

# Outer Space as International Space: Lessons from Antarctica

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## INTRODUCTION

Antarctica and outer space have a lot in common. Like Antarctica, outer space is dangerous for humans; like Antarctica, outer space has a high strategic value; like Antarctica, outer space is quite interesting for research purposes. This means a lot for lawyers because the nature of a space has a great impact on its legal status.

Nevertheless, for historical reasons Antarctica and outer space are rather different as far as their legal statuses are concerned. In fact, despite the existing claims by some states on Antarctica, on the one hand, and the acceptance of the nonappropriation principle of outer space, on the other, the common natural, strategic, and scientific aspects of both spaces make a comparison of their legal framework and governance very efficient.

In 1959 activities in Antarctica were already important, and the Antarctic Treaty succeeded in breaking the vicious circle that impeded scientific activities on this disputed territory.<sup>1</sup> The freezing of the claims and refusal of new claims made possible efficient scientific activities on the cold continent. Outer space activities were at their very beginning, and the cold war and a significant balance between both superpowers made possible the recognition of a legal status that in many ways was copied from the Antarctic Treaty.

Both Antarctic and outer space activities were boosted by the International Geophysical Year, 1957–1958. Sputnik, the first artificial satellite of the Earth, was launched on 4 October 1957; Explorer 1 launched on 1 February 1958, opening the way to the discovery of the Van Allen belt.

Fifty years later, it is interesting to go on comparing both regimes. Doing so, we must keep in mind that outer space is much more sensitive for strategy and defence than Antarctica; the vision of a dominance of the Earth through space dominance is commonplace in geostrategic theories. Economically, outer space is also quite important, for instance, in telecommunications and remote sensing. Still, on many issues, this comparison may be quite useful. For a lawyer and a specialist in space law the hypothesis for this paper is that we have a rather evolved legal framework for outer space, but we have too few cooperation mechanisms. For the time being, the treaties governing outer space are

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rather good for setting important principles regulating outer space activities, but cooperation between interested states is too limited to manage this common space and to improve the current legal framework without destroying it. Many problems are now before us that need concrete international cooperation to be solved. It seems that the cooperation in Antarctica may be a good example of what should be done in outer space.

This paper will present the current legal status of outer space, keeping in mind a comparison with the legal status of Antarctica, and will consider the necessity of a common international governance, taking advantage of the experience of Antarctica, which is more advanced but quite comparable in many ways.

### **THE LEGAL FRAMEWORK: PRINCIPLES OF OUTER SPACE LAW**

Outer space is ruled by treaties setting precise and accepted legal principles. Because of the cold war, the two superpowers supported and accepted treaties organising outer space activities. Both wanted a rather precise legal framework in order to block the other's activities. A good example of this is Article II of the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space (also called the Outer Space Treaty [OST]), which establishes the nonappropriation principle.<sup>2</sup> Given the balance between them, especially in the race to the Moon, both were interested in preventing the other one from claiming any possession in outer space and especially on the Moon. Both states also accepted the provision to limit military activities in outer space and on the Moon and other celestial bodies. Both accepted their responsibility and liability for space activities. These rather progressive provisions were proposed by the two powers and accepted by other states years before practical activities made it a necessity.

The main rules regulating outer space activities will now be considered. Like in Antarctica, but certainly more clearly and precisely, states play a very central role in outer space activities.

### **CONTROL OF ACTIVITIES IN OUTER SPACE**

States are responsible for "national activities in Outer Space." This important provision of Article VI of the Outer Space Treaty, the "Magna Charta of Outer Space," was the interesting result of a compromise between the Union of Soviet Socialist Republics (USSR) and the United States. In

their proposal for a "Draft Declaration of the Basic Principles Governing the Activities of States Pertaining to the Exploration and Use of Outer Space" to the Committee on the Peaceful Uses of Outer Space (COPUOS) in 1962, the USSR wanted to block any private activity in outer space.<sup>3</sup> Despite the fact that no private activity was conducted there at the time, the United States refused this limitation. A compromise was finally found that accepts private activities under the strict control of a state. Point 5 of the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space and Article VI of the Outer Space Treaty consider states to be responsible for "national activities in Outer Spaces."<sup>4</sup> Those texts specify that these activities include "nongovernmental" ones: "whether such activities are carried on by governmental agencies or by non-governmental entities."

Thanks to this compromise, private activities are allowed, but are clearly under the control of a state, which is responsible for their adherence to international law, including space law.<sup>5</sup> Moreover, Article VI goes on to specify that "the activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty." These rules make clear that any activity in outer space and on the Moon and other celestial bodies must be carried out "in accordance with international law, including the Charter of the United Nations."<sup>6</sup> For this reason many states involved in space activities are currently enacting domestic space legislation to control any space activity from their territory and also any activity of their nationals from international territory or even from the territory of a foreign state.

