CHAPTER 5:
AN INSIGHT INTO SOME ISSUES OF PRACTICAL SIGNIFICANCE
5.1: Introduction

The Outer Space Treaty, which is ratified by most of the states, provides only a basic framework for the governance of the moon and other celestial bodies. It fails to provide for a detailed legal regime in the light of the later developments in space technology. The Moon Agreement, despite its inherent loopholes, contains elaborate provisions to govern the moon and other celestial bodies. However the difference of opinion between the developed and developing countries on the provisions of the Moon Agreement stands in the way of giving effect to the provisions of the Agreement.

As discussed in the preceding Chapter, most of the conflicting opinions of the states revolve around Article 11 of the Moon Agreement. The developed states are not willing to accept the concept of CHM in the governance of the moon and other celestial bodies. This being the fact, the international regime for the exploitation of resources of the moon and other celestial bodies advocated by Article 11 has also not been entered till date. The failure of the Moon Agreement to obtain the status of binding norm in the international level coupled with the absence of international regime to govern the resources of the moon and other celestial bodies has opened several issues of practical significance, which need immediate attention. This Chapter looks into those
issues and the problems associated with their resolution in the light of the space treaty provisions discussed in the previous Chapter.

5.2: Claim of Sovereignty and National / Individual Appropriation of the Moon and Other Celestial Bodies

The question of sovereignty and national appropriation of the moon and other celestial bodies arose as early as in September 1959, when Luna 2 carrying Soviet flag stroked the moon. There was a considerable discussion, though the Soviet Union indicated from the beginning that it had no intention to seek any claim of sovereignty over the moon.¹ The statement of the head of Soviet government, N. S. Kruschev that his country had established priority over the moon created a doubt that the Soviet Union might eventually make a claim over the moon. But Soviet Union subsequently renounced any territorial claims in express terms.² N. S. Kruschev, replying to questions put by American correspondents on whether the landing of a Soviet pennant on the moon gave the Soviet Union grounds for making any property claims on this

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planet, said: “We regard the launching of a space rocket and the delivery of our pennant to the moon, as our achievement. And when we say “our” we imply all the countries of the world, that is, we imply that it is also your achievement and the achievement of all people living on the earth.”

The early American view was also similar to that of the Soviet Union. In 1962, the American representative to the political committee of the General Assembly stated that “we have rejected the concept of national sovereignty in outer space. No moon, no planet, shall ever fly a single nation’s flag.” Further, in order to avoid the problems relating to sovereignty associated with the Apollo program, the United States enacted Law on the Implantation of the United States Flag. Section 8 of the Law reads as follows:

the flag of the United States, and no other flag, shall be implanted or otherwise placed on the surface of the moon, or on the surface of any planet, by the members of the crew of any spacecraft making a lunar or planetary landing as a part of a mission under the Apollo program or as a part of a mission under any subsequent program, the funds for which are provided entirely by the Government of the United States. This act is intended as symbolic gesture of national pride in achievement and is not

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to be construed as a declaration of national appropriation by claim of sovereignty.\textsuperscript{4}

Wayne N. White Jr. puts forward four principal reasons for the rejection of territorial sovereignty by the Soviet Union and latter by other countries. They are, (i) to prevent conflicts; (ii) to ensure free access to all areas of the outer space; (iii) to avoid the difficulty involved in delineating boundaries in outer space; and (iv) to enhance national pride, prestige and influence.\textsuperscript{5}

The attitude of the states, especially the super powers, clearly showed the acceptance of the ban on sovereignty and national appropriation of the moon and other celestial bodies. But with the subsequent development of technology and misinterpretation of the treaty provisions, the states as well as the individuals are willing to carry on some activities in derogation of the principle of absence of sovereignty and national / individual non-appropriation.

\textbf{5.2.1: Bogota Declaration}

The difference of opinions on the claim of sovereignty over the outer space including the moon and other celestial bodies came into limelight on 3

\textsuperscript{4} Supra note 1.

\textsuperscript{5} Supra note 2.
December 1976 in the form of Bogota Declaration. Eight equatorial states\(^6\) authentically asserted their sovereignty over the geostationary orbit\(^7\) above their territory for the first time in the space history.\(^8\) According to the Parties, the geostationary orbit is linked to the earth because its existence depends exclusively on its relation to gravitational phenomena generated by the earth, and that is why it must not be considered as part of the outer space.\(^9\) They declared that this scarce natural asset is part of the territory over which equatorial states exercise their national sovereignty.

The States Parties demanded that any state wishing to place the devices permanently on the segment of the geostationary orbit must first obtain

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\(^6\) Brazil, Colombia, Ecuador, Indonesia, Congo, Kenya, Uganda and Zaire.

\(^7\) Geostationary orbit is a circular orbit at approximately 22,300 miles above the earth’s equator. Since a satellite placed in this orbit rotates at the same speed as the earth, it appears stationary from a spot on the earth below. The placing of satellites in this orbit makes the operations simpler and cheaper, as the transmitting and receiving equipment can remain directed at the same spot in outer space. Mark W. Janis and John E. Noyes, *Cases and Commentary on International Law*, (St. Paul Minn.: West Group, 1997) p. 527. Also see Stephen Gorove, *Developments in Space Law - Issues and Policies*, (Dordrecht: Martinus Nijhoff, 1991) p. 36.

\(^8\) In 1975 Colombia first claimed a segment of the geostationary orbit above its national territory. But as it was not supported by others, the claim remained unnoticed.

permission from the country beneath. The Declaration also stated that such sovereign rights are in the best interest of all countries and all mankind, and as such it negates the use of geostationary orbit for the greater benefit of most developed countries.\(^\text{10}\) It finishes by stating that the segments of the orbit corresponding to the open sea are CHM and should be used and exploited for the benefit of mankind.

The Declaration is the result of the misinterpretation of Article II of the Outer Space Treaty.\(^\text{11}\) The equatorial states adopted an attitude which was contrary to the view expressed by a majority of states within United Nations.\(^\text{12}\)

As mentioned above, neither of the superpowers claimed sovereignty over the outer space including the moon and other celestial bodies. United States was of the view that the declaration of the states amounted to a claim to national appropriation of a part of the outer space. The interests of mankind could be

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\(^\text{10}\) The equatorial states contended that by the time they develop their technology to place the satellite in the orbit, the geostationary orbit would be filled with the satellites of the developed countries. This would deprive them from exercising their freedom of exploration and use.

\(^\text{11}\) The States Parties contended that the lack of definition of outer space in the Outer Space Treaty implies that Article II should not apply to geostationary orbit and therefore does not affect the right of the equatorial states that have already ratified the Treaty. *Supra* note 7, pp. 529 & 530.

served only by free and equitable use and claiming of national sovereignty over the geostationary orbit would not serve these interests. If the ownership is granted, access to the portions claimed would obviously not be equitable - it would be foreclosed altogether. The representative of Belgium was very clear in stating that “the view that the geostationary orbit is a natural resource and subject to the sovereignty of the equatorial states is absurd, requiring no further comment.” Therefore nearly universal applicability of the non-appropriation principle can be seen in the response of the states and scholars to the Bogota Declaration.

The Bogota Declaration, though not recognized by other states and it failed to receive any legal standing in the COPUOS meetings and International Telecommunication Union’s Conferences, has shown that there is every

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possibility of states claiming sovereignty over the moon and other celestial bodies at a future date. It is feared that such national claims of territorial sovereignty over the moon and other celestial bodies would only perpetuate the history of conflict which the earth has evidenced since the origin of the *homo sapiens*. It would also act as an obstacle in the realization of well established right of freedom of access to all states enumerated under the treaty provisions. Fortunately, the United States did not claim sovereignty over the moon when it landed its men on it. The planting of American flag on the moon and saluting it by the astronauts is considered to be of no practical and territorial significance. As the principle of non-appropriation of the moon and other celestial bodies was considered to be well established, the manned and unmanned moon landings brought about no claim of sovereignty. But the future position may not be the same.

5.2.2: Human Habitation on the Moon and Other Celestial Bodies

The view that the moon and other celestial bodies should not be susceptible to occupation is reflected in the writings of different jurists and in the statements of government representatives. However, the scientific fiction and other writings show that the question of the possible establishment of a colony on the moon or on other celestial bodies has long captivated the imagination of *homo sapiens*.\(^\text{21}\) Now with the problem of shortage of space on the earth, due to the population explosion, the interest of scientists on the issue of possible human habitation on the celestial bodies, especially on the moon, has multiplied by many folds.\(^\text{22}\) Though the two basic requirements for human


\(^{22}\) Different plans were advanced for human habitation on the moon and other celestial bodies since 1980. In 1984, the Lunar Base Working Group, New Mexico, proposed one such approach. The sequence of this approach was to send unmanned cargo to the moon in 2000 to land a module for habitation and a power system. A crew of four persons was to fly from the earth to Space Station where a space vehicle was planned to be constructed for the crew to reach the moon in 2001 for 30 days. A second crew of four was proposed to arrive in 2002 for six months to begin permanent occupation. According to the plan, eight persons (two groups of four) were supposed to be there by 2006, who were planned to rotate every twelve months. In 2015, a crew of four was scheduled to fly from the Space Station to Mars, which was planned to arrive in 2016 for thirty days. A second crew was scheduled to
existence, the water and the air, are not found on the moon, the recent US plans for the creation of the human friendly environment on the moon are quite interesting. As it has been proved by the scientific research that the moon contains large quantum of ice cubes in the Polar Regions, the United States is planning to smash these regions with its missiles to convert the ice into water, and collect and preserve it in a huge reservoir. Further they are also planning to divide the water molecules to get the oxygen necessary for the human survival. Carbotek Inc., an American company, has also come out with a process of extraction of oxygen from lunar materials. The waste products of the process are also said to be made use of as building materials.

The fascinating idea of human habitation on the moon and other celestial bodies brings forward several questions of legal significance. The occupation arrive in 2018 and construct the habitat where they could live for 600 days. See Eilene Galloway, ‘Law, Science and Technology for the Moon/Mars Missions’, Proceedings of the Thirty-third Colloquium on the Law of Outer Space, 6 - 12 October 1990, Published in 1991, pp. 195 - 204 at p. 197. Further, as early as in 1986, the United States announced its plans to establish a permanent lunar base by 2017 and a Mars settlement by 2027.


of the moon and other celestial bodies gives raise to the question, whether it will not amount to national appropriation or claim of sovereignty, which is prohibited under the Outer Space Treaty and the Moon Agreement? Wayne N. White Jr., while pointing out the difference between the common law and civil law system, states that under the civil law property can exist independently of sovereignty. Therefore he supports the occupation of the celestial bodies basing his argument on the proposition that it does not amount to claim of sovereignty under civil law. However his view is based on the wrong assumption that Article II of the Outer Space Treaty prohibits territorial sovereignty but does not prohibit private appropriation.

White further supplements his argument by stating that the property rights on the moon and other celestial bodies is based upon the state jurisdiction conferred by Article VIII of the Outer Space Treaty, and not territorial sovereignty, which is prohibited by Article II of the Outer Space Treaty. However this proposition is also not acceptable because the jurisdiction conferred under Article VIII of the Outer Space Treaty is confined

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25 Supra note 2, p. 378.

