

Article IX of the Outer Space Treaty and the Concept of Planetary Protection:

Toward a Space Environment Law ?

Jean-François Mayence, LL.M.

Legal Advisor, Belgian Federal Office for Science Policy
Lecturer, University of Leuven

Article IX of the Outer Space Treaty is one of those provisions which feature many different concepts and mechanisms mixed together in the text. It is sometime difficult to determinate to which extent all those concepts and mechanisms must be read as forming a whole, or just as a list of wishful thinking statements from which States parties should select the best they can achieve. This is a shame since the said concepts and mechanisms are often much more important than what the Outer Space Treaty make them look like. For instance, the concept of Planetary Protection has been a key-principle in exploration activities during the Space Era.

The Concept of Space Environment

Planetary protection is a particular recognition of the existence of a *Space Environment*. Such a denomination would make it easy to draw a parallel with the environment as we know it on Earth, subject to policies and regulations and to big political concerns. But first of all, in order to make the concept of 'space environment' acceptable, we must come back on what '*environment*' actually means.

To define the concept of 'environment' is certainly not an easy task. In French, for

instance, the word '*environnement*' has not always been the exact translation of its English homonym. There are several definitions of the term, each of them having its own scope and range of signification. Main dictionaries¹ provide us with a definition which seems to match the concept we are dealing with here : *Environment is the whole set of biotic (living) or non-biotic elements surrounding an individual or a species, which forms its living frame and provides him with the resources necessary for its survival.*

Reading this definition, one would rather define outer space as an anti-environment with respect to the human species: its hostility towards human life, the necessity for human beings to export in outer space the resources and conditions necessary for their survival, are factors which tend to disqualify outer space as part of the 'environment'.

That being said, the fact that our planet and its atmosphere are not only surrounded by outer space but are definitely part of it, as the result of cosmological and astrophysical phenomena, should make us consider outer space at least as an indirect part of

¹ Merriam Webster : « (1) *the circumstances, objects, or conditions by which one is surrounded* (2) a) : *the complex of physical, chemical, and biotic factors (as climate, soil, and living things) that act upon an organism or an ecological community and ultimately determine its form and survival* b) : *the aggregate of social and cultural conditions that influence the life of an individual or community.* Larousse: « (1) *Ensemble des éléments (biotiques ou abiotiques) qui entourent un individu ou une espèce et dont certains contribuent directement à subvenir à ses besoins.* (2) *Ensemble des éléments objectifs (qualité de l'air, bruit, etc.) et subjectifs (beauté d'un paysage, qualité d'un site, etc.) constituant le cadre de vie d'un individu.* »

our environment, or as a 'para-environment'².

But the concept of 'space environment' has another purpose: it is to describe the interactions between natural phenomena and conditions as we can observe them in outer space or on celestial bodies. The interest of such a concept can be related to the expectation of a possible human presence in extra-terrestrial areas in the future, or to the potential existence or appearance of extra-terrestrial life in such areas. At the end of a more philosophical reflection, one could even consider the concept of 'environment' without any relation to any kind of life, but for the sake of the preservation of outer space as such.

Existing Provisions of Space Environment Law

Environmental concerns have grown together with the awareness of the environmental reality and the threats and risks caused by its degradation due to human activities. The idea that the environment is victim of human behaviour even before that the human being becomes victim of the environment, is a key triggering thought in the development of Environment Law. Therefore, the concept of 'space environment' appears clearer, as sustained by the willingness to mitigate human activities with a potential harmful effect on outer space's natural features.

² On this discussion, see the very interesting article: *Is Space an Environment?*, by Saara Reiman, in *Space Policy* 25 (2009), pp. 81-87.

An Evolution through a Developing Space Law

In 1967, the concept of Planetary Protection appears for the first time in an international treaty. Absent from Resolution 1962 of the United Nations General Assembly³ (at least under an explicit form), the idea that human exploration might cause harm either by the contamination of extra-terrestrial environmental (export contamination) or by the contamination of the Earth's environment itself (import contamination) shows how aware the space community was of the potential risk and hazard related to the development of space activities.

*States Parties to the Treaty shall pursue studies of outer space, including the Moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose.*⁴

For the first time, extra-terrestrial environment is considered for itself and not for the indirect impact it may have on the human ecological sphere. Nevertheless, it is remarkable that celestial bodies and outer space in general are only protected from contamination, while the earth environment should be kept free from any *adverse change*. Once again, this can be explained by the human-oriented vision according to which the real

³ *Declaration of Legal Principles governing the Activities of States in the Exploration and Use of Outer Space*, adopted on December 13, 1963 in Resolution 1962 (XVIII). This instrument features however the principle of non-interference.

⁴ Article IX Outer Space Treaty (excerpt)

concern is to avoid the corruption of the object of scientific research, rather than safeguard a world where the probability of life is likely void.