This principle goes further than the usual international law obligations of a state because of its personal jurisdiction. It creates a responsibility for states on behalf of their private entities, which is the only such case in international law and, therefore, is particularly important for spaces that are out of territorial jurisdiction of states. Like many other provisions of the Outer Space Treaty, the 1968 Rescue Agreement,<sup>7</sup> the 1972 Liability Convention,<sup>8</sup> and the 1975 Registration Convention<sup>9</sup> have been widely accepted and may be considered as customary law and therefore are applicable to every state whether it is a party to the Outer Space Treaty or not.

### **LIABILITY FOR DAMAGE CAUSED BY A SPACE OBJECT**

The other main provision of space law is the liability set by Article VII of the Outer Space Treaty and the

Liability Convention. It seems that this very “victim-oriented” rule was the counterpart favoured by non-space-faring countries for accepting the freedom of use of outer space by other countries. Given the sovereignty of states over their territory recognised in the Paris Convention of 1919 and that this freedom was not obvious at the time, the guarantee given by the United States and USSR that damage on Earth would be indemnified was a good way to limit the concerns of states not taking part but at risk to be damaged by the fall of space objects.

This liability is rather broad as relating to damage caused on Earth or to an aircraft in flight. It is much less efficient for damage caused in orbit when another space-faring state is involved.

The liability for damage on Earth is very protective. It lies with the launching state, defined as a state launching, a state procuring the launch, or a state whose facilities or territory are used for the launch. If there is more than one launching state, which is currently very often the case, they are jointly and severally liable; that means that the victim may sue any of them for the whole indemnification. There are no possible exceptions; neither an act of God nor the fault of a third person may be used by the liable launching state, not even the fault of the victim if not gross negligence or willful misconduct. Contrary to the liability of ship owners according to the Brussels International Convention on Civil Liability for Oil Pollution Damage,<sup>10</sup> the liability of the launching state is unlimited in amount or in time. Moreover, the victim is not prevented from seeking compensation through other ways, for instance, before a domestic judge under a domestic law.<sup>11</sup> As such, the 1972 Liability Convention mechanism may be seen as a safety net provided by the launching state to potential victims. It also has the advantage of motivating states to exercise a strict and efficient control over the activities that might cause them to be considered as a liable launching state.

The responsibility of states for national activities in outer space, including the obligation to authorise and supervise private ones, and the liability of the launching states are a strong incentive for states to exert efficient control over every outer space activities.

There are nevertheless some important shortcomings of the 1972 Liability Convention. The most important is related to damage. As usual in law, damage to the environment as such is not taken into consideration. This general problem does not come from the nature of the damage but from the fact that we need a victim to ask for and to get compensation. If the environmental damage is caused on the territory of a state, like in 1978 with the fall of the Soviet satellite Cosmos 954 on the territory of Canada, the

state can ask for compensation.<sup>12</sup> If the damage is caused to an international space like the high seas or outer space and at least some parts of Antarctica, that would not be the case; basically, no state would be entitled to ask for compensation for this damage.

There are currently some proposals in the legal sub-committee of the COPUOS to envisage the negotiation of a general convention on space activities following the example of the Montego Bay Convention on the Law of the Sea. Russia and China propose to enter into discussion in a “holistic approach.” Despite the interest to enter into discussions, such a project appears extremely dangerous to currently accepted rules, especially on responsibility and liability. For the time being it is very doubtful that any state would accept such a heavy burden. It is true that the situations are rather different; the risk of damage is much higher in Antarctica than damage from a space object falling on the Earth, but we can see from the negotiations on Annex VI to the Protocol on Environmental Protection to the Antarctic Treaty regarding liability that it would be quite difficult to make states accept now, in a different context, the rules of the 1972 Liability Convention.

## APPROPRIATION AND NONAPPROPRIATION OF INTERNATIONAL SPACES

Regarding appropriation and sovereignty, the legal situation of outer space is much clearer than Antarctica's.<sup>13</sup> Article II of the Outer Space Treaty clearly sets a nonappropriation principle.<sup>14</sup> Despite some interpretations which are often close to bad faith, the rule is wide, clear, and indisputable: “Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.” It applies not only to the bodies but also to the orbits, the “void space,” as Bin Cheng named it.<sup>15</sup>

Despite this clear wording, some try to dispute this principle. In our time of general private appropriation, they cannot accept a common domain for humanity. Some argue that the limitation is for “national appropriation” and thus does not apply to private persons. It is a misunderstanding of the word “national,” which is not synonym with “state”. If we consider the context, i.e., Article VI of the same treaty, “national activities” expressly include governmental and nongovernmental entities.<sup>16</sup> In American English the word “nation” is often used instead of “state,” but, in fact, the “nation” is both the government and the people having the nationality of a state.<sup>17</sup>