26 The question of individual appropriation is subsequently discussed elaborately under the separate heading.

27 Supra note 17, p. 371.
to the space object and the personnel thereof, and it does not extend to property on the moon and other celestial bodies. Subsequently White himself accepted that limited property rights proposed by him is applicable only regarding movables and not regarding immovables.\footnote{Wayne N. White, Jr., ‘Interpreting Article II of the Outer Space Treaty’, \textit{Proceedings of the Forty-sixth Colloquium on the Law of Outer Space}, 29 September - 3 October 2003, Published in 2004, pp. 171 - 188 at p. 176.}

Traditionally occupation has been the principal method of claiming territorial sovereignty.\footnote{The \textit{Case Concerning the Legal Status of Eastern Greenland} (\textit{Denmark v. Norway}), 1933 PCIJ, Ser. A/B, No. 53 and \textit{Clipperton Island Arbitration} (\textit{Mexico v. France}), 2R. INT’L ARB. AWARDS 1105 (1931).} Even though the effective occupation alone is not sufficient, it has the effect of providing strong backing to the claim of sovereignty.\footnote{Andrew G. Haley, \textit{Space Law and Government}, (New York: Meredith, 1963) pp. 120 & 121.} The claim of property rights through occupation becomes a claim of sovereignty and exclusive controls when it is looked from the point of view of relationship between the state and the territory.\footnote{Harry H. Almond, Jr., ‘The Legal Status of Property on the Moon and Other Celestial Bodies’, \textit{Proceedings of the Thirty-ninth Colloquium on the Law of Outer Space}, 7 - 11 October 1996, Published in 1997, pp. 20 - 30 at p. 20.} Therefore the human
habitation on the moon and other celestial bodies will undoubtedly result in the exercise of state sovereignty over the moon and other celestial bodies.

The allocation of property rights consequent to the human habitation is contrary to the provisions of the Outer Space Treaty and the Moon Agreement. Even if we do not consider the provisions of the treaties, and presume the possibility of acquisition of property rights over the moon and other celestial bodies, the complicated question of initial allocation of property rights comes into picture. Kurt Anderson Bacca, while discussing the question of allocation of property rights over the moon and other celestial bodies, concludes that

The same property rights system that is most beneficial on Earth will be most beneficial on the celestial bodies.... Although the provision of Article II against national appropriation contradicts these property concepts, it is inconsistent with the notions of jurisdiction and ownership found elsewhere in the treaty. This provision should therefore be modified and replaced with a concept of reasonable use or

32 Article II, The Outer Space Treaty.
33 Article 11 (3), The Moon Agreement.
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investment. Such a provision should provide for initial allocation of unclaimed property only upon productive use or investment.35

However this conclusion is not acceptable. The notion of jurisdiction and ownership found in other provisions of space treaties is connected only with the space objects and the personnel thereof. It has nothing to do with the property rights on the moon and other celestial bodies. Where as the principle of national non-appropriation applies to the property in the moon and other celestial bodies. Moreover the earthly principle of allocation based on first possession, productive use or investment cannot be applied to the moon and other celestial bodies, as it will result in conflicts.36 This first come first served principle gives way for an unmitigated land rush. Without any doubt it would breed the criminality and outright sabotage witnessed in the American West of the gold rush era.37

This does not mean that presence of human beings on the moon and other celestial bodies is completely prohibited. What is prohibited is the


national or individual appropriation of the moon and other celestial bodies. An installation or base, manned by a small number of astronauts or scientists for scientific purposes would not constitute national appropriation. But a large permanent lunar colony, operating under national auspices for commercial purposes, would by its magnitude and nature of its activities amount to national appropriation.

The large-scale human habitation on the moon and other celestial bodies would undoubtedly result in their colonization. The technical possibility of such colonization is also supported by many scientific views. History has shown us that the major colonial wars were the results of the struggles between the then colonial powers to expand their spheres of influence to other parts of the world outside their national territories. Competition for locations on the

38 Both in the Case Concerning the Legal Status of Eastern Greenland and Clipperton Island Arbitration it was held that smaller the uninhabited area, less control a state needs to display to establish claim. So if the area is inhabited by very few, the state needs to display a higher degree of effective control over the area to establish any claim.

39 Supra note 19, pp. 166 & 167.

40 Helen Briggs, ‘Moon Colony Within 20 Years’ [http://news.bbc.co.uk/2/hi/science/nature/3161695.stm]

moon and other celestial bodies would also result in the increase of terrestrial conflicts aided or supported by the activities on the moon and other celestial bodies.\(^42\) Thus human habitation on the moon and other celestial bodies carries with it the risk of transferring the terrestrial mistakes and weaknesses to the moon and other celestial bodies.\(^43\)

The human habitation on the moon and other celestial bodies also open wide variety of questions as to the personal legal status of the inhabitants, their personal affairs and domestic relations. This may involve legal matters pertaining to citizenship, births, marriages, deaths, divorces, custody of children etc. One might argue that they may be governed by the law of domicile of the individual or individuals involved. However such a solution might be feasible for the first or to a certain extent for second generation of inhabitants. The personal legal status of subsequent generations of inhabitants remains unclear.\(^44\) This unveils the need for separate laws governing the legal status, personal affairs and the domestic relations of individuals on the moon.

\(^42\) *Supra* note 31, p. 27.


and other celestial bodies prepared in connection with the natural, physical, economic, social conditions therein, and also separate authority to enforce these laws.\(^\text{45}\) However this transfer from the earthly laws and authorities to planetary laws and authorities would be a most challenging task, which certainly requires a prolonged period of time.\(^\text{46}\) The resolution of above legal matters also involves complications as to the exercise of jurisdiction.\(^\text{47}\) These factors show that the idea of human habitation on the moon and other celestial bodies needs meticulous thought before its implementation.

**5.2.3: Private Claims Over the Moon and Other Celestial Bodies**

Initially, the property claims were limited to the surface of the earth. But with the passage of time the concept of property proliferated to the depths of the earth and up through the air.\(^\text{48}\) Only the last domain, the outer space


including the moon and other celestial bodies remained open. However the misinterpretation of Article II of the Outer Space Treaty and questions as to the binding nature of Article 11 (3) of the Moon Agreement have resulted in private claims over the moon and other celestial bodies. A new phenomenon of selling the parts of the moon and other celestial bodies by private bodies has started. At present, Lunar Embassy is the leading seller of the property in the moon and other celestial bodies. It has utilized the media of Internet for wide publicity and sale. More than 2.5 million people from 180 countries have purchased property on the moon and mars.

While justifying his business, Dennis Hope, the owner of Lunar Embassy, states that the ownership of the extraterrestrial properties by the individuals is not forbidden. The Outer Space Treaty stipulates that no

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50 See http://www.lunarembassy.com

government can own extraterrestrial property, but it does not say whether commercial enterprises or private individuals can claim, exploit or appropriate the celestial bodies for profit.\textsuperscript{52} While questioning the binding nature of the Moon Agreement, he asserts that refusal by the majority of the states to sign the Moon Agreement shows that the prohibition on the exploitation of extraterrestrial resources by the individuals and corporations under the Agreement is not legally binding. Therefore, according to him, one can become the legal owner of an extraterrestrial body by claiming first and that is made by Lunar Embassy.\textsuperscript{53}

Hope goes on to base his claim on the registration of his claim made in 1980 in the local US Governmental Office for claim registers, the San Francisco County Seat.\textsuperscript{54} He states that the Americans were the first to walk on the moon and plant their flag on it, and therefore if the moon ever belonged to anyone, it certainly belongs more to United States than any other nation. Therefore his registration of claim in the US Governmental Office is said to

\textsuperscript{52} http://www.lunarlandowner.com/space\_law\_faq.htm (Accessed on 11 December 2006, 7:20pm)

\textsuperscript{53} It is said to be based on old American law, i.e., who stakes their claim on a piece of land first, gets the best property. [http://www.lunarembassy.com/ls/legeneralfaq\_et.shtml (Accessed on 11 December 2006, 7:15pm)]

\textsuperscript{54} He made claim for the entire lunar surface, as well as the surface of all the eight planets of the solar system and their moons. See \textit{Ibid}.
provide legal ownership of the moon and other celestial bodies. Further Hope copyrighted his work with the US Copyright Registry Office in order to prevent similar claims from others. He also sent notifications of his claim to the US and USSR governments as well as to the United Nations, and did not receive any answer. The fact that the business of Lunar Embassy has not been contested either by the United Nations or by the United States or Soviet Union’s government is also put forward to support the legality of the claim.\(^{55}\)

Though the issue seems to be too trivial from the legal point of view, it requires an immediate attention due to the magnitude of the activity. Unfortunately the number of people investing in this bogus scheme is increasing alarmingly. With this, more and more private entities selling celestial bodies have also come into existence, each with its own fanciful rules, regulations and requirements.\(^{56}\) For example: Lunar Registry, (www.lunarregistry.com), www.buyuranus.com etc. The media hype together with the inactiveness of the authorities has resulted in an impressive number of people believing that they legitimately own land on the moon and other

\(^{55}\) See Ibid.

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celestial bodies. However it is a wrong assumption which has no legal standing.

There might be disagreement among space lawyers on various issues, but there is a consensus among them that Dennis Hope or any other private entities have no legal right over the moon and other celestial bodies, and therefore they cannot sell them. None of the arguments of Dennis Hope is legally tenable. The entire activity is based on the misconception that Article II of the Outer Space Treaty does not prohibit private appropriation. However as it is discussed in the previous chapter, the prohibition under Article II extends to private appropriation. Allowing the private appropriation of the outer space or its part would have the effect of defeating the very purpose of Article II.


58 Armel Kerrest states that the arguments of Dennis Hope should shame a first year student in a law faculty. Armel Kerrest, ‘Outer Space: res communis, common heritage or province of mankind?’ [http://fraise.univ-brest.fr/~kerrest/IDEI/Nice-appropriation.pdf (Accessed on 13 October 2006, 5:11 pm)]

59 The prohibition on national appropriation under Article II has to be understood as including not only sovereign rights but also property rights. States and individuals are thus also barred from establishing any property link over the moon and other celestial bodies. Manfred Lachs, The Law of Outer Space - An Experience in Contemporary Law-Making, (Leiden: A. W. Sijthoff, 1972) p. 44.
which contains comprehensive provisions prohibiting appropriation.\textsuperscript{60} If the states cannot own and appropriate the moon and other celestial bodies, the people also cannot own them.\textsuperscript{61} Moreover as any kind of private appropriation independent from the legal authority of the state is difficult to imagine, it is absurd to say that Article II does not extend to private appropriation.\textsuperscript{62}

The property rights can be acquired only when the territory is \textit{res nullius}.\textsuperscript{63} However, although there is a disagreement as to the applicability of CHM, almost all the states have agreed to the \textit{res communis} nature of the moon and other celestial bodies by accepting them as province of all mankind. Therefore the moon and other celestial bodies cannot be subject to appropriation either by the states or by the individuals.


\textsuperscript{61} http://blogcritics.org/archives/2006/10/06/080344.php (Accessed on 11 December 2006, 7:09pm)


The Lunar Embassy’s contention that it is the first claimant is also not true. Dennis Hope’s claim in 1980 is preceded by several other such claims. In 1952, Berkeley Since-fiction Fan Club claimed ownership over a lunar region. In the very next year, a Chilean lawyer claimed lunar ownership.\(^{64}\) Further in 1955, Robert R. Coles, a former Chairman of New York’s “Hayden Planetarium”, incorporated and started selling lots on the moon for one dollar per acre. In January 1962, prior to the launching of US first lunar probe, Ranger 3, an individual in one of the British dominions claimed certain lunar area and expressed his intention to hold the United States responsible for any damage the probe would cause to his property.\(^{65}\) In 1990s Martin Jurgens contested the ownership claims of Dennis Hope\(^{66}\) by putting forward a claim that Frederick II, the King of Prussia, had bequeathed one of his ancestors with ownership of the moon in return for services rendered back in 1756. He

\(^{64}\) Supra note 57, p. 335.


petitioned the German government to initiate international action against Dennis Hope.  

Even if Dennis Hope is considered to be the first claimant of the moon and other celestial bodies, his mere claiming does not entitle him of any ownership right. In this context, Virgiliu Pop brings forward the precedent involving claim by the Masai tribe that they own all cows in the whole world by divine command. He states - “If a claim alone would entail ownership, this would entitle the Masai to universal cattle ownership. Yet, in reality, people continue to buy and sell cattle without involving the Masai, regardless of what the latter believe. Then “it is mine because I say so” approach is not functional.” Pop also asserts that “in the acquisition of possession besides “animus possidendi” - the intention to possess - one also requires “corpus possidendi” - an act of physical nature giving effect to the intention to take the thing.” Dennis Hope cannot own the moon just because he wants to, as he lacks the latter element required in the acquisition of the possession.

