

PROTECTING THE SPACE ENVIRONMENT

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ABSTRACT

The basic legal framework for the protection of the space environment is supplied by space law, by environmental law, and more generally by international law at large, which also applies to space activities. The effectiveness of environmental protection requires the application of both primary and secondary rules, the former establishing states rights and obligations, and the latter dealing with the consequences arising from breaches of primary rules, or damage caused by state activities. The substantial norms of space law on environmental protection have been, in the main, conceived from an Earth oriented-perspective; some of them, however, serve as a legal basis for maintaining the space environment. On the other hand, no secondary rule can be found in space law which specifically concerns the legal consequences of environmental damage to outer space. Integration of the applicable substantial norms can be derived from the application of international principles and rules on sustainable development. As for secondary norms, we can resort to the general principles of international law on state responsibility for wrongful acts, and to the principles concerning state liability for damage caused by ultra-hazardous activities. These latter are, however, not so consolidated in international law. State practice also contributes to defining the legal regime. However, there is need for further development. This can be achieved through

international co-operation in adopting technical norms and recommended standards, a task that could be appropriately managed by the Legal Subcommittee of the United Nations Committee for Peaceful Uses of Outer Space (UNCOPUOS).

1. THE PROTECTION OF THE SPACE ENVIRONMENT AND THE EVOLUTION OF INTERNATIONAL ENVIRONMENTAL LAW

The subject of the protection of the space environment has largely been addressed in recent years, although interest in the topic seems to be lower currently than in the past. It has to be said, however, that pollution of outer space and the increasing presence of man-made debris were been considered by jurists initially as a potential nuisance to operational satellites, rather than a potential threat to the conservation of the space environment itself.¹

It remains that space activities are *per se* ultra-hazardous activities, which may be harmful to both the space and the terrestrial environment, two aspects that are strictly intertwined. After the report adopted by the UNCOPUOS Scientific and Technical Subcommittee (STSC) in 1999,² we can say that the peril of debris is a major risk factor for the space environment, especially in Low Earth Orbits (LEOs) and in the geostationary orbit, limited resources where debris accumulation is becoming particularly worrying.³

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The legal doctrine has considered this issue with the utmost attention and the Proceedings of the annual Colloquia organized by the International Institute of Space Law (IISL) of the International Astronautical Federation are an inestimably valuable source of knowledge in this respect. Professor Lyall's paper presented at the 1999 Colloquium outlined that the rules of law, both national and international, aimed at protecting the terrestrial environment had developed remarkably, but, other than some general principles, few of them were readily transposable to the space environment.⁴

Is this conclusion still valid? I believe that some lessons have to be learnt by looking at the evolution of international environmental law which may also be helpful in protecting the space environment.

2. THE APPLICABILITY OF PRIMARY AND SECONDARY RULES OF INTERNATIONAL LAW

Following the motto *repetita iuvant*, I would like to restate two preliminary points.

Firstly, Article III of the 1967 Outer Space Treaty (OST) establishes that activities related to the exploration and use of outer space are to be carried out in accordance with international law. Therefore, applicable law includes not only the specific rules of international space law but also the rules of international law, whether their nature be customary, conventional or other, which are applicable to space activities.

Secondly, in dealing with this matter, it is useful to keep in mind that we have primary and secondary norms of international law: the former are substantial or material rules of international law, imposing rights and obligations of environmental protection upon states; the latter are instrumental rules concerning consequences arising from the breach of primary rules establishing international obligations (rules on responsibility) or concerning the legal

consequences of damage attributable to states under international law (rules on liability).

The effectiveness of environmental protection obviously requires the application of both primary and secondary rules.

3. THE PROTECTION OF THE SPACE ENVIRONMENT IN SPACE LAW

3.1. The "Earth Oriented" Perspective

So said, it is commonly understood that the main problem in dealing with this matter lies on the one hand, in the scarcity of primary norms of international law which impose clear obligations upon states carrying out space activity and, on the other hand, in the weakness of secondary norms of a customary nature applicable to environmental damage to space.