Even if some claims are far from serious, they appear so interesting to the world's media that they are widely spread and enable some to make a lot of money to the detriment of not only consenting victims but also, and more seriously, of the principle itself. The well-known claims made by the "Head Cheese," Dennis Hope, for the Moon and every planet of the solar system are a good example of this distortion of the law and of the evolution of a fanciful project turning into a money making enterprise.<sup>18</sup> Another claim is more interesting from a legal perspective. A U.S. citizen, Gregory W. Nemitz, knowing about a project by NASA to land a space probe on the asteroid Eros, decided to claim it as his property. When NASA landed its spacecraft on the asteroid, he asked for a rent before federal courts of justice.<sup>19</sup> The decisions of the courts dismissed this claim but are not quite decisive on the nonappropriation principle itself. On the other hand, the U.S. Department of State had the opportunity to fully clarify the point of claims on asteroids. Responding to Mr. Nemitz's letters, Ralph L. Braibanti, Director of the Space and Advanced Technology, U.S. Department of State, clearly stated, "Dear Mr. Nemitz. We have reviewed the 'notice' dated February 13, 2003, that you sent to the U.S. Department of State. In the view of the Department, private ownership of an asteroid is precluded by article II of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. Accordingly, we have concluded that your claim is without legal basis."<sup>20</sup>

The problem is more serious and practical when orbits are concerned, especially the geostationary orbit. As is well known, the satellites that are placed on a circular and equatorial orbit at an altitude of 35,786 km (22,236 miles) are turning quite fast but remain in view of the same position of the Earth.<sup>21</sup> By nature, such orbital positions are limited, and so are the radio frequencies needed for communication from and to the Earth. The International Telecommunication Union is in charge of administering these limited resources for states, with their cooperation. The application of the "first come, first served" principle was criticized by less-developed countries who disliked the attribution of some orbital positions and radio frequencies on an a priori basis. The evolution of a scientific technique eased the way for a solution. The colocalisation of many satellites on the same position and the digitalisation of the emissions enabled the useful capacity of orbits and number of frequencies to be greatly increased. The issue is still present, and need an efficient international cooperation, but having the

issue considered in a technical way where practical solutions are needed is helpful.

## PEACEFUL USE OF OUTER SPACE

The provisions on military uses of outer space are globally much less ambitious than the one accepted in the Antarctic Treaty. Military activities were envisaged from the beginning of space activities by both the United States and the USSR. We have to remember that at that time, both states were conducting large spying activities, with the USSR mostly on the ground and the United States overflying the Soviet territory with the U2.<sup>22</sup> The launch of the first satellite by the USSR was perhaps an opportunity for the United States and western countries because it opened the way for freedom of use and, consequently, satellite intelligence. The USSR tried to outlaw the use of satellites for intelligence purposes,<sup>23</sup> but this prohibition was not considered further. The laws of physics and the practical impossibility of preventing this use necessarily overrule the legal rules.

According to the OST, outer space is divided into two different parts as far as military activities are concerned: the orbits around the Earth, on the one hand, and the Moon and other celestial bodies and their orbits, on the other. International customary law, the OST, and, in fact, general international law prescribe peaceful use of outer space. Article IV of the OST also prohibits placing "in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction." The Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water also applies.<sup>24</sup> Any other military activities are not prohibited on the orbit around the Earth. The meaning of *peaceful use* may be disputed; given the common practice of states, it is difficult to see there a ban of any military activity and anything more than the obligation not to be aggressive. Currently, satellites, whether civilian or military, are used by the military for remote sensing/intelligence, communication, and positioning. Many of these activities are dual use. It may also be considered that remote sensing/intelligence satellites may help tracking every activity and are therefore a necessity to preserve peace.

A much less acceptable evolution is what is called "weaponisation," which is the act of putting weapons in outer space whether they are directed to targets in space or on the Earth. This sensitive point will be examined later in the light of the Antarctica Treaty System.

On the Moon and other celestial bodies, the legal situation is very close to the Antarctic one. The wording of

Article IV of the Outer Space Treaty duplicates nearly exactly Article I of the Antarctic Treaty.

The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden.

There are two differences that seem to weaken the OST compared to the Antarctic Treaty: The words “for peaceful purposes only” are changed into an apparently stronger “exclusively for peaceful purposes.” This wording may have been used in order to make a clearer distinction between the “peaceful use” that is required everywhere in outer space and “exclusively peaceful use” only compulsory for celestial bodies. The second difference is quite significant of the more-limited outline of the OST; it is the removal of the words “inter alia,” which are so important in legal texts. It transforms an open list into a limited one. In addition, a useful precision is added in the more modern text, including installations along with military bases and fortifications.

In both texts, the last precision, under a slightly different wording, is quite useful to enlighten the meaning of “peaceful purposes only” and “exclusively for peaceful purposes,” respectively. If there is a case where military personnel or equipment may be used when they are not conducting military activity, this wording clarifies that in Antarctica and on celestial bodies military activities as such are prohibited.

