

# OUTER SPACE TREATY IN PERSPECTIVE

Luboš Perek<sup>1</sup>  
Astronomical Institute  
Academy of Sciences, Prague, Czech Republic

## Abstract

In the course of the forty years which elapsed since the beginning of the space era, new facts, not known in the 1950's and 1960's became important. Space debris are playing an important role not foreseen by the Treaty. Space law as a whole has to reflect the present state of affairs and of knowledge. An important addition to the existing instruments of space law, the Agreement on Space Debris, seems to be necessary to preserve the main function of space law: to provide a framework for an orderly conduct of space activities for the benefit mankind.

## 1. Introduction

The Outer Space Treaty<sup>2</sup> has a very high ethical value. Many problems which could arise from space activities were foreseen and solutions based on international cooperation were proposed. It is by no means certain that an equally valuable document would reach consensus at present. Therefore the Treaty should be preserved as a necessary basis for an orderly conduct of space activities. Possible changes or additions should be done in a form not requiring the opening of the Treaty.

The treaty entered into force in October 1967. It was based on the Declaration of Legal Principles Governing the

Activities of States in the Exploration and Use of Outer Space<sup>3</sup> adopted in 1963. At that time, space activities consisted mainly in launching scientific and experimental satellites. In the first three years, 1957-1959, the number of payloads exceeded that of space debris. It was only the breakup of the satellite 1961-Omicron into some 270 trackable debris on 29 June 1961, which started the overwhelming preponderance of debris over active payloads. This breakup occurred presumably too late to have any influence on the drafting of the Principles. It was tacitly assumed that the few debris are lost in the immensity of outer space and that the problem in hand concerned

<sup>1</sup>Copyright © 1997 by L. Perek. Published by the AIAA, Inc., with permission. Released to the IAF/IAA to publish in all forms.

<sup>2</sup>UN GA Resolution 2222(XXI) of 19 December 1966.

<sup>3</sup>UN GA Resolution 1962(XVIII) of 13 December 1963.

active satellites. These were considered so valuable that even after their fall to the ground, they had, according to Article VIII of the Treaty, to be returned to the owner in case they were found outside the territory of the launching state. It was Article IX of the Treaty, second sentence, which dealt with the environment. It says:

State 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.

The sentence reflects the concern about contamination of the environment by extraterrestrial matter. It can hardly be interpreted as applying to space debris which are of terrestrial origin. This follows from the definition of orbital debris adopted in the IAA Position Paper on Orbital Debris<sup>4</sup>:

Orbital debris is herein defined as any man-made Earth-orbiting object which is non-functional with no reasonable expectation of assuming or resuming its intended function or any other function for which it is or can be expected to be authorized, including fragments and parts thereof. Orbital debris includes non-operational spacecraft, spent rocket bodies, material released during space operations, and fragments generated by satellite and upper stage breakup due to explosions and collisions.

"Orbital debris" was the subject of the IAA Position Paper, while another term, "space debris", appears in the title

of the item on the agenda of the UN Scientific and Technical Subcommittee. The term "orbital debris" refers to the objects while they are in orbit. The IAA Position Paper thus does not deal with debris which are no longer in orbit, i.e., which are falling through the dense layers of the atmosphere and with those which impacted on the ground or into the ocean. The term, "space debris", can be understood as slightly more general than "orbital debris" and including the decaying phase and the phase after the impact.

A definition of space debris, agreeing in substance with the definition above, has been adopted in the Buenos Aires International Instrument on the Protection of the Environment from Damage Caused by Space Debris<sup>5</sup>. Its text appears in Section 3 a.

## 2. Facts to be recognized by space law

The purpose of this paper is to point out which new facts, not taken into account in the Treaty, should be recognized by space law. Most of the new facts were not known or not appreciated in the early years of space activities but gained significance and recognition in the course of later developments.

In the first place, the existence of space debris should be reflected in space law because they constitute some 95% of all objects in space and because they pose a hazard to active spacecraft as well as to manned missions.

In the second place, those who come into contact with debris should be able to determine whether the object in question is or is not space debris.

<sup>4</sup>Acta Astronautica, vol. 31, October 1993, p. 169.

<sup>5</sup>Annex to statement by Prof. Dr. K.H. Böckstiegel, as the representative of the ILA at the 39th session of the COPUOS, Vienna, June 1966.

There should be no problem with **fragments or detached parts**. Their size and shape, as far as it can be recognized in their radar signature, and their orbital elements attributing their origin to a breakup event, are sufficient in most cases to reveal their true character. It may be different with satellites which became **inactive but are still orbiting more or less intact**. By definition they are space debris but they cannot be distinguished from dormant objects. Another example of seemingly inactive objects are scientific satellites used as indicators of the gravitational field, their sole activity consisting in revealing their location by reflecting incoming light. Only the owner or operator is familiar with the true status of his satellites. And only he can state that he has no more interest in the satellite, that he is abandoning it, that he has no means of de-orbiting it, and that it should be considered a space debris.

In the third place, the **status of space debris** has to be different from the status of active spacecraft just as the status of functional industrial products is different from that of garbage or junk. If the ownership rights of garbage were preserved, it would be impossible to collect garbage. On the other hand, the **original owner should remain liable** for potential damage caused by space debris which originated from a space object he used to be liable for.

In the fourth place, the difference of status has to be expressed in terminology. The same term should not apply to functional products and to garbage or junk as well. In our case, if confusion is to be avoided, the term **space object** should not apply to **space debris**.