The explanation is given that the major "environmentalist" concern in space treaties has been, at the moment of their negotiation and conclusion, the so-called "back-contamination" resulting from the introduction of extra-terrestrial substances. This point of view is shared by several norms contained in the five space Treaties. We can mention, on this point, Article IX of the OST setting out the obligation to avoid, in the exploration of outer space "adverse change in the environment of the Earth resulting from the introduction of extraterrestrial matter"; and Article II of the 1972 Liability Convention, concerning the absolute liability of states to pay compensation for the damage their space objects cause on Earth.⁵ As for the codes of conduct elaborated by the UNCOUOS Legal Subcommittee (LSC) and adopted by the General Assembly (GA) of the United Nations, mention must be made of the Principles relating to the use of nuclear power sources in outer space adopted by the 1992 GA resolution 47/68, which deals with the safe use of nuclear power sources in

outer space particularly in order to avoid the risk of re-entry of radioactive material to the Earth (principle 5).⁶

The view that the norms of space law on environmental protection deal with the matter from an Earth-oriented perspective is, therefore, correct. In my opinion, however, this circumstance cannot be overestimated. There is in fact a clear link between Earth pollution from the space and planetary contamination, because the source of the former can, at the same time, be the source of the latter.

I do recognize, however, that we are concerned here with a more general problem, i.e. the protection of the space environment *per se*.

3.2. Maintaining the Space Environment *per se*

Beside the limitation resulting from the "Earth-oriented perspective", some norms of international law serve as a basis for a legal regime of protection of the space environment as such. According to Article 1 of the OST, "the exploration and use of outer space shall be carried out for the benefit and in the interest of all countries, and shall be the province of all mankind". A contextual interpretation shows that this norm is aimed at protecting not only the freedom of any state to carry out space activities without suffering harmful interference by others, but also at safeguarding the cosmic environment as an essential element of this freedom. Contamination of the space environment being one of the major threats to the freedom of outer space, the protection of the space environment has to be considered as an integral part - not a limit - of space activities. Then comes Article IX of the OST, which, after mentioning the principles of co-operation, mutual assistance and of due regard to the interests of all states, sets forth the proviso that states shall "pursue studies in outer space, including the Moon and other

celestial bodies, and conduct exploration of them so as to avoid their harmful contamination". This norm clearly imposes upon states conducting space exploration activities, the obligation of avoiding harmful contamination of outer space and the Earth's orbits, which are an integral part of the space environment. It also establishes a duty of consultation upon states that "have reason to believe" that their planned activities, or experiments could produce potentially harmful interference with activities of other states. As is known, the establishment of the said consultation mechanism was a result of the early "environmentalist" concerns expressed by the Consultative Group on Potentially Harmful Effects established in 1962 by the Committee on Space Research (COSPAR) of the International Council of Scientific Unions.⁷

As regards the 1979 Moon Agreement, Article 7, para. 1, elaborates fully more in comparison with previous space treaties, by explicitly considering the risk of lunar contamination and imposing upon states the duty to take measures to prevent the disruption of the existing balance of its environment.⁸

4. INTEGRATION DERIVING FROM RULES OF INTERNATIONAL ENVIRONMENTAL LAW

4.1. The Principle of Sustainable Development

These primary norms of international space law are integrated by rules and principles on environmental protection of general scope, which have developed greatly in recent years.⁹ These rules and principles are contained in multilateral treaties, in acts of soft law, such as the GA declarations of principles, but are often evidence of general practices accepted as law in the sense of Article 38 of the Statute of the International Court of Justice (ICJ).

Now, in the judgment of 25 November 1997 on the case of *Projected Dam of Gabčíkovo-Nagymaros*, the Court stated that the principle of sustainable development had to be applied, as a legal principle, in the context of the obligations of the riparian states of the Danube river to not allow that the flow of water be altered, after the project's completion, by harmful activities and work.¹⁰

In para. 140 of this decision, the ICJ explicitly makes reference to existing norms of international law in the field of environmental protection, and among them specifically to a well consolidated principle of general international law, which provides a duty of control and preventive action.

The Court goes further towards recognizing “new norms and new standards” affirmed by a large number of instruments that tend to reconcile economic development with the protection of the environment.