### **THE PROTECTION OF SPACE ENVIRONMENT**

At the time of the adoption of the Outer Space Treaty, environmental issues were not paramount. Article IX of the OST deals with “harmful contamination” of outer space and celestial bodies and “adverse changes of the environment of the Earth.” It was the follow up of the consideration by the Committee on Space Research (COSPAR) when OST considered the possible contamination from outer space and established in 1958 the Committee on Contamination by Extra-terrestrial Exploration and in 1959 the Consultative Group on Potentially Harmful Effects of Space Experiments. The draft of Article IX of the Outer Space Treaty was very much influenced by the cold war. The USSR complained against the U.S. West Ford Experiment, which consisted of placing millions of copper needles in outer space,<sup>25</sup> and the United States criticized

the USSR for nuclear testing in the high atmosphere. Article IX set some obligations to cooperate which, for the time being, remained mostly theoretical. They will be presented later in connection with the lessons that may be learned from the activities in Antarctica.

The framework set for outer space by the UN treaties and resolutions had been established during the cold war by a consensus between the two superpowers. For the time being, the normative process is at a standstill. We need to evolve to a more-efficient cooperation between interested states. The work of the COPUOS is currently nearly blocked. The practice of the Antarctic Treaty System may be a good example to give a new start to real cooperation driven by scientists and engineers if political, military, and strategic issues can be set aside, at least in part.

### **THE NEED FOR INTERNATIONAL COOPERATION**

There are many cooperations in outer space, both multilateral, for example, the activities of the International Space Station, and bilateral. Even during the cold war, some cooperations between the two superpowers took place. These cooperations are mostly performing some task together and are not targeted at jointly regulating outer space itself and the activities conducted there.

Over the last few years, it has appeared more and more obvious that some kind of international regulations are necessary. The increase in the number of spacefaring states, the danger coming from space debris, the necessity to rationalise space traffic on some overcrowded orbits, the trend to weaponize outer space, and the projects aimed at the Moon, Mars, and other celestial bodies increase the necessity to enter into cooperation, especially if the use of the resources of these bodies is concerned.

The cooperation of states in Antarctica within the Antarctic Treaty System seems to be quite a good example to follow. The two spaces have some important differences. The main one seems to be legal; paradoxically, in practice, it is not. The existence of claims in Antarctica and the undisputed nonappropriation of outer space seem to have few consequences. Article IV of the Antarctic Treaty regarding “freezing of the claims” seems sufficient to push aside most difficulties.

The main difference comes, perhaps, from the uses of both spaces. A strategic and even military use of outer space is not abandoned; it is even very much increasing. Even if some commercial activities take place in Antarctica like tourism, they are still much less important than

the scientific activities. This is not the case of outer space, where commercial activities are important. Some, like telecommunication, are already very profitable. Generally speaking, the role of scientists in outer space activities is much less than what they are in Antarctica.<sup>26</sup>

Still some characteristics of outer space are close to Antarctica's. If states really want to commonly organise outer space as an international common, the example of the cooperation in Antarctica seems to be quite relevant. Given the strategic and economical importance of outer space, it will certainly be more difficult than in Antarctica. Three major issues will be discussed: spatial environment, reduction and control of military activities, and the management of resources of outer space and celestial bodies.

### REGULATING ACTIVITIES AND PROTECTING SPACE ENVIRONMENT

For the time being, we have some rules for outer space that are rather general and imprecise, and in any case, they are applied by states without any international inter-governmental control or even international cooperation. No specialized intergovernmental organisation exists for regulating outer space activities. The COPUOS is only a subsidiary of the UN General Assembly, with very little autonomy and small technical and administrative capacity. Some organisations are dealing with space activities as a part of their attributions, like the International Telecommunication Union, which is in charge of allocating radio frequencies and geostationary orbital positions. Other organisations, like UNESCO, intervene in outer space activities but have little real effects. In Geneva the UN Conference on Disarmament is competent for military activities in outer space, but despite some proposals, discussions on these issues are currently at a standstill because some major states do not want any discussions on these issues. As far as nongovernmental organisations are concerned, COSPAR has an important role in some precise and limited fields of space activities, especially those that do not yet have major strategic or economical impact, such as the study of potentially environmentally detrimental activities or planetary protection.<sup>27</sup> The Inter-agency Debris Coordination Committee has been created by space agencies to cooperate on space debris mitigation. In any case, this cooperation is limited by the reluctance of some states to enter into discussions that may lead to any legal constraint.

Article IX of the OST sets a general obligation to "conduct all their activities in outer space . . . with due regard

to the corresponding interests of all other States Parties to the Treaty." It deals with possible harmful contamination of celestial bodies and "adverse changes in the environment of the Earth resulting from the introduction of extra-terrestrial matter." Cooperation between states is required "if a State Party to the Treaty has reason to believe that an activity or experiment . . . would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space."

It would be of major interest to have some organised discussions after the establishment of a mechanism of environmental impact assessment. In this matter, the sophisticated mechanism applicable to Antarctica could be transformed for space activities.