Last, but quite important, the **legal climate has to be friendly not only**

to those who prevent debris from being generated but also to those who **dispose of orbiting non-maneuvrable debris**. This seems to be a necessity because preventive measures may not be enough to restrict sufficiently the hazard of space debris. There are too many inactive objects in orbit and at least some of them might have to be removed. Present law forbids the removal of an object by someone who is not its owner. Moreover, non-functional objects have very little value, if any, because their recovery is extremely difficult, if possible at all, and expensive. Removing debris from space should not be considered as disposing of foreign property but rather as collecting discarded garbage. And the devices used for removal of debris from orbit should by no means be confused with anti-satellite weapons.

### 3. Agreement on Space Debris

Let us assume that the international community decides one day (let us hope soon) that a new **Agreement on Space Debris** will be added to the existing instruments of space law. Its title already recognizes the existence of space debris satisfying our first requirement. The agreement should deal with the following questions:

#### a) Definition of space debris

The purpose would be served by a technical definition of space debris as it appeared in the IAA Position Paper (see Section 1 and footnote 4) or by the definition introduced in the ILA document (footnote 5). Here we quote the definition and the taxative enumeration of sources of space debris from the ILA document:

"Space debris" means man-made objects in outer space, other than active or otherwise useful satellites, when no change can reasonably be expected in these conditions in the foreseeable future.

Space debris may result, inter alia, from:

- Routine space operations including spent stages of rockets and space vehicles, and hardware released during normal manoeuvres.
- Orbital explosions and satellite break-ups, whether intentional or accidental.
- Collision-generated debris.
- Particles and other forms of pollution ejected, for example, by solid rocket exhaust.
- Abandoned satellites.

#### b) How space objects become space debris

Fragments or detached parts of space objects become space debris at the time of breakup, explosion, fragmentation collision, or when they leave the parent body.

More or less intact satellites become space debris when the relevant launching agency announces, in accordance with Article IV, section 2 and 3, of the Registration Convention<sup>6</sup> that the activity of the relevant space object has been terminated, will not be resumed and that the object has no technical means for landing or de-orbiting. In particular, the inactive **component parts of a space object**

and parts of its launch vehicle, appearing in Article I (c), would presumably be announced as space debris soon after launch, unless they decay within a specified period of time.

Possibly, the term "abandoned space object" should be introduced. It would be consistent with the last item on the ILA list of sources of space debris and it might simplify the wording.

#### c) Liability

Provisions for liability, in particular Article VII of the Outer Space Treaty and relevant articles of the Convention on International Liability of Objects Launched into Outer Space<sup>7</sup> should apply to space debris, in agreement with the ILA document. No change of the Liability Convention itself would be required.

#### d) Return of Objects

States should not be under the obligation to return worthless debris to the owner. Article VIII of the Outer Space Treaty and Article 5, section 1 to 4 of the Agreement on Rescue and Return<sup>8</sup> should apply to space debris only in exceptional cases, e.g., if that particular piece is valuable. If the object has to be removed from the environment because of its hazardous or deleterious nature, it should be either returned to the original owner or disposed of in an agreed way.

A suitable wording would have to be found which would obviate the necessity of making any change in the Agreement on Rescue and Return.

<sup>6</sup>UN GA Resolution 3235(XXIX) of 12 November 1974.

<sup>7</sup>UN GA Resolution 2777(XXVI) of 29 November 1971.

<sup>8</sup>UN GA Resolution 2345 (XXII) of 19 December 1967.

### e) Preventive measures

General principles for restricting the generation of debris should be stated. Technical details and parameters which may be subject to relatively frequent changes should be left to a special body. A convenient — and already existing — body may be the Inter-Agency Space Debris Coordinating Committee. Space agencies participating in the IADC are interested in preventing the generation of space debris while, on the other hand, they would adopt only measures which are compatible with the development and successful operation of space missions. The UN COPUOS could provide a political roof for such technical measures. In a way, it would be a certain analogy to the Radio Regulations and the ITU in the field of radio-communications.

### f) Disposal of space debris

The disposal of orbiting space debris by third parties should be permitted under safety conditions to be agreed upon.

### g) Opening of instruments of space law

As was explained in the preceding sections, neither the Outer Space Treaty, nor the Agreement on Rescue and Return, nor the Liability Convention would have to be opened for renegotiation. As regards the Registration Convention, the additional announcements, proposed in Section 3 b, could be made within the context of the present wording of the Registration Convention. And the Moon Treaty<sup>9</sup> is concerned with activities on the Moon and on other celestial bodies within the solar system, other than the

Earth, including orbits around these bodies and trajectories to or around them. It does not apply to activities and to objects in orbits around the Earth.

## 4. Conclusion

This proposal to elaborate an **Agreement on Space Debris** is just an outline. Its details and legal provisions would have to be elaborated by the same process which other instruments of space law have undergone in the COPUOS and its subcommittees. The Agreement or some other elaboration of the ideas contained in this proposal could be a useful addition to existing instruments of space law. The Agreement:

- Would recognize 95% of objects in space which at present have no legal status,
- Would legalize the disposal of non-maneuvrable debris from the orbit, a method of cleaning outer space which might prove to be indispensable,
- Might introduce the concept of "abandoning a space object",
- Would state general principles for preventing the generation of new debris while leaving the technical details to a competent technical body,
- Might revitalize the Registration Convention, and
- Would not require the opening of the Outer Space Treaty or of other instruments of space law.

<sup>9</sup>UN GA Resolution 34/68 of 18 December 1979.