68 Supra note 57, p. 335.
69 Supra note 65.
Wayne N. White, Jr. questions the validity of the registration of the claim by Dennis Hope. According to him, there is no such thing as a “US Governmental Office for claim registers”. The local government offices in the United States have no authority whatsoever to perform official services or render opinions on behalf of the United States federal government. The validity of an interest in property can only be determined by the courts in the United States. Therefore the recording of the document at San Francisco County Seat is just a proof that it was prepared and executed on or before the recordation date and it does not mean that either the US Federal Government or the San Francisco County Government has decided that Hope’s claim is valid.\textsuperscript{70}

The argument that, as the Americans were the first to walk on the moon and plant their flag on it, the moon belongs more to the United States than any other nation is absurd. The principle of national non-appropriation, explicitly mentioned under Article II of the Outer Space Treaty, is accepted by all states, including the United States. As discussed above, the United States has made clear its intention of not claiming sovereignty over the moon and other celestial bodies on several occasions. As the United States does not own the moon, a

\textsuperscript{70} \textit{Supra} note 28, p. 172.
claim based on the registration made in an US office cannot hold good in the eye of law.

A cornerstone of Lunar Embassy’s claims, the absence of governmental and UN protest, is irrelevant. The USSR and the UN are not expected to protest such trivial claim because they have more important issues to be addressed.\(^{71}\)

As Yehuda Z. Blum notes –

the absence of protest is relevant in the formation of an historic title only in those cases in which protest would have been expected to be forthcoming, had the affected State really wished its objection to be made known. There are situations... in which an inference of acquiescence cannot be justifiably drawn from the simple fact of absence of protest.\(^{72}\)

Despite the fact that the issue is trivial from the legal point of view, the inactiveness of the US authorities is not justified, as it is not trivial from the point of view of public. An immediate action from the US authorities to bring to book such illegal and fraudulent activity is required to prevent the multiplicity of such activities. Wayne N. White, Jr. points out the responsibility

\(^{71}\) Supra note 57, p. 336.

\(^{72}\) Supra note 65.
of the states under Article VI of the Outer Space Treaty to check such activities of their citizens or other non-governmental entities.\textsuperscript{73}

These illegal activities have already resulted in the purchasers of extraterrestrial property seeking administrative remedies as well as filing lawsuits. In 1997, three men from Yemen filed suit in a Yemen court alleging that Mars had belonged to their ancestors for 3000 years, and sought redress against NASA for trespassing on their property during the course of the Mars mission. They immediately withdraw the case when the Yemeni prosecutor general threatened them with arrest.\textsuperscript{74} In another case filed in September 2000, an Italian woman contested that the Lunar Embassy had sold the same two plots that she purchased from a company called Celestial Gardens. Her suit for fraud was supplemented by a petition to the White House and the United Nations. Unfortunately the outcome of the case is not clear.\textsuperscript{75}

\textsuperscript{73} Supra note 28, p. 179.

\textsuperscript{74} Ibid., p. 177.

\textsuperscript{75} Ibid.
On 17 February 1996, NASA launched the NEAR Shoemaker spacecraft from Cape Canaveral Air Station. On 3 March 2000, Gregory William Nemitz filed and got registered a “class D claim” with the Archimedes Institute Internet Registry regarding the ownership over Asteroid 433, Eros, and a volume of space 50 km in altitude into space from every point on the surface of the Asteroid. On 12 February 2001, the NEAR Shoemaker landed on Eros, which prompted Nemitz to send a letter to Daniel Goldin, the Administrator of NASA, informing about his ownership of the asteroid. Nemitz asked NASA to pay a “parking/storage fee” for the NEAR spacecraft, in the amount of $20.00 for a period of one century. NASA denied Nemitz’s claim and refused to pay any amount based on different reasons put forward during the course of a series of letters between the parties.

Nemitz v. United States

Gregory William Nemitz v. The United States of America; The United States Department of State; National Aeronautics and Space Administration 2004 WL 3167042 (D.Nev.)

It is an Internet registry intended to set the priority among the competing claims relating to extraterrestrial property.

Nemitz’s intention was to get some sort of recognition of his claim from a pioneer space agency like NASA.
In a letter dated 9 April 2001, then General Counsel of NASA Edward Frankle stated the following:

Your individual claim of appropriation of a celestial body (the asteroid 433 Eros) appears to have no foundation in law. It is unlike an individual’s claim for seabed minerals, which was considered and debated by the U.S. Congress that subsequently enacted a statute, The Deep Seabed Hard Mineral Resource Act, P.L. 96-283, 94 Stat. 553 (1980), expressly authorizing such claims. There is no similar statute related in outer space.

Accordingly, your request for payment of a "parking/storage fee" is denied. In taking this action NASA does not need to and does not take any position on whether the requirements of the Outer Space Treaty of 1967 apply to private individuals, or whether the Treaty should be amended for this purpose. Your claim depends on the establishment and validity of your ownership of asteroid 433. On the basis of the evidence provided, including your admission that the Archimedes Institute does not have legal authority to confer property rights, you have not
established a legal right to any payment. Therefore, NASA has no authority to use its appropriated funds to pay your claim.\textsuperscript{79}

In a letter dated 15 August 2003, Ralph L. Baribanti, the Director of Space and Advanced Technology in the Department of State’s Bureau of Oceans and International Environmental and Scientific Affairs, wrote:

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.\textsuperscript{80}

Having exhausted the administrative remedies, Nemitz filed suit against NASA and the Department of State in the United States District Court for the District of Nevada on 6 November 2003. In addition to the claim of parking/storage fee from NASA for landing the NEAR Shoemaker on the asteroid, he sought a declaratory judgment, alleging that NASA and the State Department unlawfully denied him property rights guaranteed by the United

\textsuperscript{79}http://www.orbdev.com/010409.html (Accessed on 13 December 2006, 6:55pm)

\textsuperscript{80}http://www.erosproject.com/exhibit01.html (Accessed on 13 December 2006, 6:40pm)
States’ Constitution. He also alleged that NASA has an implied contract with him for the payment of parking/storage fees, and has breached that contract. Nemitz based his claims on the registration made in the Archimedes Institute website and his filing of a Uniform Commercial Code security interest in California as both debtor and creditor with the asteroid identified as the collateral.

Nemitz brought forward an interesting argument in support of his claim. He asserted that

An asteroid is a thing and according to centuries of jurisprudence, things are not property unless and until a party originates a claim to it. At the instant of the pronouncement of the claim, a ‘thing’ transforms into property of one species or another. Upon pronouncement of the claim, a property right immediately vests in the claimant, even before physical possession. This is well settled law under centuries of jurisprudence.

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82 On 7 March 2002, Nemitz filed a Uniform Commercial Code (UCC) Financing Statement Amendment with the California Secretary of State. He filed another Financing Statement Amendment on 17 July 2002. These UCC documents listed Nemitz as both debtor and creditor, and identified the Eros asteroid as collateral.
Physical possession is not the sole or absolute standard that vests property rights or vests the ability to derive income from property and rights. The level of perfection of the claim increases with the infusion of work-equity into the property, and with the owner’s defense of his property rights.

In a motion to dismiss the case, the United States contested Nemitz’s ownership of the asteroid. The defendants alleged that Article 9 of the California Commercial Code sets forth a procedure for the regulation of security interests in property, it does not create a property interest. Therefore filing of a Uniform Commercial Code form cannot be used by Nemitz to establish an ownership interest in the asteroid. The defendants stated that the Archimedes Institute registration does not confer title or rights to property on its registrants, which is evident from the disclaimer on Archimedes website.83 The website creates only a Registry and it does not provide a legal basis for asserting that such a registry creates a property interest in the asteroid. The

83 A disclaimer in the Archimedes website states that “The Institute makes no warranties either express or implied regarding the validity of the claims filed with the registries by any and all claimants…. The Archimedes Institute makes no claims of ownership on space resources by virtue of this Registry.” [http://www.permanent.com/archimedes/register.htm#Disclaimer (Accessed on 14 December 2006, 6:35pm)]
defendants also argued that neither the US Constitution created any such property right nor such property claim is supplemented by any codified or statutory law, either Federal or State.

The Court agreed with the defendants and dismissed the suit. The judge, while delivering the decision, observed that

…neither the failure of the United States to ratify the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, commonly referred to as the Moon Treaty, nor the United States’ ratification in 1967 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, commonly referred to as the Outer Space Treaty, created any rights in Nemitz to appropriate private property rights on asteroids. Nemitz has thus failed to assert a cognizable cause of action against the Federal Defendants.
Nemitz went on appeal to the San Francisco based Ninth Circuit Court of Appeals. But the Appellate Court upheld the District Court’s decision and dismissed the appeal.\textsuperscript{84}

The opinions of the legal experts are unanimous as to the impossibility of private ownership of the moon and other celestial bodies.\textsuperscript{85} Most of the opinions reflect the illegality of the activities involving sale of the moon and other celestial bodies. According to Ezra J. Reinstein, “no system of property law should permit and protect Lunar Embassy’s business.”\textsuperscript{86} Joanne Irene Gabrynowicz\textsuperscript{87} stated, “The legality of the Lunar Embassy’s sale of deeds to property on the Moon and other celestial bodies is highly questionable, and most likely illegal under both the 1967 Outer Space Treaty and the 1979 Moon Treaty.”\textsuperscript{88}

\textsuperscript{84} Keay Davidson, ‘Final frontier for lawyers - property rights in space: Land claims, commercial schemes and dreams have legal eagles hovering’ [http://sfgate.com/cgi-bin/article.cgi?file=c/a/2005/10/16/MNG7EF96GN1.DTL (Accessed on 13 December 2006, 9.35am)]
\textsuperscript{86} \textit{Supra} note 37, p. 70.
\textsuperscript{87} Director of the National Remote Sensing and Space Law Center, University of Mississippi.
\textsuperscript{88} \textit{Supra} note 57, p. 337.
Frans von der Dunk warns the potential buyers of the property in the moon and other celestial bodies by stating that

You should not expect to have paid for any valid legal title to a plot in the outer space, just for a nice piece of paper to stick on your wall…

Whether that means it’s [the sale of extraterrestrial property] fraud and such a claim is null and void under national law, would basically be up to any national legal system to determine. It does mean, however, that under international law the U.S. government should unequivocally make clear that these practices are not based on any sound legal premise.89

John Pike, while commenting on the claim of Dennis Hope, said, “The bottom line is, he can’t own property on the moon unless he’s got a government to back him up. No one is claiming sovereignty rights on the moon. And if any government did, I’d be very skeptical that any other government would recognize that claim.”90

89 Supra note 51.

In 2004, the Board of Directors of the International Institute of Space Law (IISL) issued Statement on Claims to Property Rights Regarding the Moon and Other Celestial Bodies taking note of the increasing extraterrestrial real estate business and also the raising opportunity of individuals being misled in this field. The Statement reads, *inter alia* -

The prohibition of national appropriation by Article II... includes appropriation by non-governmental entities (i.e. private entities whether individuals or corporations) since that would be a national activity. The prohibition of national appropriation also precludes the application of any national legislation on a territorial basis to validate a ‘private claim’. Hence, it is not sufficient for sellers of lunar deeds to point to national law, or the silence of national authorities, to justify their ostensible claims. The sellers of such deeds are unable to acquire legal title to their claims. Accordingly, the deeds they sell have no legal value or significance, and convey no recognized rights whatsoever.  

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Further, pointing out the responsibility of the states in this regard, the Statement reads -

…to comply with their obligations under Articles II and VI of the Outer Space Treaty, States Parties are under a duty to ensure that, in their legal systems, transactions regarding claims to property rights to the Moon and other celestial bodies or parts thereof, have no legal significance or recognised legal effect.  