In the field of planetary protection, even if it is a relatively limited activity compared with other more strategic and commercial spatial endeavours, we have a good example of what could be done. It is the most comparable issue with cooperation and scientific influence within the Antarctic system. The COSPAR's Panel on Potentially Environmentally Detrimental Activities in Space (PEDAS) and Panel on Planetary Protection (PPP) are active in this limited but important field.<sup>28</sup>

The graduation of requirements according to possible impact would be major progress. Even if, at the end of the process, states would have the last word, the necessity to discuss their projects would be quite interesting. Some controversial projects were already proposed for outer space. Fortunately, they were partially stopped. Let me refer, for example, to the Project West Ford to put a ring of copper needles around Earth's orbit in order to communicate using the needles as a reflector. This project contributed to space debris and was criticized by scientists.<sup>29</sup> The system was abandoned when satellite communication became efficient.<sup>30</sup> Another project was also set and abandoned: Russian scientists launched *Znamya*, a mirror reflecting the Sun and able to illuminate places during the night, with illumination about two times the glow of a full moon. This mirror would conserve electricity but would create significant light pollution. Exploration and use of the Moon, Mars, and other celestial bodies open the way to discussions on the impact of these activities on the celestial bodies, such as contamination by terrestrial organisms (forward contamination), and also the impact on the Earth as a result of materials returned from outer space carrying potential extraterrestrial organisms (backward contamination). A comparison may be made between this issue and the activities of the Scientific Committee on Antarctic Research and, for instance, its Subglacial Antarctic Lake Exploration Group of Specialists.<sup>31</sup>

Many other programs have been or may be envisaged; publicly available environmental impact assessments are necessary before they are launched, especially, but not only, when nuclear power sources are involved or for activities on celestial bodies that appear to have more than a “minor or transitory impact on the environment.” The rules of Annex I of the Protocol on Environmental Protection to the Antarctic Treaty and the way they are implemented would be very a good example to follow. Most of them can be directly transposed and used for outer space activities.<sup>32</sup> The rules will work if the strategic or economical pressures are not too strong. If they are, a stronger and compulsory legal framework should be decided and generally accepted, a difficult work in perspective.

On a more regularly basis the protection of outer space against space debris is much needed. Some orbits are already dangerous. The recent creation of much debris<sup>33</sup> in very useful orbits shows the necessity to organise a kind of “space traffic management.”<sup>34</sup>

### **MILITARY ACTIVITIES IN OUTER SPACE**

As discussed, military activities are not prohibited in orbits around the Earth as far as they are nonaggressive and do not use weapons of mass destruction. It is now a necessity to avoid an arm race in outer space. The so-called weaponisation would be extremely costly. It must be emphasised that weapons would also be mostly useless for security purposes. Satellites are very fragile; it is quite easy to destroy them, either one by one with appropriate rockets or laser beams or all at once with nuclear bombs. Satellites for military activities are useful for low- or middle-level conflicts.<sup>35</sup> In case of a high-level conflict involving spacefaring countries, the destruction of satellites could be very quickly done as a “Spatial Pearl Harbor.”<sup>36</sup> Such destruction with the related creation of a lot of debris would prevent any activity, whether military or civilian, for years or even centuries. The solution is not to increase the space dominance of one state or another or to try without success to harden satellites but to limit militarisation and to forbid weaponisation of outer space.

If agreements may be negotiated and accepted, it would be necessary to set an efficient international control, the condition of this acceptance by any state. The example of the current practice in Antarctica would, *mutatis mutandis*, be quite interesting. Of course, the practical situation is rather different as these activities are conducted in outer space, where it is not technically possible to make any inspection. On the other hand, no space activity can

be really secretly conducted, launching a spacecraft is so “noisy” that every state with some technical capabilities is immediately aware of each of them.<sup>37</sup> A control on Earth is needed and should be accepted. The argument that the possible use of many apparently civilian satellites for military or even aggressive purposes prevents any efficient control is not acceptable. It would be like refusing to control the commerce on heavy weapons because crimes might be committed with kitchen knives.<sup>38</sup> Of course, it is obvious that it would be a more difficult task to have this limitation accepted for outer space than for Antarctica, where military activities seems much less “useful.”

The situation is, of course, different for military activities on the Moon or other celestial bodies. The current legal situation is very comparable to Antarctica’s: no military activity is permitted. Inspection of installations is feasible as far as the states have the technical capability to do so. Article XII of the Outer Space Treaty opens the possibility of such a visit:<sup>39</sup>

All stations, installations, equipment and space vehicles on the moon and other celestial bodies shall be open to representatives of other States Parties to the Treaty on a basis of reciprocity. Such representatives shall give reasonable advance notice of a projected visit, in order that appropriate consultations may be held and that maximum precautions may be taken to assure safety and to avoid interference with normal operations in the facility to be visited.

### **EXPLOITING THE MINERAL RESOURCES OF THE MOON AND OTHER CELESTIAL BODIES**

Given the technical and financial difficulties of exploiting the Moon or any other celestial bodies, this activity seems to be rather futuristic. Here also it may be quite interesting to compare with the situation of Antarctica. For a nonscientist, It is difficult to have a precise opinion of whether a ban of any mining activity should be supported for the Moon as it was for Antarctica; it may be.

If not, it may be quite useful to have a look at the former Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA). First of all, this text was proposed before any mining activity took place in Antarctica; the supportive states expressed their will to discuss this issue before it would be necessary to act in a hurry. We are perhaps in the same situation for celestial bodies.

