

Author: Mr. Aditya Sharma

National Law University, New Delhi, India, advocatus.aditya@gmail.com

PROTECTION OF THE OUTER SPACE ENVIRONMENT: NEED TO

REVISIT THE LAW

Abstract

States have rapidly grown interest in exploration of space, with rapid advancement in technology, more and more national and international entities are capable of conducting space exploration than it were in the past. States have ambitious and inspirational goals of exploring outer space, which leads us to numerous problems, most important being the threat to space environment and environment of earth. Corpus Juris Spatialis, international environment law (conventions, treaties, customary law and general principles followed by civilized nations, predominantly provide a basic legal framework for protection of space environment. Each exploration mission that takes place causes a grave threat of 'forward contamination' and 'backward contamination'. Forward contamination can render all prospects of research and exploration futile, where as backward contamination poses a threat to whole human race. Outer space treaty demands every state to avoid exploration in a manner to cause 'adverse changes' from introduction of extraterrestrial matter. Similarly the moon agreement and General body of international law puts obligation on each state, not to harmfully affect the environment. Measures or Law for Environment protections are established, recognized and enforced; however with the change in scenario, law cannot be expected to provide effective solution to many of the problems and do the needful. This paper examines the situations where law lacks in providing protection to the space environment and environment of the earth in the light of recent developments and especially focusing on the Exploration mission carried out under COSPAR category V highlighting the need to revisit the law, Lastly it suggests solutions to these problems and measures to cover such situations for protecting the environment.

Introduction

Space law and space flights came into existence in the second half of the twentieth century, and became part of life of human beings.¹ Space technology has not only touched human lives in their day to day activities like the weather forecast, direct to home television services, the mobile devices (Cellular technology) or the Global Navigation system (GPS) etc, but also is capable of answering global concerns and

the question of universal importance relating to past and future of human beings.

States have rapidly grown interest in space exploration and thus furthered the developments in space technology. Russia, Japan, China and India are preparing a number of orbiter, Lander and Sample return missions. Russia's Phobos-Grunt mission will be launched in 2012 to return samples from the Martian moon Phobos and Japan's Hayabusa spacecraft recently returned to

Earth in June 2010 with a sample from the asteroid Itokawa.² Several Lunar orbiter missions will be carried out in this decade, such as China's recently launched Chang'e-2 and India's planned Chandrayaan-2 (as a part of Russia's Luna Resource-1). Contact and in-situ robotic missions to the Moon are also envisaged for later in this decade, including Japan's Selene-2 (lander) and Selene-3 (sample-return), Europe's Lunar Lander, China's Chang'e-3 (lander) and Chang'e-4 (sample return), and Russia's Luna Resource-1 (Russian lander with Indian orbiter) and Luna Resource-2 (Russian lander, rover and retransmitting satellite).³

The increase in space activity has considerably expanded the nature and magnitude of risks to the mankind, there is thus a heightened need to regulate the activities of states in outer space.

A state has jurisdiction over any activity carried on by its nationals⁴, including launching of a space object.⁵ This is further evinced by the *travaux préparatoires* of the OST, where the U.S suggested that "a State from whose territory or *with whose assistance or permission a space vehicle is launched bears international responsibility for the launching*".⁶

The appropriate state would in most circumstances be a launching state even as per A. VI which was a compromise between U.S. and Russia to ensure that a State is always responsible for a launch, even if by a private entity⁷ and outside the territory of the State.⁸ The launching state is the one has the realistic chances to exercise control, and thus bears responsibility internationally.⁹ For clear determination of responsibility and liability of states there is a need for a comprehensive code on licensing the activities of private entities which adheres to international standards and thus a basic document for licensing common to all countries.

The primary obligation with respect to the prevention of contamination of Outer Space is envisaged under Art. IX and Art.VII of the OST and Moon Agreement respectively. Article IX of the Outer Space Treaty¹⁰ lays down that all state parties shall avoid harmful contamination and adverse changes through the extraterrestrial contamination. Space activities are considered abnormally dangerous activity (or ultra hazardous activity).¹¹ Ultra-hazardous activities comprise all activities which involve a risk of serious harm on an international scale which cannot be eliminated by the exercise of the utmost care.¹² From the outset, Space has been considered to be an inherently dangerous activity.¹³ Space activity have potential of harmfully contaminating environment and are also capable of causing adverse changes to the environment of earth.

Responsibility of states

Corpus juris spatialis has been developed on the principles of cooperation between states. Space faring nations owe a moral responsibility for their outer space activities. Furthermore state take responsibility for activities carried out by private entities under their jurisdiction in outer space. With the emerging trend of participation of private entities in outer space, laws of state responsibility must be strengthened.