So despite the misinterpretation of Article II of the Outer Space Treaty and questions as to the binding nature of Article 11 of the Moon Agreement, the scholars are unanimous in stating that private claims over the moon and other celestial bodies are not legally acceptable. But the private claims over the moon and other celestial bodies are not yet taken seriously by the national authorities concerned. This has resulted in the increase in such activities as well as more and more peoples buying property on the moon and other celestial bodies. Therefore the annoying business of selling the moon and other celestial bodies requires national authorities to come out of the slumber and take necessary action to stop such activities.

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92 Ibid.
5.2.4: Exploitation of the Resources of the Moon and Other Celestial Bodies

In 1972, when the United States made a formal proposal for the inclusion of concept of CHM in the Moon Agreement, it also promised to make a good faith effort to see that the negotiations for the establishment of the international regime stipulated under Article 11 (5) are successfully concluded. However with the changed circumstances, the United States has failed to keep its promise, and it now stands as a major obstacle in the establishment of such an international regime. The failure to agree on the international regime governing the exploitation of the natural resources of the moon and other celestial bodies has kept open the debate over the legality of exploitation of the resources of the moon and other celestial bodies. The Outer Space Treaty provides no solution due to the fact that the term “exploitation” does not appear even once in the whole treaty text. Though Article I paragraph 1 of the Outer Space Treaty speaks of “use of the outer space including the moon and other celestial bodies”, it is a too vague term for legal


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application, especially so in respect of the “exploitation of the natural resources”.\(^95\)

With the development in the space technology, it has become evident that the moon and other celestial bodies have enormous deposits of helium-3, oxygen, silicon, aluminum, iron, calcium, magnesium, manganese, titanium, gold, rhenium, germanium, platinum, palladium, iridium, osmium, rhodium, ruthenium and other resources in traceable amounts.\(^96\) According to an estimation, each one kilometer sized metallic asteroid contains a billion tons of iron, 200 million tons of nickel, 10 million tons of cobalt and 20,000 tons of platinum, with an estimated market value of about US $ one trillion.\(^97\) However with the finding of large quantum of natural resources on the moon and other celestial bodies, the plans for their exploitation by the developed states have also started to emerge.\(^98\)


Also see *Supra* note 37, p. 60.

\(^{97}\) *Ibid*.

\(^{98}\) Now it is said that no future venture in space would be more exciting and commercially attractive than the mining of mineral resources and human settlement on the moon and other celestial bodies. Ricky J. Lee, ‘Reconciling International Space Law with the Commercial Realities of the Twenty-first
The United States, being the major contender for the resources of the moon and other celestial bodies, has expressed its willingness to exploit the resources in the near future. On 14 January 2004, the US President George W. Bush unveiled the ambitious plans to return to the moon as early as 2015 and to establish a long term base to serve as a jump-off point for manned missions to Mars and across the solar system. It is believed that large-scale human operation in the space would be more cost-effective if the moon is utilised, both as a launching base and as a source of minerals and fuels. Bush also explained that an extended human presence on the moon would allow astronauts to develop new technologies and take advantage of lunar resources. The fact that the US plans revolve solely around the exploitation of valuable resources of the moon and other celestial bodies is more clear from


100 *Supra* note 96.

Bush’s statement that “we may discover resources on the moon and Mars that will boggle the imagination, that will test our limits to dream.”

The above plans show that the resources of the celestial bodies would probably be used initially in the construction of lunar base, satellites and launch stations on the moon. At least seven major potential lunar construction materials, concrete, sulfur concrete, cast basalt, sintered basalt, fiber glass, cast glass and metals, have been identified to exist on the moon. The asteroids, being rich in the metals and minerals, may be used in building such facilities and comets, which are rich in sources of water and carbon-based molecules, may be used to maintain life. The construction of lunar base is expected to decrease the cost of launching the objects, since the lunar based spacecraft would escape the moon’s lower gravity using less energy at less cost than earth-based vehicles. Once the transportation cost decreases and the scarcity

105 http://members.fcac.org/~sol/station/ast-mine.htm (Accessed on 02 June 2007, 12:13 pm)
106 http://space.about.com/cs/nasanews/a/bushspaceplan_2.htm (Accessed on 02 June 2007, 1:43 pm)
of the natural resources on the earth increases, the full-scale exploitation of the extraterrestrial resources for use on the earth will start. This would mainly involve the extraction of helium-3, which is found necessary for meeting the energy needs on the earth.\textsuperscript{107}

The Bush plans are also supported by the White House as well as the scientific community in the United States.\textsuperscript{108} The scientific developments to supplement such plans are taking place since 1980’s. The US Bureau of Mines and several Universities in US are working in this direction. In the early 1980’s, scientists have developed a “mass driver” magnetic catapult that could hurl mined materials into orbit from the moon or from an asteroid.\textsuperscript{109} The US Bureau of Mines has developed the technology to extract aluminum from the moon.\textsuperscript{110} The researchers at the University of Wisconsin’s Center for Space Automation and Robotics\textsuperscript{111} are working on the extraction and use of helium-3.

\textsuperscript{107} A ton of helium-3 could meet the electrical needs of a city of 10 million. The lunar samples collected by Apollo astronauts show that helium-3 is so abundant on the moon that it could accommodate the earth’s energy needs for at least 1,000 years. See \textit{Supra} note 104.


\textsuperscript{109} \textit{Supra} note 96.

\textsuperscript{110} http://www.asi.org/adb/02/02/aluminum-applications.html (Accessed on 02 June 2007, 12:34 pm)

\textsuperscript{111} One of the 16 NASA Centres for the Commercial Development of Space.
The grant of 186 Ph.D.s in the field of fusion program since 1963 by the University shows the intensity of the work carried on by the researchers to bring into reality the helium-3 fusion, which is necessary for using it as an energy source.\textsuperscript{112} The researchers have also studied possible mining sites on the moon based on US experience during the Apollo 11 mission, as the knowledge of location of the resources is important for landing the spacecrafts.\textsuperscript{113} Sea of Tranquility on the moon is determined to be the prime target for initial investigations, as it is expected to contain many tons of helium-3 below the surface. The scientists have also designed the solar-powered robotic equipment to scoop up the top layer of lunar soil and to place it into a robotic unit. The heating of the soil separates helium-3 from other lunar materials vital to human existence in space.\textsuperscript{114}

The US plans are the result of ambiguous wordings of Article 11 (3) of the Moon Agreement. The wording, natural resources \textit{in place}, under the said Article is a weakness in the system of complete prohibition on individual appropriation of the resources of the moon and other celestial bodies. As elaborately discussed in the previous chapter, this weakness has led to the

\textsuperscript{112} \textit{Supra} note 104.

\textsuperscript{113} http://www.asi.org/adb/02/02/resource-distribution.html (Accessed on 02 June 2007, 12:28 pm)

\textsuperscript{114} \textit{Supra} note 104.
misinterpretation that natural resources, when removed, are not covered by non-appropriation principle. Consequently the enterprises interested in the exploitation of the natural resources of the moon and other celestial bodies are offered an opportunity to establish property rights over such resources.\textsuperscript{115} This is also supported by the confusion surrounding the prohibition under Article II of the Outer Space Treaty.

Ernst Fasan draws a distinction between asteroids having long known astronomical specifications and / or those who have already received a name and other asteroids. According to him, the former should be considered as celestial bodies and the latter should not.\textsuperscript{116} Rene Oosterlinck goes on to develop this argument by stating that the Moon Agreement excludes property rights in the surface and subsurface of the moon and other celestial bodies, which by definition are immovables, but it does not exclude property rights once the resources are removed, i.e. when it becomes movables. He further states that as the large and important asteroids are within the ambit of celestial


bodies, property rights can only exist in parts once removed. However, small asteroids could be assimilated to a movable and as such they are subject of property as a whole.\textsuperscript{117} In other words, small sized asteroids could be used entirely for the production of useful materials irrespective of the fact that such use may result in their disappearance.

The above attempts to show the legality of individual appropriation of the resources of the moon and other celestial bodies are based on some false assumptions. Firstly, it is based on the classification of asteroids into two groups, one falling within the definition of celestial bodies and the other not falling within the definition. This classification has no legal background. The Moon Agreement applies to the moon and all other celestial bodies.\textsuperscript{118} It does not make any distinction between large and small asteroids. There is also no customary or scientific background for such classification. Secondly, it is also based on the misinterpretation of the wordings of Article 11(3) of the Moon Agreement.

More importantly, individual appropriation of the resources of the moon and other celestial bodies runs against the very purpose of the Moon Agreement.

\textsuperscript{117} Supra note 1, p. 277.

\textsuperscript{118} Article 1(1) of the Moon Agreement.
Agreement. As the preamble of the Moon Agreement stipulates, one of the objectives of the Agreement is to prevent the moon and other celestial bodies from becoming an area of international conflict. On earth, the resource allocation system is based on property rights, including the power to exclude - as granted to the first possessor, the power to use, and the power to dispose. States enforce this system according to sovereign power or international agreement or custom.\textsuperscript{119} Despite this, the world history shows that the unequal distribution of natural resources on the earth has been a major source of conflict between the human beings.\textsuperscript{120} As there is no system of allocation of the resources of the moon and other celestial bodies, much more conflicts are bound to occur in the course of their exploitation. The drafters of the Moon Agreement, being aware of this fact, made an attempt to avoid conflicts surrounding the benefits, which may be derived from the exploitation of natural resources of the moon and other celestial bodies. This resulted in the establishment of a legal regime based on CHM principle. The Moon Agreement does not impose a total prohibition on the exploitation of the natural

\textsuperscript{119} Supra note 34, p. 1059.

\textsuperscript{120} Therefore the earthly experience in the allocation of resources is not of much help in the allocation of the resources of the moon and other celestial bodies. Myres S. McDougal, Harold D. Lasswell and Ivan A. Vlasic, \textit{Law and Public Order in Space}, (New Haven: Yale University Press, 1963) pp. 867 & 868.
resources of the moon and other celestial bodies, but it prohibits individual appropriation of such resources to avoid conflicts.\textsuperscript{121} Any exploitation subject to CHM regime is expressly permitted by the Moon Agreement, as it avoids conflicts through a system of sharing of the benefits. Therefore any interpretation that contravenes said objective is unacceptable.

Another interesting issue for consideration is the legal status of the resources of comets having orbit stretching from our solar system to outside the solar system. The provisions of the Moon Agreement apply only to the moon and other celestial bodies within the solar system.\textsuperscript{122} Therefore the unanswered question is, whether they can be appropriated in contravention of the Moon Agreement when they are outside the solar system? Some authors opine that private appropriation of some asteroids and comets would be allowed not because celestial bodies can be privately appropriated, but because they escape


\textsuperscript{122} Article 1(1) of the Moon Agreement.
non-appropriation principle, being in fact not celestial bodies in the legal sense.\textsuperscript{123}

Similar to comets, meteoroids may also have changing legal status. They are considered as celestial bodies when they are in outer space. Accordingly, they are subject to CHM regime proposed by the Moon Agreement. But their status change when they fall on the earth. Generally they are considered to be the property of the state on the territory of which they have fallen. However the legal status of the meteoroids fallen outside the state jurisdiction remain unclear.\textsuperscript{124}

These factors make it clear that the legal regime governing the exploitation of the resources of the moon and other celestial bodies need to be strengthened. The protection of said resources must consist of measures for their preservation as well as rational utilization. What is required is not an illogical ban on the utilization of the natural resources of the moon and other


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celestial bodies, but an effective legal regime as stipulated under Article 11(5) and (7) of the Moon Agreement with an object to reconcile the interests of those states capable and desirous of exploiting the natural resources of the moon and other celestial bodies on the one hand, and the common interest of mankind on the other hand.\textsuperscript{125} Such a regime could be established only by doing away with the fundamental conceptual differences between various groups of states based on different possibilities, demands and necessities.\textsuperscript{126}

Any system of distribution of benefits derived from the resources of the moon and other celestial bodies presupposes the existence of an impartial international authority. Unfortunately, unlike the Law of the Sea Convention, the Moon Agreement failed to take the final step in establishing such a functional authority.\textsuperscript{127} Therefore one of the reasons why the common resources, especially found in the Antarctic and on the moon and other celestial bodies, are not yet exploited is the failure of the Moon Agreement to bring about a legal regime that could reconcile the interests of those states that wish to exploit the resources of celestial bodies with the common interest of mankind. This failure is due to the inability of the international community to overcome the conceptual differences between various groups of states based on different possibilities, demands and necessities.