The mechanism created by CRAMRA succeeded at an apparently impossible task: to organise a mining activity on a territory where states do not agree on sovereignty. It

would be much easier task for the Moon and celestial bodies, where the principle of nonappropriation is accepted by treaties and even by international customary law.

For the time being, we do have a treaty: the Moon Agreement.<sup>40</sup> It was mostly proposed by the U.S. delegation to COPUOS and accepted by consensus in the COPUOS and by the UN General Assembly.<sup>41</sup> Later, because of political changes in the United States, strong lobbying of some space activists, and the necessity to obtain the authorisation of the U.S. Senate for ratification, the project was set aside, and many states are no longer considering its ratification. The agreement was only accepted by 13 states.<sup>42</sup> None of them has or even considers having the capability to go to the Moon. Nevertheless, as shown by its acceptance by consensus in the COPUOS and UN General Assembly, this agreement is quite acceptable if ideology can be set aside. In Article 11, it declares “the moon and its natural resources are the common heritage of mankind.” States have the right to explore and use the moon without discrimination. Exploitation would need an agreement establishing an international regime “to govern the exploitation of the natural resources of the moon.” Such a regime should be negotiated “when such exploitation is about to become feasible.” Article 11, paragraph 7, indicates the main purpose of such a regime.

Despite its limited ambitions, for reasons that are more ideological than practical, this agreement is currently demonised. If we want to have a legal regime for exploiting the resources of the Moon, it may be necessary to draft a new instrument. Both the Montego Bay Convention on the Law of the Sea (as modified by the New York Agreement) and CRAMRA may be used by analogy to build the future regime.

As is currently the case for the resources of the bottom of the sea, if there is some possibility to mine the Moon, it will be necessary to adopt a clear international agreement. The concept of the common heritage of mankind is the logical consequence of the nonappropriation and *res communis*, the common province of mankind principles when consumable goods (i.e., goods destroyed by first use) are to be exploited. This is already the case for sea resources. The refusal of this principle has more to do with ideology than pragmatism. The Moon Agreement, as accepted by every delegation to the COPUOS, envisages “an equitable sharing by all States Parties in the benefits derived from those resources, whereby the interests and needs of the developing countries, as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the moon, shall be given

special consideration.” In any case, it will be a long time before such exploitation becomes financially profitable. Like for Antarctica, it may be useful to enter into discussion before the activity begins. The existence of a clear and undisputed legal regime is always a necessity before considering important investments. Here they promise to be huge. The CRAMRA was very much oriented toward a protection of the environment; on that issue, it may be quite useful for comparison.

## CONCLUSIONS

The current status of Antarctica is generally well accepted; efficient cooperation is occurring. In outer space it should be quite useful to try, *mutatis mutandis*, to use the lessons from the Antarctic Treaty System. First, world scientists should be given a more important role when issues are not too strategic; groups of experts within the framework of the United Nations could be created in related scientific areas, including space law. They should range from particular domains, like planetary protection, to more general uses, including mitigation of space debris, space traffic management, and even limitation of military uses.

In a longer perspective, the creation of an international organisation may be envisaged, but it is not a priority for the time being. A real international intergovernmental cooperation should be largely improved, especially among states interested in space activities. The specificities of every state may be taken into consideration.<sup>43</sup>

Finally, the issue of demilitarisation with the necessary control should be seriously considered. Nonmilitarisation of outer space, like accepted for Antarctica, is certainly not possible in the foreseeable future for the orbit around the Earth, but international agreements to block weaponisation are necessary and feasible. The example of Antarctica is quite interesting in that regard.

## NOTES

1. Armel Kerrest, L'Antarctique, un statut juridique extraordinaire, *Revue “Accès,”* 2003 tome II.

2. “Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies,” opened for signature on 27 January 1967, entered into force on 10 October 1967, XXX *United Nations Treaty Series* (UNTS) XXX, XX *United States Treaties and Other International Agreements* (UST) XXX, *Treaties and Other International Acts Series* (TIAS) No. XXXX; adopted by the General Assembly in Resolution 2222 (XXI), with 98 ratifications and 27 signatures as of 1 January 2008; also referred to as the Outer Space Treaty (OST).



3. UN General Assembly, COPUOS, “Draft Declaration of the Basic Principles Governing the Activities of States Pertaining to the Exploration and Use of Outer Space,” UN Doc. A/AC.105/L.2, 10 September 1962, at point 7: “All activities on any kind pertaining to the exploration and use of outer space shall be carried out solely and exclusively by States.”

4. UN General Assembly, Plenary Meeting, “Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space,” 13 December 1963; Resolution 1962 (XVIII).

5. Outer Space Treaty, Article III.

6. Outer Space Treaty, Article III.

7. “Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space,” opened for signature on 22 April 1968, entered into force on 3 December 1968, 672 UNTS 199, 19 UST 7570, TIAS No. 6599; adopted by the UN General Assembly in Resolution 2345 (XXII), with 90 ratifications, 24 signatures, and 1 acceptance of rights and obligations as of 1 January 2008; also referred to as the Rescue Agreement.