Under Article VI of the Outer Space Treaty, states parties have assumed direct responsibility for all actions qualifying as national activities in outer space'.¹⁴ It provides that the states are directly¹⁵ responsible for *national activities* of non-governmental entities in the *outer space*.¹⁶ A Thus a State is directly,¹⁷ responsible for national space activities of governmental and non-governmental entities.¹⁸ The precise scope and content 'National activities' continues to be a bone of contention in academic literature.

‘National activities’ signify a national endeavour, whether to be performed by a governmental agency or private entity.¹⁹ Thus a national activity for which a State is to be held responsible encompasses activities undertaken by its nationals,²⁰ in the outer space as well as activities undertaken from its territory.²¹ As the Project 2001 Working Group on Privatisation, of the Institute of Air and Space Law of the University of Cologne remarks: State are responsible for all activities as national activities, on which the State has the possibility to exercise jurisdiction and control.²²

Reading of A. 6 with A. 9 of the OST shows that national activities are the activities of the nationals.²³ The text of the OST and the *travaux préparatoires*, show no intention to deviate from concepts of general international law, according to which a State has jurisdiction over an activity carried on by its *nationals*.²⁴ Further, nationality should determine the appropriate state since responsibility is for “national activities”.²⁵

Responsibility of ‘appropriate state’

The appropriate state must *ensure* that the national activities are carried out in accordance with the provisions of the Treaty.²⁶ This shows an intention to make the State Parties guarantors of such compliance.²⁷ The ‘appropriate state’ must ensure that activities conducted by private bodies are *authorised* and *continually supervised* by it. This duty would extend to ensuring that the compliances ensure that the activities are carried out in accordance with the OST, as evinced From A.VI, sentence1.²⁸

The Draft Code of Rules on the Exploration and Uses of Outer Space,²⁹ provided that “No *spacecraft shall be operated by private persons or corporations save by license granted by the State of which they are nationals.*” This was to ensure that all space activities, apart from

being attributable to a State are also regulated by it.³⁰ Hence, no unlicensed or unregulated launch was intended to be allowed under the Treaty.³¹

Several national space legislations³² also contain regulations pertaining to space activities of all nationals, including indemnification provisions for the State, third party liability insurance etc. all applicable even for activities outside the territory of the State. The US Commercial Space Launch Act highlights the need for regulatory directives within legislative enacted guidelines, consultations, reports and inspections to assure compliance with international obligations.³³

National Activity

a) Nationality Principle

The decisive criterion for nationality is the place where the enterprise is incorporated or the principle place of business of the enterprise³⁴, since the State exercises personal jurisdiction over it.³⁵ A state of incorporation has been the traditional standard of corporate nationality under international law.³⁶ In *Barcelona Traction*³⁷ case, the ICJ affirmed the traditional state of incorporation standard as a definitive test for determining nationality. More specifically, it is the place from where the space activity takes place.³⁸ State practice such as the Sea Launch Project³⁹ and the national legislations of several States mandate all nongovernmental entities *incorporated* within the state to register their space objects with the national registry of the state.⁴⁰

The OST does not specify the content of the authorisation or supervision and that is left to the State.⁴¹ One form of authorisation of the activity is to grant a licence to the private entity to carry on the same,⁴² when there is the provision for the same.⁴³ The requirement of continuing supervision includes provision for adequate means for

receiving information, as well as means for intervention or deterrence.⁴⁴ The supervision ought to effectively *control* the private launch within the limitations of international law.⁴⁵ The authorisation and continuing supervision is the obligation of the State under whose jurisdiction the activity is conducted.⁴⁶ For any activity to qualify as national activity of that state requires a effective link between the activity and the state.

Different states have separate laws on what they consider to be national activity in space. States like Russia and Ukraine have included the creation, development, and manufacture and testing of space technology and products, under this ambit.⁴⁷ The Russian law⁴⁸ regarding space activities describes space activities as any 'activity directly and immediately' connected with operations to explore and use of outer space. The United Kingdom law⁴⁹ on space activities covers all the activities of the incorporated bodies in relation to launching or procuring the launch of a space object. Similar practice is evident in laws enacted by Sweden⁵⁰ and South Africa⁵¹ which cover any activity related to space.