\textsuperscript{125} Supra note 20, pp. 1 & 2.


bodies, suffer from a lack of practical solutions is the absence of a single organization responsible as a trustee of these resources.\textsuperscript{128}

An organisation, by name United Societies in Space Inc. (USIS), has proposed the establishment of Lunar Economic Development Authority (LEDA), which reflects a municipal style entity with special quasi-public authority.\textsuperscript{129} It has tendered to congresses and parliaments worldwide for sponsorship. However this sort of ad-hoc arrangement, which may act as tool in the hands of the developed countries, must be discouraged. The possibility of such an authority acting impartially is too remote. The range of issues to be considered in the acquisition and enforcement of rights in the resources of the moon and other celestial bodies show the need for adequate representation of all concerned in any body attempting to determine these matters.\textsuperscript{130} Therefore


any attempt to establish such an impartial authority needs to be initiated by a well-established international organization such as United Nations.

5.3: Problem of Military Activities on the Moon and Other Celestial Bodies

The world history shows that the struggle for power originated right from the birth of human beings. This struggle for power has necessitated the necessary evil of accumulation of military power. Now with the development in technology the mankind has accumulated so much of military power that could destroy the whole world several times. The advent of space took place at the time when struggle for power between the two superpowers was at its peak.\textsuperscript{131} As both the superpowers were very much aware of the fact that whoever controls the outer space will win the race, they started thinking in terms of militarization of the outer space including the moon and other celestial bodies.\textsuperscript{132} Though the world community was quick to respond to the problem of militarization of outer space, the superpowers, by then, were so much involved

\textsuperscript{131} In fact, the main drive behind the spectacular progress in space activities has been the unrelenting quest for military supremacy. Vishwanath More, ‘Military Uses of Outer Space: A Politico-Legal Perspective’, \textit{Indian Journal of International Law}, Vol. 8, 1968, pp. 329 - 347 at p. 329.

in the cold war that neither of them was in a position to give up the task of establishing its supremacy.\textsuperscript{133} As discussed in the previous chapter, this has resulted in the blatant violation of the provisions of UN General Assembly resolutions and treaties on demilitarization of outer space.

The activities of the super powers in the outer space reflected the power race by making the realm of outer space an extension of the traditional theaters of cold war.\textsuperscript{134} By 1980’s, the Soviet Union made tremendous achievements in the field of nuclear warhead missiles. In order to counter the Soviet achievements, the United States started thinking in terms of developing space-based weapons.\textsuperscript{135} On 23 March 1983, President Ronald Reagan declared a mega project, Strategic Defense Initiative (SDI), popularly known as ‘Star War’ program.\textsuperscript{136} The program was designed to develop the ground-based and space-based defense systems to destroy the ballistic missiles. The space-based defense system included the launching of the anti-ballistic missiles from

\begin{itemize}
  \item \textsuperscript{134} See M. N. Golovine, \textit{Conflict in Space}, (New York: St Martin’s, 1962) pp. 18 - 36.
  \item \textsuperscript{136} SDI was an anti-ballistic missile program designed to intercept and destroy the ballistic missiles in flight. It gained the popular name Star Wars after the 1977 movie by George Lucas.
\end{itemize}
artificial satellites and celestial bodies. The SDI was the first attempt towards the active deployment of the space weapons instead of passive military space systems.

The first question that came into picture soon after the declaration of the mega project was about the nature of the project. There was a widespread doubt as to whether the SDI would be defensive or offensive. President Reagan, while speaking about the defensive nature of the project, said, “The United States does not start fights. We will never be an aggressor. We maintain our strength in order to deter and defend against aggression - to preserve freedom and peace.” The United States also advocated that the SDI serves as

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137 The space segment of the SDI was planned to consist of anti-ballistic missiles placed in the earth’s orbit as well as on the celestial bodies, and the operation of such missiles were intended to be controlled by the ground control facility. The kind of such intercepting missiles was not specified.


deterrence to any offensive step by the states, and thus ensures the worldwide security.\footnote{Subrata Roy Chowdhury, ‘Outer Space Without Arms: Substratum of a Peaceful Regime for Common Benefit’, \textit{Asian Yearbook of International Law}, Vol. 4, 1994, pp. 3 - 24 at p. 14.}

President Reagan’s assurance as to the defensive nature of the program was not convincing. Other states did not view the SDI as just defensive. Soviet Union clearly stated that the SDI would increase the quantity and quality of strategic offensive weapons. The Star Wars, according to the Soviet Union, would trigger off an uncontrolled and unmanageable arms race in all spheres to turn the strategic balance into strategic chaos, and the Soviet Union would have no alternative except to take counter measures to overcome the shadow of terror to the world.\footnote{Supra note 139, p. 210.} Apart from the Soviet Union, many countries including the US allies were not sure about the nature of the program. This is evident from the fact that the US allies such as Canada, Denmark, France, Greece, Norway and Australia have explicitly declined to participate in the SDI program. Even the scientists involved in SDI research had doubt about the defensive purpose and leak proofness of SDI program. Nationwide, nearly
7,000 scientists including 15 Nobel laureates in physics and chemistry strongly opposed the program.\footnote{J. N. Singh, *Outer Space, Outer Sea, Outer Land and International Law*, (New Delhi: Harnam Publications, 1987) p. 90.}

There is no doubt that the SDI was in clear violation of the international norms. Though the program *per se* violated Article IV of the Outer Space Treaty, the United States was able to put forward its plan cleverly with the colour of peaceful uses. It advocated SDI as non-aggressive military use, which is not prohibited by Article IV of the Outer Space Treaty.\footnote{As discussed in the previous chapter, the United Sates contended that the term ‘peaceful uses’ under Article IV means non-aggressive uses and not non-military uses.} In addition, another major hurdle existed in the way of SDI, the Anti-Ballistic Missile Treaty,\footnote{The Anti-Ballistic Missile Treaty is a bilateral treaty between the United States and the Soviet Union signed in 1972. Hereinafter referred to as the ABM Treaty.} was sacrificed by the United States to legalize its mega project.\footnote{See generally Pamela L. Meredith, “The Legality of a High-Technology Missile Defense System: The ABM and Outer Space Treaties,” *American Journal of International Law*, Vol. 78, No. 2, April 1984, pp. 418 - 423.} Despite the fact that Article V of the ABM Treaty expressly prohibits the parties from developing, testing or deploying anti-ballistic missile systems or components which are sea-based, air-based, space-based or mobile land-based,
the United States misinterpreted the provision to mean that anti-ballistic missile systems with weapons based on new technologies, non-existent at the time of signing the ABM Treaty would be free of prohibition. The United States also contended that SDI is only a research program, which is not prohibited by the ABM Treaty. Finally, in 2002 US also withdrew from the ABM Treaty.

The Soviet Union countered the US program by proposing ‘Star Peace’ program. It called for the establishment of a World Space Organisation and proposed for conveying an international conference by 1987 to consider the problem of outer space exclusively. Soviet Union was able to receive support from most other states. However, the United States continued with its unilateral action, despite knowing the fact that SDI was opposed by almost all the states. Thankfully, with the end of cold war, the United States’ government lost its interest in SDI as a mega project.

However the problem of militarisation of outer space, the moon and other celestial bodies did not end with the cold war. Despite the end of cold war the space militarization process is continuing, although it has been forced to

147 Supra note 139, p. 215.
148 Supra note 133, p. 65.
149 At the end of 2001, the United States had nearly 110 operational military spacecrafts orbiting the earth. Russia had about 40 and rest of the world had about 20 such satellites. See John Pike, ‘The
slow down in the modern period of time.\footnote{Several bilateral and multilateral disarmament agreements after the cold war period have to a certain extent established new relationship between the former adversaries. I. A. Vlasic, ‘Space Law and the Military Applications of Space Technology’, in Nandasiri Jasentuliyana (ed.), \textit{Perspectives on International Law}, (London: Kluwer Law International, 1995) pp. 385 - 410 at p. 408.} It is reflected in the subsequent declarations made by the United States as well as Russia. In 1996 General Joseph W. Ashy, head of the USA Space Command, declared that “we are going to fight in space...some people don’t want to hear this and it isn’t in vogue...but - absolutely - we are going to fight in space.”\footnote{Jose Monserrat Filho, ‘Total Militarization of Space and Space Law: The Future of the Article IV of the 67’ Outer Space Treaty’, \textit{Proceedings of the Fortieth Colloquium on the Law of Outer Space}, 6 - 10 October 1997, Published in 1998, pp. 358 - 369 at p. 359.} In 1997 the US Space Command published Vision for 2020 highlighting some militarization concepts like, ‘the ability to dominate space’ and ‘the application of precision force from, to, and through space’.\footnote{Johannes M. Wolff, ‘Peaceful Uses of Outer Space has permitted its Militarization - Does it also mean its Weaponization?’ \textit{Disarmament Forum}, Vol. 1, 2003, pp. 5 - 13 at p. 10.} Similarly in August 2005, Russian Defense Minister Sergei Ivanov, during the official visit to China, said, “Russia
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has the ability for an adequate response to the countries that orbit their weapons”.

The fact that the United States has lost its interest in SDI does not mean that the program has disappeared altogether. Especially after the anti-satellite missile test by China, the fear of rebirth of SDI program has arisen. As the Chinese action was directed mainly against the US supremacy in the outer space, the US response to it has become crucial. The Chinese act has been


155 In 2002, China and Russia proposed a treaty banning the deployment of weapons in space or attacks against space-based objects. They thought that the American missile defense system would lead to increasing use of space for military purpose and fuel an arms race. But the United States refused to negotiate on the ground that a treaty would be unenforceable and would only give an advantage to countries that are trying to hide their efforts to develop weapons for use in space. This resulted in China shifting its gear in the field of space technology. China’s space program entered a new era with its first manned space flight in 2003 and second in 2005. Now it took a step forward by destroying a redundant weather satellite with a missile. See http://www.economist.com/displayStory.cfm?story_id=8579371 (Accessed on 08 February 2007, 6:08 pm) Also see
opposed by most of the states including United States, Australia, South Korea, Canada, Britain, Japan and India. The voices were also raised in the United States to answer the Chinese challenge by military means. The United States did not take any direct action against the Chinese test. But now after one year, the United States has tested its anti-satellite missile by


159 Jane Macartney, Richard Beeston and Tim Reid, ‘China Tries to Reassure the World on Space Missile Aimed at Peace’, [http://www.timesonline.co.uk/article/0,,3-2556823,00.html (Accessed on 08 February 2007, 5:30 pm)]


destroying one of its spy satellites under the garb of prevention of damage on the surface of the earth in the event of its fall.\textsuperscript{165}

Therefore the situation at present depicts an unhealthy state of affair.\textsuperscript{166} On the one hand, we have a legal framework governing the demilitarization of the moon and other celestial bodies, which is already found faulty during the cold war period. On the other hand, the world is witnessing the preparedness of states other than superpowers to enter into the weaponization race.\textsuperscript{167} So a meticulous thinking in terms of strengthening the provisions relating to demilitarization of outer space, the moon and other celestial bodies is required. The issue needs to be addressed on the priority basis, as the existing situation is patently inimical to the maintenance of the international peace and security.

\textsuperscript{165} On 20 February 2008, US destroyed its spy satellite, USA 193.