8. “Convention on International Liability for Damage Caused by Space Objects,” opened for signature on 29 March 1972, entered into force on 1 September 1972, 961 UBTS 187, 24 UST 2389, TIAS No. 7762; adopted by the General Assembly in Resolution 2777 (XXVI), with 86 ratifications, 24 signatures, and 3 acceptances of rights and obligations as of 1 January 2008; also referred to as the Liability Convention.

9. “Convention on Registration of Objects Launched into Outer Space,” opened for signature on 14 January 1975, entered into force on 15 September 1976, 1023 UNTS 15, 28 UST 695, TIAS 8480; adopted by the General Assembly in Resolution 3235 (XXIX), with 51 ratifications, 4 signatures, and 2 acceptances of rights and obligations as of 1 January 2008; also called the Registration Convention.

10. “International Convention on Civil Liability for Oil Pollution Damage,” 29 November 1969, UNTS 973, p. 3, 9 *International Legal Materials* (ILM) 45.

11. Liability Convention, Article 10.

12. The claim between both states was finally settled by an agreement: “Protocol between the Government of Canada and the Government of the Union of Soviet Socialist Republics.” done on April 2, 1981, [http://www.oosa.unvienna.org/oosa/SpaceLaw/multi\\_bi/can\\_ussr\\_001.html](http://www.oosa.unvienna.org/oosa/SpaceLaw/multi_bi/can_ussr_001.html) (accessed 7 December 2010).

13. Armel Kerrest, “L’appropriation de la lune et des corps célestes,” in *Droit de l’Espace*, ed. Philippe Achilleas (Brussels: Larcier, 2009), pp. 342–358.

14. See also the “Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space,” Resolution 1962 (XVIII), 13 December 1963, at point 3.

15. The expression was used by one of the finest space law lawyers, Bin Cheng, when he wanted to make a clearer distinction from the difference between the 1963 phrase “outer space and celestial bodies” and the 1967 phrase “outer space, including the moon and other celestial bodies.” Bin Cheng, *Studies in International Space Law* (Oxford: Clarendon Press, 1997), p. 517, note 13.

16. See Freeland and Jakhu on Article II, *Cologne Commentary on Space Law*, ed. Hobe, Smidtd-Tedd, and Schrogl (Cologne: Carl Heymanns Verlag, 2009), p. 52.

17. The redactors of the U.S. code took this point into consideration and decided to change the word “Nation” to “Country,” which is quite right: “In this chapter, the word ‘Country’ is substituted for ‘Nation’ for consistency in the revised title and with other titles of the United States Code” (*U.S. Code* 49), subtitle IX, chapter 701, Commercial Space Launch Activities, footnote).

18. The text of his claim (22 November 1980) is by itself quite revealing of this fanciful character: “This is to inform the sovereign planet of Earth, that, Dennis M. Hope is now and shall ever be known as, ‘THE OMNIPITANT RULER OF THE LIGHTED LUNAR SURFACE,’ [sic] . . . [and to] inform the world that the ownership of the Moon, of Earth, is hereby claimed by me, Dennis Hope. Said property shall remain in my possession until such time as I declare differently. Let it also be known to all mankind that I subsequently claim ownership of the remaining known eight planets and their respective moons from this day forward . . .” It is amusing to see that despite the obviously far from serious characteristics of this proclamation, many people are taking these claims seriously.

19. U.S. District Court, District of Nevada, 6 November 2003; U.S. Court of Appeals for the Ninth Circuit in San Francisco, California, 20 July 2004; as discussed on The Eros Project for Space Law Web site, <http://www.erosproject.com> (accessed 20 November 2009).

20. Letter from Ralph L. Braibanti, Director of Space and Advanced Technology, U.S. Department of State, Washington, D.C., to Gregory William Nemitz, 15 August 2003, reproduced on the Web site of Mr. Nemitz, <http://www.erosproject.com/exhibit01.html> (accessed 20 November 2009).

21. This orbit, also known as the Clarke Orbit, has orbital velocity of 3.07 km/s (1.91 miles/s) with a period of 1436 minutes.

22. “The U-2 Incident,” <http://www.eisenhowermemorial.org/stories/U2.pdf> (accessed 20 November 2009).

23. UN General Assembly, COPUOS, “Draft Declaration of the Basic Principles Governing the Activities of States Pertaining to the Exploration and Use of Outer Space,” UN Doc. A/AC.105/L.2, 10 September 1962, at point 8: “The use of artificial satellites for the collection of intelligence information in the territory of foreign States is incompatible with the objectives of mankind in its conquest of outer space.”

24. “Treaty Banning Nuclear Tests in the Atmosphere, in Outer Space and Under Water 5,” August 1963, in force 10 October 1963, 480 UNTS 43.

25. On this issue, especially on the history of drafting of Article IX, see Sergio Marchisio in *Cologne Commentary on Space Law*, pp. 169–182.