Effective Link or Genuine link

It is a generally recognized principle of international law that an effective or genuine link between a corporation and a state i.e. A substantial and genuine connection between the subject matter of jurisdiction,⁵² sought to be exercised should be established to determine nationality on the international plane.⁵³ National basis of ownership and control has been widely applied to the corporations.⁵⁴

Art. VII of the OST imposes a strict liability regime on the launching and registry states.⁵⁵ This was in the *Libyan Arab Jamahiriya /Chad*⁵⁶ case. Further OST⁵⁷ and Liability Convention⁵⁸ also impose international liability on the launching state for any damage caused

by its space object. The liability convention should be interpreted in the light of OST since express reference has been made to it in the preamble of the convention.⁵⁹ This is consistent with the customary principles of State responsibility in that liability for reparations must follow from a violation of international law.⁶⁰ Thus the launching state criterion which is also the state of registry as elaborated in the registration and liability convention offers the best chance for securing the practical fulfilment of the responsibilities of states in execution of space activities in particular by private enterprise.⁶¹

The intention of Article VI is to provide for all necessary authorization and supervision by a State in view of its responsibility for national activities in outer space. This duty has been imposed under Article VI upon the '*appropriate state*'.

b) Jurisdiction Principle

Another interpretation of private 'national activities' would make states internationally responsible precisely for those activities over which they can exercise legal control.⁶² Therefore, a state should be held responsible for those private activities undertaken from within its jurisdiction. According to Article VIII of the Outer Space Treaty⁶³, a state on whose registry an object launched is carried shall retain jurisdiction and control over such object. Through this notion of 'registry' a space object is effectively made subject to *sui generis* registration-based jurisdiction, which in other words provides for a quasi-nationality, very much like ships or aircraft.⁶⁴

There are three forms of jurisdiction in International Law - Territorial Jurisdiction, Quasi-territorial jurisdiction and personal jurisdiction.⁶⁵ Now, whereas jurisdiction of different types of state jurisdiction can co-exist, there is a definite hierarchy in jurisdiction so that in case of conflict

territorial jurisdiction overrides quasi-territorial and personal jurisdictions, while quasi-territorial jurisdiction overrides personal jurisdiction.⁶⁶

For the purpose of Article VI of the Space Treaty, whenever or wherever a space activity is being carried on by a governmental agency or a non-governmental entity that is within a state's jurisdiction, whether territorial, quasi territorial or personal, that activity qualifies as that state's 'national activity'.⁶⁷

The two views espoused by Article VI of the OST often lead to situation where these two principles lead to two different 'appropriate state(s)'. However, the wording of the article is clear in the essence that it amounts to the use of the term appropriate state in the singular sense and hence there can be only one appropriate state. Here in lies the need for an effective definition which takes into account all criteria and points towards one appropriate state.

Obligation not to cause harmful contamination

The freedom of use of outer space and celestial bodies has been recognized as customary international law.⁶⁸ This freedom is however not without responsibilities. As per neither Jenks, nor does freedom of use include freedom to misuse.⁶⁹ Thus, States have an obligation to protect the environment of outer space including the celestial bodies.

OST (Article IX) and Moon treaty (Article 7(1)) prohibit the harmful contamination of the outer space and celestial bodies.⁷⁰ The Moon treaty further provides in article 7(1) that states parties should not introduce adverse changes to the existing balance of its (moon's) environment, or other forms of disruption. Violation of these provisions would result in the responsibility of the State under international law.⁷¹

Under Article IX OST, State parties are

obligated to take appropriate measures to avoid the harmful contamination of the environment of the earth.⁷² Under the Article states are bound to prevent harmful effects to Earth's biosphere through back contamination.⁷³ Back contamination is the biological contamination of the Earth by extraterrestrial micro-organisms carried by space craft.⁷⁴ Extra-terrestrial can be defined as a creature that comes from another planet⁷⁵ or existing or coming from somewhere outside earth and its atmosphere.⁷⁶

Deleterious consequences could occur from the introduction of terrestrial contaminants to celestial environments.⁷⁷ Moreover, evidence seems to suggest that the earth's environment has a natural ability to repair itself whereas the lunar environment has no such capability due to lack of an atmosphere.⁷⁸ After the Moon Treaty has come into force the meaning of harmful contamination is no more restricted to *harmful to humans* but also extends to *harmful to the environment of other celestial bodies*.⁷⁹ Thus precautions should be taken to minimize the forward contamination of planets by terrestrial micro-organisms.⁸⁰

The notion of 'due regard', is recognised as a customary rule of international law, imposed under A. IX of the OST and A. 7(1) of the Moon Agreement,⁸¹ it requires the State Parties to prove beyond reasonable doubt that all possible care was taken to prevent the harmful act from occurring.⁸² The duty under A. 7(1) extends to activities planned by *its nationals*, and hence failure to take such action makes the State the risk bearer for all damage that could ensue.⁸³ Activities in outer space, being *per se* ultra-hazardous activities,⁸⁴ the obligation does not extend merely to taking appropriate measures against activities already identified as having the propensity to cause *harmful contamination*, but also to take measures to

identify such activities.⁸⁵

The standard of care to be met by state parties is the crucial criterion in determining their responsibility. While the treaties mandate states to take 'appropriate measures'⁸⁶; they do not however provide any guidelines in order to make a determination of what is appropriate.⁸⁷ This determination must be left at the discretion of the parties,⁸⁸ and the interpretation of the preparatory works.⁸⁹ The United Nations Committee on Peaceful Uses of Outer Space has commented that Article 7 (1) was not intended to prohibit the exploitation of moon as such, but to ensure that any disruption caused is *minimized*.⁹⁰ The exploration thus should not be done at the expense of the environment. This means that present and future generations can benefit from both economic and scientific development⁹¹ and from the preservation of the planetary environment.⁹²