4.2. The Duty to Prevent Environmental Damage

The duty of control and preventive action is implied in the traditional principle 2 of the 1992 Rio Declaration on environment and development, restating principle 21 of the 1972 Stockholm Declaration. Beside the sovereign right of states to exploit their resources pursuant to their environmental and developmental policies, there is a responsibility – that is to say an obligation – to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of their national jurisdictions. The same concept was expressed by the ICJ in its advisory opinion on the *Legality of the Threat or Use of Nuclear Weapons*: “the existence of a general obligation of states to ensure that activities within their jurisdiction and control respect the environment of other states or of areas beyond national jurisdiction is now

part of the corpus of international law relating to the environment”.¹¹

This responsibility also covers, indeed, outer space as an area beyond national jurisdiction, as a *res communis omnium* or common space of the international community as a whole. And space activities are paradigmatic of that kind of activity which must remain under the jurisdiction or control of a given state according to Article VI of the OST.

The obligation of preventive action to avoid potential damage to outer space as a whole has to be fulfilled also, and principally, by developing environmental laws and requirements within national space legislations. States have to exercise due diligence in planning and performing their space activities and in framing and enforcing their laws and regulations in the space field. In this area, we must take into account that the precautionary approach, according to which when there are threats of “serious or irreversible damage” to the environment, lack of scientific certainty cannot be invoked by states in order to postpone preventive measures (principle 15 of the Rio Declaration), has gained increasing relevance in international law, in the European Union Law, and in national legislation.

4.3. The Duty to Inform

In this legal framework, the duty to inform also plays an important role. Information is recognized as a prerequisite for effective national and international environmental management, protection and co-operation. In international law, the information duty is mostly envisaged from an Earth-oriented perspective (principles 18 and 19 of the Rio Declaration, which relate to terrestrial environment). This is also true for access to environmental information, as is clearly shown by the Convention of the United Nations Economic Commission for Europe (UNECE) concerning access to information,

public participation in decision-making and access to justice in environmental matters (Aarhus, 1998).¹²

As for space law, specific provisions on the duty to inform and the duty of consultation are contained in the last part of Article IX of the OST, which makes reference to activities in outer space which would cause potentially harmful interference; and in Article XI of the same Treaty concerning the information which has to be given to the Secretary-General of the United Nations, as well as to the public and the international scientific community.

Moreover, Article IV of the 1975 Registration Convention has had, in my opinion, an application environmentally oriented, in a functional sense. This point will be better highlighted by the examination of state practice on the registration of space objects and related information, which the COPUOS LSC will start considering from 2004.

4.4. Other Environmental Principles and Criteria

It is true, in the end, that many principles and rules that have been developed more explicitly within international environmental law are, at least implicitly, of growing relevance also in international space law. Even the debated principle of common but differentiated responsibility affirmed in the Rio Declaration merits attention in taking into account the needs of developing countries.¹³ The principle could be considered, in fact, a more specific application of two general principles which are found in international space law: that of international co-operation, and that according to which space activities have to be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development (Articles I and IX of the OST). Indeed, many bilateral and multilateral

agreements concerning joint participation of developed and developing countries in space programmes take into account, in establishing the rights and obligations of the contracting parties, their differing degrees of economic development and of scientific and technical knowledge.¹⁴

Moreover, a lesson which can be learned from the application of environmental treaties and principles is that any international environmental regime requires the participation of the private sector to be viable. Industry has been associated as a core component in the functioning of the regime applicable to the protection of the ozone layer within the framework of the 1985 Vienna Convention, the subsequent Montreal Protocol, and its technical annexes and amendments, which have led to the trading off and phasing out of dangerous substances that deplete the ozone layer.¹⁵ Therefore, space law is not the only branch of international law where private sector participants have earned a major role in ensuring the effectiveness of applicable legal regimes.

It is my habit to see the glass half-full, rather than half-empty, so, I think that the abovementioned stipulations, even if they probably fail to set completely clear obligations, do pave the way for identifying the existing legal regime which protects the space environment.

5. DEVELOPMENTS IN STATE PRACTICE

It has been often said that international space law is a law without practice: claims for compensation are rare and there are no disputes.

This is true on the one hand, but, on the other, we have a very conspicuous practice of the space-faring states from which we can deduct, if not yet a consolidated *opinio iuris*, a clear tendency toward the recognition of the imperative of space environment

protection. The main evidence of legal obligation is to be found in current practice of states and a rough idea of state practice can be gathered from concrete behaviour and action rather than from more classical sources.