26. This lack of involvement may be the reason why COSPAR, which is an observer to COPUOS, despite the fact that it is the main intergovernmental body for regulating outer space, does not attend (at least since 2000) any meeting of the Main Committee or of the Legal Subcommittee and not always the meeting of the Scientific and Technical Subcommittee. Since 2000, COSPAR was not represented at the 2010, 2009, and 2006 meetings; UN COPUOS Report A/AC/105/869, at point 6.

27. The COSPAR Panel on Potentially Environmentally Detrimental Activities in Space (PEDAS), H. Klinkrad (European Space Operations Centre, European Space Agency), chair, and N. L. Johnson (United States), vice-chair; the COSPAR Panel on Planetary Protection (PPP), J. D. Rummel (United States), chair, and G. Kmínek (European Space Research and Technology Centre, European Space Agency), vice-chair.

28. A workshop of the COSPAR PPP was scheduled to take place in Princeton in June 2010.

29. On 20 May 1964 the executive council of the Committee of Space Research (COSPAR) adopted a resolution on “no harmful interference from Westford experiment.” See Marchisio, p. 173, on Article IX.

30. See Marchisio, p. 172.

31. See the interesting comparison made between the PPP and the Subglacial Antarctic Lake Exploration Group of Specialists in “Antarctic Governance and Implications for Exploration of Subglacial Aquatic Environment,” in *Exploration of Antarctic Subglacial Aquatic Environments environmental and Scientific Stewardship* (Washington, D.C.:

National Academies Press, 2007), pp. 104–113, especially a table of comparison on pp. 107–109.

32. Secretariat of the Antarctic Treaty, “Guidelines for Environmental Impact Assessment in Antarctica,” [http://www.ats.aq/documents/recatt/Att266\\_e.pdf](http://www.ats.aq/documents/recatt/Att266_e.pdf), (accessed 21 November 2009).

33. China’s destruction of one of its weather satellite (Fengyun-1C, 11 January 2007) as a demonstration of its capacity to destroy a satellite created much debris in a rather high and very useful orbit, creating around 2630 catalogued fragments. In 2008 the accidental collision between Iridium 33 and Cosmos 2251 created more than 1,500 debris fragments larger than 10 cm on a range from 200 to 1700 km. Some fragments will fall to Earth many will stay until the end of the century. See *Orbital Debris Quarterly News* 13, no. 3 (2009): 2–3, <http://www.orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv13i3.pdf> (accessed 20 November 2009).

34. International Academy of Astronautics, *Cosmic Study on Space Traffic Management* (Paris: International Academy of Astronautics, 2006), <http://iaaweb.org/iaa/Studies/spacetraffic.pdf> (accessed 21 November 2009).

35. Testimony of Michael Krepon of the Henry L. Stimson Center before the House Committee on Armed Services, Subcommittee on Strategic Forces, 18 March 2009, [http://www.fas.org/irp/congress/2009\\_hr/space.pdf](http://www.fas.org/irp/congress/2009_hr/space.pdf) (accessed 7 December 2010).

36. According to the wording used by the Commission to Assess United States National Security Space Management and Organization (Rumsfeld Commission) in 2001.

37. For the current position of the United States against the Chinese and Russian proposal to limit weaponisation of outer space, see

“Contemporary Practice of the United States,” *American Journal of International Law* 102: 667–669; and Paula A. DeSutter, “Is an Outer Space Arms Control Treaty Verifiable?” (remarks to the George C. Marshall Institute Roundtable at the National Press Club, Washington, D.C., 4 March 2008), [http://www.nti.org/e\\_research/official\\_docs/dos/dos030408.pdf](http://www.nti.org/e_research/official_docs/dos/dos030408.pdf) (accessed 22 November 2009). For quite a different philosophy, see “Outline of Basic Provisions of a Treaty on General and Complete Disarmament in a Peaceful World (submitted by the US Delegation to the UN Committee on Disarmament Geneva April 18 1962),” *American Journal of International Law* 56, no. 3 (1962): 899–925

38. DeSutter, “Is an Outer Space Arms Control Treaty Verifiable?”

39. Cf. Antarctic Treaty, Article VII, paragraph 3.

40. “The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,” opened for signature on 18 December 1979, entered into force on 11 July 1984, 1363 UNTS 3, 18 ILM 1434–1979, <http://www.unoosa.org/oosa/en/SpaceLaw/moon.html> (accessed 7 December 2010); adopted by the General Assembly in Resolution 34/68, with 13 ratifications and 4 signatures as of 1 January 2008; also called the Moon Agreement.

41. Carl Q. Christol, “The Moon Treaty Enters into Force: Current Developments,” *American Journal of International Law* 79, no. 1 (1985): 163–168.

42. As of 1 January 2008, 13 states have ratified, 4 have signed; <http://www.unoosa.org/oosa/en/SpaceLaw/moon.html> (accessed 21 November 2009).

43. States with launch pads, strong satellites operators, remote sensing capabilities, etc.