State Parties must ensure that non-governmental entities conduct their activities in compliance with general international law and all other treaty obligations incumbent upon them.⁹³ International environmental law requires the activities within the jurisdiction and control of a State do not cause damage to the environment of *areas beyond the limits of such national jurisdiction*⁹⁴, which would include outer space. Steps must be taken to protect Earth against the remote possibility of contamination by life forms that may have evolved on other celestial bodies.⁹⁵ Back contamination must be given the most serious and careful consideration in missions where samples are to be returned to Earth for analysis.⁹⁶

Obligations under COSPAR Planetary Protection Policy

COSPAR maintains and promulgates the planetary protection policy for the reference of space faring nations, both as a provider of international standard for procedures to

avoid organic constituent and biological contamination in space exploration. It also provides accepted guidelines in this area to guide compliance with the wording of A.IX OST and other relevant international agreements.⁹⁷

Article IX OST is the most important provision with regard to the avoidance of interference with the activities of other states in outer space including moon and other celestial bodies.⁹⁸ Article IX binds State Parties to undertake appropriate international consultations before proceeding with any activity or experiment planned by it in outer space, including the moon and other celestial bodies that the State Party has reason to believe...would cause potentially harmful interference.⁹⁹ Also, the State should have a reason to believe that a planned activity or experiment would cause potentially harmful interference. The duty of prior consultation has a precedent in the West Ford project carried out by the United States in 1962. This experiment, which involved the launching of a belt of copper needles into orbit, prompted COSPAR to convene a meeting in order to assess the potential environmental damage arising from this activity.¹⁰⁰

Liability under Liability convention

The Liability Convention deals with issues of damages caused by space activities on Earth and in Space. The concept of damage is defined in the Liability Convention.¹⁰¹ The Liability Convention establishes an absolute liability regime in case of damage caused on the surface of the Earth¹⁰² and a fault based liability to damage caused in Outer Space by its Space object to another State party to the Treaty.¹⁰³

Absolute liability as a "generally accepted principle"¹⁰⁴ of law modifies the traditional concept of state responsibility, as otherwise based upon fault, when the source of injury is an abnormally dangerous

activity¹⁰⁵. The principle of absolute liability forms a part of the national laws of many civilized nations such as United States of America¹⁰⁶, Russia¹⁰⁷, France¹⁰⁸, etc. The principle of Absolute Liability also finds applicability to all abnormally dangerous activities in the field of aviation law¹⁰⁹, environmental law¹¹⁰ and nuclear activity¹¹¹. In previous instances, absolute liability has been invoked by the courts in cases such as the Trail Smelter Arbitration¹¹².

The applicability of the Liability Convention to damage sustained in Outer Space is based upon 'fault' of the party that was responsible for the damage.¹¹³ In the absence of a definition of fault in the Outer Space Treaties, general principles are applicable.¹¹⁴ 'Fault' arises out of the breach of a 'duty of care'¹¹⁵ If the duty of care is breached by a states activities in outer space.¹¹⁶ It must be held liable for the resultant damage.

Conclusion

First and foremost it is absolutely essential to ensure that the intention of the drafters of the OST is understood and implemented. By providing a better definition of the term 'appropriate state' the law would not only in theory lessen the ambiguity that one relates with the laws of outer space but also in practice make it possible for one state to clearly assign liability on another state. Keeping in mind the increase in space activity and the higher probability of incidents that might occur (environmental or other), imputation of liability would be fundamental to the growth of International Space Law.

The difficulty in determining the issues of fact outlined in the paper, including the determination of state of nationality and appropriate state etc, warrants an introduction of a contractually governed liability regime. This is particularly in the context of private entities expanding their activities into outer space. The

determination of this question should turn less on legal trivialities and more on the intent of the parties to distribute the liability. This could be affected through formulation of a uniform draft code for licensing the activities of private entities into outer space.

While it may be tempting to adopt a fault based liability of the damages caused in the outer space policy consideration must take into account the practical hindrances of such a regime. The rule of sovereignty, the difficulty in collection of evidence and the ultra hazardous nature of space activities make for a case of a liability regime that is governed by principles of absolute liability.

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