other hand, with the economic interests of countries and private entities.

One should also remember that we still know very little about the processes taking place in the *mutatis mutandis* environment of outer space. Therefore, even the most elaborate approach to promoting the idea of environmental protection from the perspective of its terrestrial origin and move it to the "ground" of outer space can be ineffective or even counterproductive, in the negative scenario.

Therefore, it should also be noted that any "terrestrial" analogy to "outer space" situations must be very carefully studied, like for example the often invoked analogy for these circumstances, that is the situation of international seabed regime. As common elements in this approach one can point to the idea of the common heritage of mankind, global commons, acting for the good of humanity and only for peaceful purposes, responsibility, sustainable use, the precaution-

ary approach, etc. As a result, a decision-making process for the management of exploitation of seabed might indicate *mutatis mutandis* directions as how to solve similar situations in the exploitation of space.

Other potential sources of analogy, which the legal literature often indicates, are the air space law, the rules governing the activities on the high seas, or regulations concerning the Antarctic status. It is well known that the Antarctic Treaty has been successfully dealing with military challengers, sovereignty claims issues, scientific explorations and related similar problems. Although both treaties shared similar priority goals, over the last 50 years they have diverged with the environmental protection and management issues. Therefore one should take this analogy with a relevant distance[17].

5. SOME FINAL REMARKS

1. Environmental legislation related to human activity in outer space is so far just rudimentary, does not have a systemic nature and is not adequate to solve problems and tasks associated with the environmental aspect of outer space; from this perspective it would be highly desirable to adopt a legal instrument on the sustainable use of outer space.

2. Adoption of an international agreement in this regard would be even more desirable in connection with emerging problems resulting from human activities in outer space; for it is clear that the use of outer space by more and more actors must be regulated.

3. The most urgent problem to be solved seems to be the problem of space debris and of the compliance with the UN Committee on the Peaceful Uses reports as well as of the Space Debris Mitigation Guidelines of 2007 in this regard[18].

4. Intensified research should be carried out on the issue of the so-called reverse contamination.

[17] On the subject of similarity issue between Antarctic and the outer space legal approach see for example M. S. Race, *Policies for Scientific Exploration and Environmental protection: Comparison of the Antarctic and Outer Space Treaties*, (in:) P. A. Berkman, M. A. Lang, D. W. H. Walton, O. R. Young, *Science and Diplomacy: Antarctica, Science, and the Governance of International Spaces*, Washington 2011, pp. 143–152.

[18] See: UN Doc. A/AC. 105/C.1/L.260, Annex.

ENVIRONMENTAL PROTECTION IN CORPORE IURIS SPATIALIS (MAPPING THE ISSUE)

Summary

The aim of this paper is to map the issue of environmental protection of outer space from the perspective of regulations of existing *corpus iuris spatialis*. The issue of the environmental protection of outer space has been a subject of considerable discourse which leaves many questions unanswered from the present *corpus iuris spatialis* perspective. There is no doubt that environmental concerns are an issue for the outer space legal regime and that the human activities in outer space pose a serious threat to future generations and uses of space. The article consists of five parts. In Parts I and II, the author deals with the problems of definitions of the environment of outer space and the environmental threats connected with human activity in the outer space; Parts III and IV present an overview of *corpus iuris spatialis* from an environmental protection perspective, and principles of international environmental law from the perspective of the future regulation *iuris spatialis*. Part V presents some final remarks.

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KEYWORDS

outer space, environment, environmental protection, threats to environment, *corpus iuris spatialis*, international environmental law

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przestrzeń pozaziemska, ochrona środowiska, środowisko pozaziemskie, zagrożenie dla środowiska, *corpus iuris spatialis*, międzynarodowe prawo środowiska