In 1979, the Moon Agreement will further develop the concept of Planetary Protection, which is dedicated its own paragraph.

*In exploring and using the Moon, States Parties shall take measures to prevent the disruption of the existing balance of its environment, whether by introducing adverse changes in that environment, by its harmful contamination through the introduction of extra-environmental matter or otherwise. States Parties shall also take measures to avoid harmfully affecting the environment of the Earth through the introduction of extraterrestrial matter or otherwise.*⁵

One notices the extension of the concept of 'environment' to the Celestial Bodies. It is also remarkable that the Moon Agreement postulates the existence of an environmental balance on those celestial bodies and the possibility for human activities to disrupt it, a fact that may seem obvious nowadays, but which has not always been accepted even as far as the earth's environment is concerned: see for instance the long-lasting belief that the ocean could serve as a waste deposit without significantly affecting nature and human health.

Another interesting mechanism foreseen by the Moon Agreement is the feedback information due by State Parties to the United Nations Secretary General on their measures for the implementation of the

⁵ Article 7, §1, Moon Agreement. According to Art. 1, §2, of the Agreement, the term « Moon » designates the Moon as well as all any celestial body of the Solar System.

Planetary Protection principle.⁶ This is likely supposed to contribute to the enhancement of the practices and the definition of common standards applicable to all missions.

It is well known that the Moon Agreement has not reached a level of participation which allows its mechanisms and procedures to become general legal norms. But the Planetary Protection concept has followed its own path though the scientific community and among policy makers. This is obvious considering the importance of ethical and political dimensions in 'space environment' policy (including Planetary Protection)⁷.

General Environment Policies and Space Environment Policies

The Four Dimensions of an Environment Policy

The concerns that usually call for the development of an environment policy, including a dedicated legal and regulatory framework are of various natures.

⁶ See Article 7, §2, Moon Agreement

⁷ See notably A. Ducrocq, *Ethique spatiale*, in *Air & Cosmos/Aviation Magazine International*, n°1687, January 22, 1999 (on the contamination from imported samples); UNESCO/COMEST, *The Ethics of Outer Space, A Policy Document*, (working document), Paris 2004 (<http://www.unesco.org/shs/ethics>); Vienna Declaration "*The Space Millennium*", as adopted at the UNISPACE III Conference, on July 30, 1999, and in particular its section 1, (c), as published on <http://www.unoosa.org>; L.M. Covert, *Multinational and Ethical Issues in Manned-Space Strategy*, in *Space Policy* 18 (2002), pp. 151-156; M. Williamson, *Space Ethics and Protection of the Space Environment*, in *Space Policy* 19 (2003), pp. 47-52; L. Billings, *How Shall We Live in Space? Culture, Law and Ethics in Spacefaring Society*, in *Space Policy* 22 (2006), pp. 249-255.

1° Those concerns can be related to human health, at local, regional or global scale. Due to its direct and harsh impact on individuals, the health factor (namely the perception that one may have of the impact of an activity or a phenomenon on one's own physical integrity) certainly remains as the greatest motivation for a human group to act against its own behaviour and habits.

2° Sociological concerns also stand at the first row when it comes to assess the necessity of an environment policy. A sound environment is a factor of social order and a condition for social stability and development. This has been expressed through the definition of the concept of Environmental Justice, as integrated in various national environmental policies⁸. The development of environmental awareness during the two last decades has also permitted to integrate ecology into economy and *vice versa*.

3° Ecology has moved from an economical concern towards an economical solution, sharing with economy the concept of Sustainable Development.

4° Finally, the need to take into account superior considerations of moral, religious or philosophical nature, has led to give environment an ethical dimension.

Having identified what we would present as the four dimensions of an environment policy (the health dimension, the sociological dimension, the economical dimension and the ethical dimension), a parallel can be drawn between the development of general environment law and the development of space

environment law. Indeed, it is our belief that the phenomenon of the development of environment law at various scales (from local to global) is deeply connected with those four dimensions. As law is the result of a political process based on society's concerns of various natures (economical, sociological, material, moral, religious, etc.), the sensitivity of those concerns combined with the degree and the width of the awareness of the public is a condition for the development of a new branch of law, just as it has been the case so far for environment law. Now, the question is: can space environment law benefit from the same thrust and political activism as those that characterize ecologism nowadays?

Relation between Space Law and Environment Law

From a legal point of view, the subjection of space law to general international law is a key consideration. This subjection is stated as a general principle by Article III of the Outer Space Treaty, but it can easily be deduced from the general principles of law (space law being a *lex specialis* with regard to international law). Therefore, one must assume that general environment law being part of international law, it applies to outer space to the extent that it is not subject to specific rules and that such application is not prevented by logical disruption (i.e. you can't protect the fauna or flora on Mars), nor technical infeasibilities (i.e. environmental impact assessment of activities to be performed on an unknown celestial bodies).