\textsuperscript{167} Article IV of the Outer Space Treaty, which is supposed to be the central provision for curbing the militarization of the outer space, is having the opposite effect. The space powers are acting on the premise that what is specifically not prohibited under the Treaty is permissible and lawful. Joseph A. Bosco, ‘International Law Regarding Outer Space - An Overview’, Journal of Air Law and Commerce, Vol. 55, No. 3, Spring 1990, pp. 609 - 651 at p. 631.
5.4: Damage to the Environment of the Moon and Other Celestial Bodies

No doubt, the space technology is of great use to the mankind as a whole. But the benefits consequent to tremendous development in the space technology are not free of cost. Apart from huge expenditure involved in launching the satellites, cost is also paid in terms of pollution of the environment of space, the moon and other celestial bodies. Just like the pollution of the earth’s environment, the pollution of environment of the moon and other celestial bodies is a matter of great concern since the preservation of their environment is the pre-requisite for the continuation and expansion of the space ventures and for the long term deriving of benefits. The question of prevention of adverse impact on the overall success of space activity needs to be responded by avoiding undue harm to the natural environment of the outer space, the moon and other celestial bodies. The major sources of pollution of outer space, the moon and other celestial bodies are the space debris, chemical effluents, biological and radiological contaminants.

168 The pollution of the environment of outer space, the moon and other celestial bodies is an inevitable product of exploration and use. Alesia McCloud, ‘Space Pollution’, Proceedings of the Thirtieth Colloquium on Law of the Outer Space, 10 - 17 October 1987, Published in 1988, pp. 142 - 146 at p. 142.
Space Debris

Space debris stands as an important obstacle in the expansion of the space activities. Since the beginning of the space age, thousands of objects have been launched into the outer space and they are revolving in the orbit even after they have become inactive. In addition, the explosions and break-ups of active and inactive spacecrafts have added more debris to the outer space. The first break-up of the satellite occurred in 1961, when an Ablestar rocket exploded due to an unknown cause, releasing hundreds of pieces of debris. Since then a number of explosions of spacecrafts have been recorded. There are also a number of intentional explosions in the form of Anti-satellite Tests by the former Soviet Union, United States and recently by China.


171 The Chinese anti-satellite weapon test conducted on 11 January 2007 is the largest space debris production incident in the history. The event created more than 800 pieces of traceable debris of baseball size or more, over 40,000 pieces with the size between 1cm and 10 cm and roughly 2 million fragments of size 1mm or larger. Jeffrey Lewis, ‘Chinese ASAT Likely Made Massive Debris’
The space debris is also increasing rapidly by the collisions between the orbiting objects. As the number of spacecrafts and debris produced by them is increasing fast, the probability that two objects meet and generate more debris is increasing. These debris remain in the orbits until the natural forces cause them to decay into the atmosphere, which is a lengthy process. The fifty years of operation of spacecrafts has deposited thousands of inactive play loads, tens of thousands of traceable objects of measurable size and millions of smaller fragments into the earth’s orbit.\(^{172}\) These debris not only obstruct the space activities by posing the threat of collision,\(^{173}\) but also carry the risk of falling on the earth,\(^{174}\) the moon and other celestial bodies causing serious environmental

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\(^{173}\) A debris as small as 1cm in diameter has enough kinetic energy to disable a medium-sized spacecraft.

http://www.windows.ucar.edu/tour/link=/headline_universe/space_debris_update.html&edu=high

(Accessed on 13 July 2007, 5:28 pm). The problem of collision with the debris has resulted in the 1986 Challenger disaster and the 2003 Columbia disaster, each taking away the valuable lives of seven astronauts.

\(^{174}\) There are examples of falling of inactive spacecrafts on the earth polluting the earth’s atmosphere and causing injury to people. A Japanese ship was hit by pieces of space debris and five sailors were injured in 1969. In 1978, Soviet Satellite Cosmos 954 fell on Canada’s Northwest Territory and in the
damage. Moreover, the orbiting debris hinders the observation of faraway celestial bodies.

Chemical Effluents

The release of chemical effluents during the launch and operation of spacecraft have adverse impact on scientific observations and can provoke changes in the natural state of the environment of the moon and other celestial bodies. The chemicals may be intentionally released for scientific purposes or might result from the exhaust of rockets which burn fuel to achieve propulsion. In addition, the possibility of nuclear and other chemical weapon

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testing on the moon and other celestial bodies by the technologically developed states cannot be ruled out.\textsuperscript{177} The release of carbon dioxide by the exhaustion of the rocket fuel and other chemical testing plays a significant role in the greenhouse effect.\textsuperscript{178} As these chemicals remain in the moon and other celestial bodies for a long period of time, they trigger series of changes in their environment.

\textit{Biological Contamination}

The possibility of biological contamination is a problem which attracted the attention of the world community since the beginning of the space exploration.\textsuperscript{179} The life forms found on the earth and if found on the moon and other celestial bodies would certainly be different in nature. The introduction of organisms from the earth to the moon and other celestial bodies\textsuperscript{180} or vice-

\textsuperscript{177} http://www.breitbart.com/article.php?id=D8SETSN80&show_article=1 (Accessed on 02 December 2007, 5:50 pm)


\textsuperscript{180} The phenomenon is referred to as forward contamination.
versa leads to biological contamination. The missions to the moon and other celestial bodies carry the risk of biological contamination due to the fact that it is highly impossible to disinfect the spacecrafts entirely before launch as well as before return to the earth.

The forward contamination is a matter of greater concern than back contamination, as the life forms are yet to be found on the moon and other celestial bodies. However the possibility of the mutation of the organisms in the course of forward contamination and their return to the earth by way of back contamination cannot be ruled out. The introduction of the organisms to the moon and other celestial bodies would jeopardize the integrity of scientific

181 Popularly known as back contamination.

182 For instance, the introduction of blue-green algae into the upper atmosphere of Venus would result in the reduction of high carbon-dioxide content of the atmosphere of Venus and consequently it would lower the temperature by as much as hundreds of degrees. Stephen Gorove, 'Legal Aspects of Pollution and Outer Space', *Proceedings of the Fourteenth Colloquium on Law of the Outer Space*, 20 - 25 September 1971, Published in 1972, pp. 67 - 71 at p. 68.
investigation relating to the indigenous forms of life. It may also result in deleterious environmental consequences.

**Radioactive Pollutants**

The emission of electromagnetic waves by the radioactive materials used in the space missions is also a matter of serious concern. The powerful radio transmitters located on the earth or in space generate electric and magnetic fields over large areas, which disturb satellite telecommunications and radio astronomy observations. The use of nuclear power sources in the satellites needs a special concern, as it has the potential to cause severe environmental damage in the moon and other celestial bodies as well as in the earth’s environment when it re-enters the atmosphere. The re-entry of Soviet

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183 No indigenous life is found on the moon and other celestial bodies till date. But it would be premature to conclude that life does not exist anywhere else in the solar system.


satellite Cosmos - 954 on 24 January 1978 resulting in damage to Canada and falling of United States’ Skylab on 3 July 1979\textsuperscript{186} are the glaring examples of such pollution. Same kind of damage also occurs in the moon and other celestial bodies when the satellites carrying the radioactive materials make hard landing on their surface.

In addition to the above sources of pollution, the damage to the environment of the moon and other celestial bodies can occur by the mere human presence on them.\textsuperscript{187} The manned and the unmanned crafts that have landed on the moon and mars have altered their surface by scattering of medallions, the tracks of roving vehicles and the footprints of men. These changes are permanent, as the moon and other celestial bodies have no substantial atmosphere to erase the surface residue of man’s presence. The future plans of interplanetary missions would further disrupt the environment of the moon and other celestial bodies.\textsuperscript{188} Moreover, if the mankind decides to


\textsuperscript{188} \textit{Supra} note 184, p. 99.
mine the moon and other celestial bodies, the environment impact would increase significantly.\textsuperscript{189}

5.4.1: Scientific Response to the Regulation of Damage to the Environment of the Moon and Other Celestial Bodies

The problem of pollution of environment of the moon and other celestial bodies is addressed by both scientific and legal community. Though both were late to recognize and address the issue, the problem of pollution of the column above the airspace started along with the launching of first space object, Sputnik - I. Now it is well-known that the dangers resulting from the gradual pollution of the environment of the moon and other celestial bodies can no longer be ignored.\textsuperscript{190} According to Wassenbergh, the protection of the space environment is more a scientific/technical problem than a legal problem.\textsuperscript{191}

\textsuperscript{189} As it is evident from the terrestrial experience, when exploration becomes exploitation, the environment tends to suffer. Mark Williamson, ‘Protection of the Space Environment Under the Outer Space Treaty’, \textit{Proceedings of the Fourtieth Colloquium on Law of the Outer Space}, 6 - 10 October 1997, Published in 1998, pp. 296 - 302 at p. 298.


scientific efforts are directed towards the reduction of debris creation and biological contamination.

The scientists have devised a debris removal program, popularly known as ‘Orion’, which uses laser and earth-bound sensors to detect, track and eliminate the debris by removing the fragments from the orbit to burn up in the earth’s atmosphere. However the economic feasibility of de-orbiting the debris has come into question, as the process of de-orbiting requires too much fuel. This has resulted in devising a plan to bring the debris to an orbit where the automatic drag would cause it to de-orbit after some years. Such a plan was successfully performed with the French Spot - I satellite at the end of 2003. It is expected to re-enter the atmosphere in approximately 15 years.\(^\text{192}\)

Another substitute proposed is to bring the debris to a graveyard orbit where no operational satellites are present. This graveyard orbit is planned to be a very high orbit above the geostationary orbit, as the lower zones are extensively used for space activities.\(^\text{193}\) Diederiks-Verschoor puts forward an


interesting proposition that the salvage system\textsuperscript{194} should be introduced to outer space with special emphasis on the protection of the environment.\textsuperscript{195} In addition to above plans, steps are also taken to minimize new debris emissions by preventing the explosion of energy storage devices within satellites, reducing the number of mission related objects and by developing reusable launch components.\textsuperscript{196}

The COSPAR has promulgated the guidelines for the regulation of the biological contamination.\textsuperscript{197} It obligates the states to take active measures to sterilize the spacecraft before launch. However the guidelines are significantly relaxed in the recent period of time. It is due to the fact that the extraterrestrial life is not found till date, and also due to the understanding of inhospitable conditions to life existing on the moon and other celestial bodies.\textsuperscript{198}

\textsuperscript{194} Salvage system is widely used in the sea. Marine salvage is a process of rescuing the ship, its cargo, and crew during distress, as well as protecting the marine environment from the effects of shipwreck. [http://www.marine-salvage.com/ (Accessed on 22 December 2007, 3:15 p.m)]

\textsuperscript{195} Supra note 193, pp. 78 & 79.

\textsuperscript{196} Supra note 172.

\textsuperscript{197} Popularly known as COSPAR Planetary Quarantine Requirements.

\textsuperscript{198} Supra note 184, p. 105.
5.4.2: Legal Response to the Problem

As discussed in the previous chapter, the legal fraternity is also involved in finding a viable solution to the problem of pollution of the environment of the moon and other celestial bodies. Though the solution is to be found more in scientific/technical terms, the appropriate legal framework to supplement the technical aspects was always found necessary. The legal regime governing the protection of the environment of the moon and other celestial bodies is based on the customary international law\(^{199}\) as well as the space treaties. While the customary international law speaks about the general obligations of the states, the space treaties impose specific obligations to protect and preserve the environment of the moon and other celestial bodies. Despite the fact that the legal regulations specified in the space treaties are directed towards the much-

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\(^{199}\) One of the well-established principles of the customary international law is that the states are responsible for ensuring that activities within their jurisdiction do not cause any damage to the territories outside their jurisdiction. This principle is also incorporated into many international agreements. Glaring example of such incorporation is the Stockholm Declaration, 1972. See A. Kiss, ‘The International Protection of the Environment’, in R. J. MacDonald and D. M. Johnson (ed), *The Structure and Process of International Law*, (Netherlands: Martinus Nijhoff, 1986) pp. 1074 - 1075.
needed sustainable development,\textsuperscript{200} they suffer from the loopholes pointed out in the last chapter.