Now, it seems that this practice shows a growing tendency not only toward consciousness of the problem but also toward tackling it, by behaving to protect, to the maximum possible extent, the space environment and by trying to avoid harmful contamination. In this regard, we may mention the application of the recommendation contained in the 2002 GA resolution 57/116 calling for the continuation of national research on space debris and the safety of nuclear-powered satellites; the conduct and procedures adopted by space-faring countries to effectively minimize the creation of space debris; the application of Article IV of the Registration Convention and state practice on the re-entry of space objects, like the MIR manned orbital station and its “safe and controlled” descent from orbit, or like the Beppo-sax Italian satellite’s destruction and splash down into the Pacific Ocean on April 29, 2003 following a procedure of voluntary notification to potentially affected states; and finally, NASA’s Galileo nuclear-powered spacecraft, deliberately destroyed by disintegrating it at high altitude within Jupiter’s atmosphere “to eliminate the chance of an unwanted impact with Jupiter’s moon Europe”.¹⁶

As for the contribution of the scientific community, we may recall the COSPAR Planetary Protection Policy, aimed at providing acceptable guidelines which can be generally adopted by states to avoid contamination in their space exploration.¹⁷

Finally, mention has to be made of national legislation, as a part of relevant state practice. Regarding this point, the UK Outer Space Act of 1986, Section 5, includes among the conditions that might be imposed

on private operators for them to obtain a license for their space activities, the requirement that their operations be conducted in such a way as to prevent contamination of outer space or adverse changes to the environment of the Earth.¹⁸

6. THE LACK OF SECONDARY NORMS

But the feeling still remains that the substantial legal regime for space protection is not well defined and needs to be improved from a *de lege ferenda* point of view.

This conclusion is also true as far as the secondary norms are concerned. The special regime of international responsibility and absolute/strict liability set forth in Articles VI and VII of the OST and in the 1972 Convention does not provide any mechanism for claiming compensation for environmental planetary damage.

Also, if we look at the current situation of general international law, we can see that absolute/strict liability for harmful consequences of internationally lawful activities is not reflected yet by specific customary norms. It is well known that the Draft Articles on prevention of transboundary harm from hazardous activities adopted by the International Law Commission (ILC) in 2001 confirms such a conclusion.¹⁹

The only secondary rules of general international law applicable to the protection of the space environment are, therefore, the norms on state responsibility for wrongful acts, according to which every breach of an international legal obligation entails state responsibility and creates a further obligation to make reparation. This regime is mentioned, in my interpretation, in the last phrase of Principle XIV of the 1986 GA resolution 41/65 on remote sensing, according to which the application of the strict liability regime to remote sensing is without prejudice to the applicability of the

norms of international law on state responsibility for remote sensing activities. Now, the critical point is the concept of “injured state”. In fact, in the case of violation of an obligation concerning the protection of the space environment, which state is entitled to invoke the responsibility of the violator state? This is a rather controversial issue. According to Article 42 of the Draft Articles on state responsibility for internationally wrongful acts adopted by the ILC in 2001, a state is entitled as an “injured state” to invoke the responsibility of another state, if *a*) the obligation breached is owed to him individually; or *b*) the obligation is owed to a group of states, or the international community as a whole, and the breach of the obligation specially affects that state, within the group or the international community. These criteria clearly identify the state entitled to invoke the responsibility as a state whose rights and interests are directly affected by an internationally wrongful act. In addition, according to Article 48 of the Draft Articles, any state *other than an injured state* is entitled to invoke the responsibility if “*a*) the obligation breached is owed to a group of states including that state and is established for the protection of a collective interest of the group; or *b*) the obligation breached is owed to the international community as a whole”.²⁰ Therefore, Article 48 entitles a state which is not directly affected by the breach of an obligation to invoke the responsibility, if that obligation is established for the protection of *a collective interest*, or is owed *to the international community as a whole*. Is this criterion applicable to the damage to the space environment when there has been a breach of legal obligations?