But it is true that existing space environment provisions already features the same mechanisms and procedures as those established by general environment law.

⁸ See notably the definition and use of this concept by the US Environmental Protection Agency (<http://www.epa.gov/environmentaljustice/index.html>), by the US Department of Transportation (<http://www.fhwa.dot.gov/environment/ej2000.htm>).

For instance, according to the principles that lay under the Planetary Protection concept, States must adopt measures in order to guarantee the protection of an environment from elements belonging to another environment. This non-contamination principle (which, to some extent, may be seen as a particular application of the non-interference principle) is present in the Convention on Biological Diversity, done in Rio de Janeiro, on June 5, 1992. This instrument recalls the principle according to which the exercise by a State of its sovereign right to exploit its national natural resources must not cause any harm to another State's environment or to the environment in areas outside any national jurisdiction. This formulation seeks to temper the strong statements which can be found in the UNGA resolution 1803 (XVII) of December 14, 1962, on the Permanent Sovereignty over Natural Resources and from which the notion of Environment is quite absent⁹.

The 1992 Convention on Biodiversity adopts an approach similar to the phrasing of Article IX of the Outer Space Treaty, to the extent that it covers the conservation of biological material both *in situ* and *ex situ*.¹⁰ It is noteworthy that the Convention establishes a regime of protection of the environment for the sake of the so called 'biodiversity' itself and wherein human beings are not the direct beneficiaries of that protection. On the other hand, biological diversity sometimes requires active intervention in order to keep the fragile balance between cohabiting species. This illustrates the difference between 'protection' and

⁹ This can easily be explained by the fact that in the de-colonization context, limitations of the developing States' sovereignty on their natural resources, even justified by environmental concerns, would have been considered as a manifestation of economic imperialism.

¹⁰ See in particular Art. 8, (h), and Art. 9, (d).

'preservation'. While a protection policy may justify such intervention for the sake of the species itself, preservation relies on the absence of such intervention in order not to interfere with the environment and its inherent and natural regulation. In that sense, it would be more correct to speak about *Planetary Preservation*.

Another example of international law instrument featuring an obligation of non-contamination is the Protocol on Environmental Protection to the Antarctic Treaty, done in Madrid on October 4, 1991. In particular, Article 4 of its Annex II on the protection of fauna and flora deals with the rules applicable to the introduction of non-indigenous species on the Antarctic soil.

The subjection to international law also requires to take into account the whole set of sources of international law, including the relevant jurisprudence. This extension, as highlighted by Prof. Dr. Sergio Marchisio, allows to subject space activities to the general principle of the duty of control and preventive action as recalled by the International Court of Justice in its judgement on the case of Projected Dam of Gabčíkovo-Nagymaros¹¹. This principle has a particular resonance in outer space: the fact that the exploration of celestial bodies is characterized by the quite poor knowledge we have about them, compared with terrestrial areas, the fact that the possibility and the probability of extra-terrestrial life is still an issue subject to huge scientific controversies, all those uncertainties makes the duty of

¹¹ Case concerning the Gabčíkovo-Nagymaros Project (Hungary v. Slovakia) (Judgement) (1997) ICJ Rep. 7, mentioned by Prof. Dr. Sergio Marchisio in its commentary of Article IX of the Outer Space Treaty, in *Cologne Commentary on Space Law, Volume 1: Outer Space Treaty*, ed.: S. Hobe, B. Schmidt-Tedd, K-U. Schrogl, Carl Heymanns Verlag, 2009, pp. 177-178.

precaution even more significant in the exploration and use of outer space.

The Elements of a Space Environment Policy

With regard to the current – and sometimes critical – issues that space activities are facing, one can identify three major domains of space environment policy:

- Planetary Protection
- Orbital Space System Protection
- Protection against Near-Earth Objects¹²

A fourth domain may possibly be added in the future : the Celestial Bodies' resources management and sustainable exploitation, which goes far beyond the Planetary Protection and involves natural resources management policy.

Planetary Protection is already implemented through mission requirements based on international standards and guidelines, such as the COSPAR Planetary Protection Policy¹³. As previously mentioned, this policy essentially aims at preventing the contamination of extra-terrestrial environment in order to respond to *scientific* requirements¹⁴.

¹² Although Near-Earth Objects are traditionally included as a component of Planetary Protection, we would prefer, for the purpose of this paper, to consider it as a separate subject since the preservation of Celestial Bodies' environment is a very different issue than the protection of human life on Earth.

¹³ Cf. dedicated presentations and papers.