The risks of harm to the environment of the moon and other celestial bodies due to human activities on them were not apparent during negotiations for the space treaties.\textsuperscript{201} The value of the moon and other celestial bodies was limited to their use as a medium to conduct different activities, and any activity on them was considered as harmful to their environment if and only if that activity threatens their future use for conducting the activities.\textsuperscript{202} Therefore Article IX of the Outer Space Treaty is more oriented towards the prevention of back contamination rather than forward contamination.\textsuperscript{203} It is important to note here that there is a close link between the contamination of the environment of the moon and other celestial bodies and the earth’s environment. Because as

\textsuperscript{200} Sustainable development strikes a balance between the rights of present and the future generations by allowing the present generation to utilize the resources to the maximum extent, without affecting the rights of future generations over such resources.


\textsuperscript{202} \textit{Ibid}, p. 60.

\textsuperscript{203} It only prohibits the adverse changes in the earth’s environment, and fails to deal with the adverse changes in the existing balance of the environment of the moon and other celestial bodies.
mentioned above, the source of the first can be at the same time the source of the other.

An attempt to rectify the failure of the Outer Space Treaty to address the issue of forward contamination is made in the Moon Agreement. Article 7 and 11 of the Moon Agreement are undoubtedly marked improvement over the provisions relating to environmental protection under the Outer Space Treaty. However this development is negated by the developed countries by not ratifying the Moon Agreement. Moreover Article 7 lacks the much needed sanction mechanism to assign penalties and mandate repatriation for any damage caused.\textsuperscript{204}

\textit{Question of Liability for Polluting the Environment of the Moon and Other Celestial Bodies}

The most striking loophole in the regime governing the protection of the environment of the moon and other celestial bodies is the failure to address the issue of liability for polluting their environment. Neither the customary

\textsuperscript{204} \textit{Supra} note 190, p. 431.
international law\textsuperscript{205} nor the space treaties impose concrete obligations on states to prevent such pollution.\textsuperscript{206} At the outset Article VII of the Outer Space Treaty and the provisions of the Liability Convention seem to cover the entire area of liability for conducting the outer space activities. Article VII of the Outer Space Treaty fixes the liability on state launching an object into outer space including the moon and other celestial bodies for injuries caused by such object to another state or to natural or juridical persons, whether on earth, in airspace or in outer space. The provisions of the Liability Convention supplement the above Article. It imposes an absolute liability on the launching state to pay compensation to any damage caused by its space object on the surface of the earth or to an aircraft in flight.\textsuperscript{207} In addition, the state incurs a fault-based

\textsuperscript{205} There was a debate over the implications of Principle 21 of Stockholm Declaration 1972, which while guaranteeing the right of the states to exploit their resources, imposes an obligation not to cause damage to the environment of other states as well as of areas beyond the limits of national jurisdiction. The Principle has attained the binding force, as it is considered to reflect the customary international law. However, the translation of Principle 21 into a customary international law liability regime for damage to the environment of the moon and other celestial bodies is far from clear. Kathy Leigh, ‘Liability for Damage to the Global Commons’, \textit{Australian Year Book of International Law,} Vol. 14, 1993, pp. 129 - 156 at pp. 134 - 135.

\textsuperscript{206} \textit{Supra} note 185, p. 482.

\textsuperscript{207} Article II of the Liability Convention.
liability for any damage caused elsewhere than on the surface of the earth to a space object or to persons or property on board such a space object.\footnote{Article II of the Liability Convention.}

Though wide-ranging provisions on liability for space activities are mentioned in the Outer Space Treaty and the Liability Convention, the question of liability for damage to the environment of the moon and other celestial bodies remains unanswered. The launching state incurs liability only for damage caused on the surface of the earth, to aircraft in flight, to space object in orbit and to persons or property on board such object. Moreover the Liability Convention defines damage as “loss of life, personal injury or other impairment of health; or loss of or damage to property of states or of persons, natural or juridical, or property of international intergovernmental organizations”.\footnote{Article I (a) of the Liability Convention.} The moon and other celestial bodies are not the property of any state or organization.\footnote{Article I of the Outer Space Treaty.} Therefore the damage caused to their environment \textit{per se} is not subject to the liability regime. As a result the launching state cannot be compelled to pay compensation for the damage caused to environment of the moon and other celestial bodies by creating the danger of debris, or by introducing chemical, biological or radiological contaminants. This means the
essential implementation norm to protect and preserve the environment of the moon and other celestial bodies is missing in the existing space law. 211

In addition, the provision of fault based liability for damage caused in outer space, the moon and other celestial bodies by the space objects suffer from several loopholes. Though the definition of space object under the Convention covers space debris, 212 it is quite difficult to identify the state to which the debris belongs. Keeping record of each debris is not an easy task. Moreover the provision also contains a difficult task of ascertaining fault in outer space or on the moon and other celestial bodies. 213


212 Article I (d): The term ‘space object’ includes component parts of a space object as well as its launch vehicle and parts thereof.

Article 14 of the Moon Agreement recognizes the insufficiency of the provisions existing in the Outer Space Treaty and the Liability Convention.\textsuperscript{214} It calls the States Parties to make detailed arrangements concerning liability for damage caused on the moon and other celestial bodies due to extensive activities on them. Though the provision does not specify the type of damage covered, it can be used to fill the gaps existing in the regime governing the protection of environment of the moon and other celestial bodies. Unfortunately, as the Moon Agreement is not ratified by any space-faring nation, no such arrangement is made till date.

Thus the above discussion shows that the space liability regime needs a rethinking in the light of liability for causing damage to the environment of the moon and other celestial bodies. The damage caused to the environment of the moon and other celestial bodies constitutes much serious damage than other damage addressed under the Convention, as it affects the right of all the states to freely explore and use them. Such damage also deprives the right of future

\textsuperscript{214} Article 14 (2) - States Parties recognize that detailed arrangements concerning liability for damage caused on the moon, in addition to the provisions 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 and the Convention on International Liability for Damage Caused by Space Objects, may become necessary as a result of more extensive activities on the moon. Any such arrangements shall be elaborated in accordance with the procedure provided for in article 18 of this Agreement.
generation over the moon and other celestial bodies and neglects the "maximum sustainable yield" permitted under the concept of sustainable development. Therefore a system of absolute liability for polluting the environment of the moon and other celestial bodies needs to be adopted to keep them unpolluted for the benefit of present as well as future generation. The nations may be compelled to pay the compensation based on their proportional contribution to the debris creation. The collected amount should go to the pool that would pay for cleanup.

5.5: Activities on the Moon and Other Celestial Bodies - Responsibility and Liability Regime

The activities on the moon and other celestial bodies bring forward another important question, i.e., the question relating to the responsibility and liability for such activities. At present, Article VI and VII of the Outer Space Treaty, Article III of the Liability Convention and Article 14 of the Moon Agreement deal with the issue of responsibility and liability for the activities on

\[215\] Exploration of the resources to the maximum level while maintaining a sufficient basis of resources for the future use.

the moon and other celestial bodies. Article VI of the Outer Space Treaty and Article 14 of the Moon Agreement state that the States Parties to the treaty must bear international responsibility for all national activities on the moon and other celestial bodies. Both the provisions extend the state responsibility to private activities on the moon and other celestial bodies.


218 States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. 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. When activities are carried on in outer space, including the moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.

219 Article 14 (1) - State Parties to this Agreement shall bear international responsibility for national activities on the moon, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in this Agreement. States Parties shall ensure that the non-governmental entities under their jurisdiction shall engage in activities on the moon only under the authority and continuing supervision of the appropriate State Party.

220 In other words, the states are responsible to the same extent for private activities as they are for the public activities. Frans G. von der Dunk, ‘Sovereignty Versus Space - Public Law and Private Launch
However the private activities on the moon and other celestial bodies should be conducted under the authorization and continuing supervision of the appropriate state.

The attribution of the responsibility exclusively on the states is based on the logic that the activities on the moon and other celestial bodies are risky and someone must bear responsibility in case of any mishap.\textsuperscript{221} In most of the cases, the private entities may escape from responsibility on various grounds, like bankruptcy, shelter of municipal law etc. Therefore the states are obligated to control the activities of their private entities on the moon and other celestial bodies. The space treaties impose this obligation on the states by way of attributing the responsibility for failure to control the activities of their private entities. The blame attribution compels the states to affirmatively plan for and take protective measures in their activities as well as in the activities of their private entities on the moon and other celestial bodies.\textsuperscript{222}


The regulation of the space activities is generally done by the licensing requirement under the municipal law of the state. In United States, the Commercial Space Launch Act 1984 has established Office of Commercial Space Transportation\textsuperscript{223} for licensing every space venture. Similar system of licensing is also found in the Outer Space Act 1986 passed by the United Kingdom.\textsuperscript{224} The license may consist of a clause for reimbursement in case the state makes any payment of damages for private activities.\textsuperscript{225} The provision to this effect can be found in both the UK and US legislation.\textsuperscript{226}

Article VII of the Outer Space Treaty\textsuperscript{227} and Article III of the Liability Convention\textsuperscript{228} impose liability on the launching state for the activities on the

\textsuperscript{223} It was established as a part of Department of Transportation.

\textsuperscript{224} Section 3 of the Outer Space Act.


\textsuperscript{227} Each State Party to the treaty that launches or procures the launching of an object into outer space, including the moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its
moon and other celestial bodies. Unlike the Liability Convention, the Outer Space Treaty makes no distinction between the liability for damage caused on the surface of the earth or to the aircraft in flight, and for damage caused to a space object elsewhere than on the surface of the earth. The former is subject to the absolute liability regime and the latter is subject to the fault liability regime under the Liability Convention. Neither the Outer Space Treaty nor the Liability Convention speaks about the liability of the private entities for the activities on the moon and other celestial bodies. Again it can be presumed that the states in which the private entities conduct their operation are liable for the activities of the private entities, as they fall within the ambit of at least one of the criteria mentioned in the meaning of the launching state.\(^229\)

Unfortunately, the existing provisions relating to the responsibility and liability for the activities on the moon and other celestial bodies suffer from

\(^{228}\) In the event of damage being caused elsewhere than on the surface of the earth to a space object of one launching state or to persons or property on board such a space object by a space object of another launching state, the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible.

\(^{229}\) Article I (c) of the Liability Convention - The term 'launching State' means:

(i) a state which launches or procures the launching of a space object;
many loopholes.\textsuperscript{230} Though there is wide range of provisions on the subject, they are vague and confusing especially in the light of the recent developments. Following are some of the major loopholes in the regime.

\textit{Firstly}, the Outer Space Treaty and the Moon Agreement impose a duty on appropriate state to authorize and supervise private activities on the moon and other celestial bodies, but they fail to define ‘appropriate state’ in clear terms.\textsuperscript{231} Though the term used here is ‘appropriate state’, its meaning is not confined to one single state. There might be several states that may fall within the ambit of ‘appropriate state’. Moreover, the term appropriate state is sufficiently vague to allow several interpretations. Some of the possible interpretations are, the state which exercises jurisdiction and control over the private enterprise, the launching state, the registration state, state of nationality, state which owns the space device etc. This vagueness has created confusion in

\begin{itemize}
  \item[(ii)] a State from whose territory or facility a space object is launched;
\end{itemize}


determining the state that incurs responsibility for private activities on the moon and other celestial bodies.

Secondly, the responsibility regime provided under the Outer Space Treaty and the Moon Agreement is not in conformity with the traditional notion of state responsibility. Traditionally the state can be made responsible for the act or omission of the individuals only when it can be attributed to state.\textsuperscript{232} When the individual act cannot be attributed to the state, the state responsibility for injurious acts of the private persons is limited to the extent of failure of the state to exercise due diligence in punishing the offenders and compelling them to pay damages.\textsuperscript{233} Thus in \textit{Janes Claim},\textsuperscript{234} Mexico was held responsible for its failure to apprehend and punish the private individuals who killed Janes and not for the death of Janes at the hands of those individuals.\textsuperscript{235}

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\textsuperscript{234} \textit{US v. Mexico} (1926) 4 RIAA 82.