This is an open question. It is evident, however, that the protection of the outer space environment is inherently linked with the concept of outer space as an intergenerational trust of the international

community as a whole. In fact, the principle of exploration and use of space as the province of humankind contains, even implicitly, the concept of intergenerational equity, which is at the core of international law in the field of sustainable development and environmental protection.²¹ Intergenerational equity transcends spatial dimensions by viewing international law from an inter-temporal perspective, linking the present to the future. It can therefore address the question whether harm to areas beyond national jurisdiction can be averted or recompensed where potential or actual harm occurs to the space environment. The task ahead lies in translating widely expressed concern for future generations into normative obligations.

But this is a more general task of progressive development of international law.

7. INTERNATIONAL CO-OPERATION TO LIMIT SPACE DEBRIS AND OTHER HARMFUL EFFECTS

The *de lege ferenda* point of view is very intriguing, but rather difficult. I think that in the short term, a more pragmatic approach has to be taken.

The United Nations has paid great attention to the necessity of protecting space environment. Thanks to the COPUOS action, progress has been made in the area of international co-operation to limit space debris or other harmful effects of space activities. Following the adoption of the 1999 Report on space debris, the STSC has continued its consideration of the item in accordance with the work plan adopted at its 38th Session. The Inter-Agency Debris Coordination Committee (IADC) has adopted and presented the Space Debris Mitigation Guidelines, based on a consensus among the Committee members²². The STSC has requested and encouraged all member states to study these proposals and to provide their comment before 2004.

This constitutes a solid body of work, which could also form the basis for the LSC to address this item. Until now, the LSC has only been able to discuss the space debris issue on a very general level. Some COPUOS members, like Brazil and the Czech Republic, put forward a proposal to consider the issue of the legal aspects of space debris within the Subcommittee, while France recently proposed that the LSC embark on the negotiation of a declaration of principles on the subject. Others are of the opinion that such a step would not be constructive at the present time, the fastest way of reducing the space debris being for space-faring nations to immediately implement on a voluntary basis the measures contained in the IADC Guidelines.²³

This consideration brings me to my last point, which is the role of the LSC in this field. Some years ago, in 1999, during the Perugia Colloquium on "International Organization and Space Law", Dr. Jasentuliyana put forward the idea of the drafting by both COPUOS Subcommittees, on an ordinary functional basis, of international recommendations and standards.²⁴ As the experience of some specialized institutions shows, real drive can come from the so called technical norms. We may recall the recommended standards and practices of the International Civil Aviation Organization (ICAO), adopted in the form of annexes to the constituent Treaty following an opting-out procedure; the *Codex Alimentarius*, a joint system of the Food and Agricultural Organization (FAO) and of the World Health Organization (WHO) for deciding food standards and fair practices in food trade, which has been adopted by acceptance by member states (full acceptance, target acceptance, and acceptance with specific deviations); the regulatory frameworks of the WHO and, finally, the technical annexes to a number of environmental treaties, like the 1987 Montreal Protocol on substances depleting

the ozone layer, based on an opt-out mechanism.

I think that this proposal should be revitalized, in order to allow the LSC to consider an international regulatory framework applicable to space debris for an orderly, reliable and safe environment for beneficial space activities.

¹ Cfr. Reijnen, B.C.M., de Graaff, W., *The Pollution of Outer Space, in Particular of the Geostationary Orbit. Scientific, Policy and Legal Aspects*, Dordrecht-Boston-London, 1989, p. 38 ff. See also Gorove, S., *Developments in Space Law. Issues and Policy*, Dordrecht-Boston-London, 1991, 164 ff.

² Committee on the Peaceful Uses of Outer Space, Report of the Scientific and Technical Subcommittee on the Work of its Thirty-sixth Session, UNGA doc. A/AC.105/719, 18 March 1999.

³ Cfr. Courteix, S., *La pollution de l'espace extra-atmosphérique par les débris spatiaux*, "Mankind and the Environment. What rights for the twenty-first century?", Paris, 1998, pp. 563-581. See also Frankle, E.A., *International Regulation of Orbital Debris*, "IISL Proceedings", 2000, p. 369 ff.

⁴ Lyall, F., *Protection of the Space Environment and Law*, "IISL Proceedings", 1999, p. 472 ff.

⁵ See, generally, Reijnen, B., *The United Nations Treaties Analysed*, Utrecht, 1992, p. 122 ff. and p. 184 f.