¹⁴ Cf. policy statement in the preamble of the *COSPAR Planetary Protection Policy*, as adopted on October 20, 2002 and subsequently amended

Considering whether this element is or could become an engine for the development of a space environment law, is a difficult issue. If we refer back to the four dimensions of environmental policy we have highlighted above, we do not see how Planetary Protection would become a subject of enough importance to justify a hard law response from the international community. It has neither direct nor remote impact on human life (except possibly on future astronauts or space settlements inhabitants) and the impact of human activities on the celestial bodies' environmental is hard to determine. This concern remains thus for the responsible of space missions.

The situation is quite different when it comes to the Orbital Space Systems Protection. First of all, earth orbits are an actual natural resource of huge importance in the global economy. Secondly, the problematic of space debris has reached a critical level which has made policy makers and general public aware of this issue. Here, environmental concern is in direct relation with an economic area where substantial interests are at stake. The dynamic behind the development of policies and legal rules in the field of the sustainable management of orbital activities is therefore very different than the motivation behind Planetary Protection. The economical dimension should constitute a driving force in the search for compromise solutions at international level. The adoption of technical standards and references, already on a voluntary basis, might be the starting point of a regulatory framework which could eventually evolve through its 'legalization' under specific principles of the outer space treaties. The liability for fault for the damage caused in

(<http://cosparhq.cnes.fr/Scistr/PPPpolicy%2820-July-08%29.pdf>).

outer space could be one of the vectors through which those soft law provisions are attached a mandatory effect.

As far as the Protection against Near-Earth Objects is concerned, although it constitutes an actual probability, its perception by the general public is that it still belongs to 'science fiction' rather than it constitutes a pending threat. Still, the question is at the agenda of UNCOUOS and other international space organizations. Coordination of national efforts as well as the formulation of a clear policy in case such event would occur is certainly not dispensable. But if we have a closer look at the tracks which have been highlighted in the Association of Space Explorers' report of 2008 on Near-Earth Objects¹⁵, we can identify open issues related to the scheme of actions/decisions to be taken. And these scheme is similar to the one currently debated in the framework of global climate change. The ASE's report first calls for the setting up of a dedicated legal mechanism, to assess the threat and to manage global communication about it¹⁶. This is certainly an issue in common with all major natural threats. We know how sensitive the question of the credibility and the legitimacy of scientific warnings can be. Communication management is also a key-issue in order to find the right balance between on the one hand, the fundamental right to information and the freedom of speech and, on the other hand, the necessity to avoid confusion, ambiguity or irrational behaviour. The sharing of (national) detection and mitigation capacities is also at stake. Who will decide on what to do? Could national initiatives be prevented by a international coordinated response? Once again, the

parallel with climate change is relevant, where the behaviour of some States can have regional or global harmful effects. The reflection on Near-Earth Objects is certainly mirroring the controversies we see in environmental policy's domains.

Conclusion

The comparison between the current legal framework protecting outer space as a common global natural resource, and the set of laws and regulations governing environment in general, must not be limited to juxtaposing the texts and highlighting similarities or differences. It also requires to analyze the perspective of development of those legal frameworks. Their history, just as their evolution in the future, is guided by lines of force, pro-activity, tensions between human yearning for a better quality of life and more actual and immediate interests, such as commercial business.

The concept of 'space environment' is very convenient for the purpose of encompassing a number of issues related to the negative effects of human activities in outer space. But beyond this convenience and apart from some similarities in the way that an institutional response to those issues is sought, we cannot qualify them as 'environmental issues'. Planetary Protection is about preservation of scientific areas, Orbital Space Systems Protection is about safeguarding economical interests of space operators (much more than protecting human life on the surface of the Earth). Protection from Near-Earth Objects is about giving terrestrial life a shield against a very specific type of threat. Those issues are not environmental issues like, for instance, the

¹⁵ See <http://www.space-explorers.org> : *Asteroids Threat: A Call for Global Response* (2008)

¹⁶ See the ASE Report, Appendix III, p. 45.

protection of oceans, of the rain forest, of still water, of fertile soil, of atmosphere, etc., any area or element which provides human beings with **living resources or vital conditions**, and constitutes the whole or part of an eco-system.

This vision should certainly not be interpreted as a cynical one, diminishing the importance and the urgency of the space issues. To the contrary: the ultimate meaning of our considerations is to highlight which interests and which actors are, today as we write, expected to play an effective role in their solution.

The best incentive for working towards a better sustainability of space activities remains their harmful impact on big business ventures. Money calls for money and the early champions of space ecology are likely to be the space operators themselves or the space scientists. This supposes a large part of **self-regulation** in space activities.

We must not be concerned about causing harm to outer space. It will destroy us much quicker than we would destroy it. We should be concerned about causing harm to ourselves by wasting the considerable and wonderful wealth we have received from Mother Nature.

*