⁶ See Courteix, S., *The Legal Regime of Nuclear Power Satellites: a Problem at the Cross-Roads of Nuclear Law and Space Law*, "IISL Proceedings", 1991, p. 117 ff.

⁷ Cfr. Cheng, B., *Studies in International Space Law*, Oxford, 1997, p. 256 f.

⁸ On the "parallel line" between Article 7 of the Moon Agreement and Article 145 of the United Nations Convention on the Law of the Sea concerning protection of the marine environment, see Baslar, K., *The Concept of the Common Heritage of Mankind in International Law*, The Hague-Boston-London, 1998, p. 174 f.

⁹ Cfr. Abeyratne, R.I.R., *Use of Nuclear Power Sources in Outer Space and its Effect on Environmental Protection*, "Journal of Space Law", 1997 p. 17 ff., at pp. 24-26.

¹⁰ "International Legal Materials", 1998, p. 162. See also *Symposium: The Case Concerning the Gabcikovo-Nagymaros Project*, in "Yearbook of International Environmental Law", 1997, pp. 3-50,

and SANDS, P., *International Courts and the Concept of "Sustainable Development"*, "Max Planck Yearbook of United Nations Law", 1999, pp. 389-405.

¹¹ I.C.J., *Reports*, 1996, p. 226 ff.

¹² See generally Leme Machado, P.A., *Information and Participation: Required Instruments for the Improvement of Environmental Rights*, "Environmental Policy and Law", No. 4, 1997, pp. 285-288, and more specifically Stec, S., Casey-Lefkowitz, *The Aarhus Convention: an Implementation Guide*, Economic Commission for Europe, United Nations, New York-Geneva, 2000.

¹³ According to Principle 7 of the Rio Declaration "the developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressure their societies place on the global environment and of the technologies and financial resources they command".

¹⁴ See, for example, the Italy-Kenya agreements on the San Marco-Malindi station. Cfr. Ferrajolo, O., *Launch and Tracking Stations: the San Marco-Malindi Case*, "Outlook on Space Law over the Next 30 Years", The Hague-London-Boston, 1997, pp. 273-284, at p. 283 f.

¹⁵ On the ozone layer's legal regime see Nanda, V.P., Pring, G., *International Environmental Law and Policy for the 21st Century*, Ardsley, N.Y., 2003, p. 239 ff.

¹⁶ See "Le Monde", September 20, 2003, p. 27.

¹⁷ The text of the document on a revised and consolidated planetary protection policy, adopted by the COSPAR Council on 20 October 2002 can be

downloaded at <http://www.cosparhq.org/scistr/PPPPolicy.htm>.

¹⁸ Cfr. Close, R., *Overview of the Outer Space Act and the UK Licensing Framework*, Paper presented at the first UK Conference on "The Impact of Space Debris on the Private Commercial Operator", held on 9th November, 2001 at Inmarsat, London.

¹⁹ Report of the International Law Commission on the Work of its Fifty-third Session, Official Records of the General Assembly, Fifty-sixth Session, Supplement No. 10 (A/56/10), chp.V.E.1.

²⁰ Cfr. Crawford, J., *The International Law Commission's Articles on State Responsibility. Introduction, Text and Commentaries*, Cambridge, 2002, p. 254 ff. and p. 276 ff.

²¹ See the classical contribution by WEISS, *Our Rights and Obligations to Future Generations*, "American Journal of International Law", 1990, pp. 198-207.

²² IADC Space Debris Mitigation Guidelines, IADC-02-01, 15 October 2002.

²³ Committee on the Peaceful Uses of Outer Space, Report of the Scientific and Technical Subcommittee on its Fortieth Session, Held in Vienna from 17 to 28 February 2003, UNGA doc. A/AC.105/804, 5 March 2003.

²⁴ Jasentuliyana, N., *Strengthening International Space Law – The Role of the United Nations*, "International Organisations and Space Law. Proceeding of the Third ECSL Colloquium", Noordwijk, The Netherlands, 1999, p. 87 ff. See also Perek, L., *Maintaining the Space Environment*, Discussion Paper presented at the Technical Forum of UNISPACE III, IISL Workshop on Space Law of the 21st Century, Session 8, July 23, 1999.