\textsuperscript{235} Therefore state responsibility may arise both for breach of international obligations and also for other infringements of legal duty, such as failure to prosecute and punish the offenders within the state. Ruwantissa I. R. Abeyratne, \textit{Frontiers of Aerospace Law}, (Aldershot: Ashgate, 2002) p. 69.
\end{flushleft}
As discussed above, the Outer Space Treaty and the Moon Agreement make no distinction between the acts of the government entities and the private entities in attributing the blame to the states. This is not in conformity with the well-established principles of justice and equity. It is the accepted proposition that one who derives the benefit must also incur burden. As the states are not benefited from the private activities on the moon and other celestial bodies, they should not be compelled to incur burden. At present, the need for rethinking of such blame attribution on the states has multiplied due to the fact that the states are losing control over the private space activities due to the rapid technological development.

The scholars have expressed different suggestions to overcome the difficulty of state responsibility and liability for private activities on the moon and other celestial bodies. The suggestions vary from the idea of setting up international warranty fund\textsuperscript{236} to obtaining mandatory insurance cover for meeting the damages. There are also advocates of the proposition that the private entities should be held directly responsible for their activities on the moon and other celestial bodies and the state exercising jurisdiction over them

should be responsible indirectly.\textsuperscript{237} It would be unjustifiable, if we continue with the present policy of imposing the unnecessary burden on the states for the private activities on the moon and other celestial bodies.

\textit{Thirdly}, the Outer Space Treaty, the Liability Convention and the Moon Agreement do not recognize the distinction between state responsibility and state liability in their modern sense.\textsuperscript{238} The essential distinction between the state responsibility and state liability is that the prerequisite to the former is an act breaching international law and to the latter is the harmful effect of an activity,\textsuperscript{239} which is not per se a violation of the international law.\textsuperscript{240} As the

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\textsuperscript{238} In the municipal law sphere there seems to be no distinction between the terms ‘responsibility’ and ‘liability’. It is evident from Salmond’s definition that liability or responsibility is the bond of necessity that exists between the wrongdoer and the remedy of the wrong. See P. J. Fitzgerald, \textit{Salmond on Jurisprudence}, Twelfth edition, (Bombay: N. M. Tripathi Private Limited, 1999) p. 349. But ‘responsibility’ and ‘liability’ convey different meaning when attributed to the states in their international relations. The distinction between the state responsibility and international liability is noticed by the International Law Commission in 1978 and since then it has done considerable work in this field. The International Law Commission has drafted two separate sets of rules governing them due to the fact that they are distinct from each other.

\textsuperscript{239} The resultant injury must be of serious nature.

\end{footnotesize}
concept of state liability is evolved to strike balance between the interests of states carrying on lawful activities and that of the innocent victims of such lawful activities, the state can continue the activity after paying compensation for the damage caused.241

Though the Outer Space Treaty contains separate provisions on state responsibility and liability for the activities on the moon and other celestial bodies, it fails to note the existing distinction between the two. The distinction drawn by the Outer Space Treaty is based on the old notion that responsibility does not necessarily involve the payment of compensation but liability involves an obligation to make reparation for any damage caused, especially in the form of monetary payment.242 The Liability Convention adds fuel to the confusion by advocating liability based on fault for damage caused in outer space, the


moon and other celestial bodies.\textsuperscript{243} This provision completely fails to comprehend the modern notion of state liability. As mentioned in the above paragraph, state liability is the result of damage caused by the acts not prohibited by international law and as such the question of fault does not arise in such cases.\textsuperscript{244}

\textit{Fourthly}, the fault-based liability for activities on the moon and other celestial bodies stipulated under the Liability Convention is virtually impracticable. The claimant state would face the difficult task of determining the precise malfunction in the spacecraft of other state, which has resulted in the accident or injury to its space vehicle, persons or property on board of its space vehicle. In addition, it has the almost impossible task of showing that the malfunction was due to the negligence of the launching state or that of an instrumentality under its control.\textsuperscript{245} This task is almost impossible because the determination of negligence relies on the reasonableness, and the reasonableness can be determined by looking into the prior experience in the relevant activity. The

\textsuperscript{243} Article III of the Liability Convention.


lack of duplicative experience relating to the activities on the moon and other celestial bodies and peculiar characteristics of each missions to the moon and other celestial bodies make it impossible to set the standard of reasonableness.

Finally, the Outer Space Treaty and the Liability Convention provide two different regime of liability for the activities on the moon and other celestial bodies.\textsuperscript{246} The Outer Space Treaty does not make any distinction between the liability for damage caused on earth, airspace and outer space,\textsuperscript{247} whereas the Liability Convention applies absolute liability for damage caused on earth and airspace, and fault liability for damage caused on the moon and other celestial bodies. The Outer Space Treaty also confines the state liability only for damage caused to another state which is a party to Outer Space Treaty. It is silent about the liability for damage caused to other states and their subjects. The existence of two different regimes has resulted in confusion especially in determining liability in cases of joint activities on the moon and other celestial bodies. It may result in absurd consequence of imposing liability on some of the states involved in joint activities while making others not liable.

\textsuperscript{246} The former is applicable to the states that are parties to Outer Space Treaty and not to Liability Convention, and the latter is applicable to State Parties to the Liability Convention.
For ex: Let us assume that states ‘A’ and ‘B’ together with ‘C’, a non-party to the liability Convention, jointly launch a space object for conducting activities on the moon and other celestial bodies and the space object has caused serious damage to property in the territory of state ‘D’, a non-party to Outer Space Treaty. The major question in this case is what is the liability of state ‘C’? No doubt states ‘A’ and ‘B’ are liable to pay compensation as per the Liability Convention. But it is very difficult to establish liability on the part of state ‘C’. The provisions of Liability Convention are not applicable, as state ‘C’ is not a party to it and the Outer Space Treaty does not impose a duty on the states to compensate a non-party. This means the two of the launching states, ‘A’ and ‘B’, are liable but the other, state ‘C’, is not liable.

Therefore the state responsibility and liability regime under the space treaties, consisting of the above loopholes together with its failure to deal with the issue of protection of the environment of the moon and other celestial bodies, needs a meticulous rethinking.

5.6: Intellectual Property Rights\textsuperscript{248} on the Moon and Other Celestial Bodies

Intellectual property law had a tremendous growth during the twentieth century. The IPR is based on the principle that every creative expression and invention needs to be rewarded by providing protection in order to stimulate the intellectual creations.\textsuperscript{249} With the extensive human activities in outer space, the moon and other celestial bodies, the IPR regime has entered the sphere of outer space in the last part of the twentieth century. Three important IPR that have direct connection with the activities on the moon and other celestial bodies are, patents,\textsuperscript{250} trade secrets\textsuperscript{251} and copyright\textsuperscript{252}. Unfortunately, as the

\textsuperscript{248} Hereinafter referred to as IPR.

\textsuperscript{249} http://issues.takingitglobal.org/intprop?gclid=CLyp5_mivpACFQsweed8zrEPQ (Accessed on 23 December 2007, 4:58 pm)

\textsuperscript{250} Patent is a monopoly right granted to an inventor to ripe the benefit out of his intellectual work for a limited period of time. The basic purpose is to encourage the public disclosure of the invented subject matter.

\textsuperscript{251} Trade secrets are transferable technical information, which are not generally known and not patented. It includes ideas, concepts, inventions, manufacturing processes and other confidential information. As these trade secrets give an added advantage to the industrialists in competing with others and in increasing their returns, they (industrialists) do not want to disclose it to others. Article 39
present IPR regime fails to clarify the issue of its applicability for the activities on the moon and other celestial bodies, there is a legal vacuum in the field.

The major source of vacuum is the difference in the origin and applicability of the IPR regime and the regime governing the moon and other celestial bodies. IPR law is fundamentally national in its origins and scope of application, notwithstanding efforts towards international harmonization.\textsuperscript{253} The regime governing the moon and other celestial bodies is essentially extraterritorial in its origin and application.\textsuperscript{254} The strong national root of the IPR regime is associated with problem of dissimilarity in the laws of different countries. Though the Agreement on Trade-Related Aspects of Intellectual Property Rights\textsuperscript{255} makes an attempt to harmonize the IPR laws of different

\textsuperscript{252} Copyright is a set of exclusive rights that regulate the use of a particular expression of an idea or information.


\textsuperscript{255} Hereinafter referred to as TRIPs. It came into effect on 1 January 1995. TRIPs, being one of the WTO Agreements, is the most comprehensive multilateral agreement on the IPR till date. It covers
countries, it is more oriented towards providing minimum standards rather than unifying their laws. The developed countries are more interested in keeping control over their intellectual creation by subjecting them to their strong IPR regime, and there is no reason to expect change in this attitude. Therefore the problem of difference in the IPR laws of the states is continuing, and this makes the determination of the applicable intellectual property law difficult when it is associated with the activities on the moon and other celestial bodies. In addition, some fundamental space law principles like CHM and the province of all mankind have added more confusion to the existing IPR regime.

The legal vacuum created by the interrelationship between the IPR regime and the outer space regime is noticed very recently by the international community, especially after the establishment of the International Space Station (ISS). The recent US plans also reveal its willingness to go beyond almost all the types of IPR that are related to trade. See generally Adrian Otten and Hannu Wager, ‘Compliance With TRIPs: The Emerging World View’, *Vanderbilt Journal of Transnational Law*, Vol. 29, No. 3, 1996, pp. 391 - 413.


257 Inter-Governmental Agreement on the International Space Station was initially signed on 29 September 1988 by the United States, Japan, Canada and members of European Space Agency. With
the ISS and to establish similar stations on the moon and Mars.\textsuperscript{258} Now it is also well known that moon and other celestial bodies can be used for conducting some important experiments, which cannot be conducted on the earth with such a great effect.\textsuperscript{259} Therefore there is every possibility of investment of huge sum in such experiments. Though at present there is no reported instance of IPR conflict directly related to the activities on the moon and other celestial bodies, the pace of technological development is showing its potentiality to bring forward such problems in the near future. Therefore this seems to be the appropriate time to clarify the IPR regime to avoid future conflicts.

5.6.1: Monopoly Rights vis-à-vis CHM

the Russia’s inclusion in the project on 17 December 1993, new negotiations took place between the former participants and Russia. It resulted in the new Inter-Governmental Agreement on the International Space Station, which was signed on 29 January 1998. The construction work is still going on and it is expected to be completed by 2010.


The outer space and the IPR being subject to two different schools of jurisprudence, their regimes do not go hand in hand.\textsuperscript{260} The IPR, whether it is patents, trade secrets, copyright or others, advocates for the monopoly right of the person using the intellectual labour.\textsuperscript{261} When IPR is applied to the activities on the moon and other celestial bodies, it always comes in conflict with the concepts of province of all mankind and CHM, which advocate for the rights of all people in the world.\textsuperscript{262} As one of the essential elements of the CHM is the equitable sharing of the benefits, the IPR monopoly would fall outside the ambit of the concept.

The strict application of province of all mankind and CHM would clearly deny any claim of monopoly right for the activities conducted on the moon and other celestial bodies.\textsuperscript{263} But is it justifiable to extend the scope of

\textsuperscript{260} The former is subject to the idealistic school and the latter to the realistic school.
\textsuperscript{263} Sa’id Mosteshar, ‘Research and Invention in Outer Space and their Commercial Exploitation: Liability and Intellectual Property Rights’, in Sa’id Mosteshar (ed.), \textit{Research and Invention in Outer
space law concepts to such an extent so as to deprive an inventor from deriving benefit out of his intellectual labour? The answer seems to be negative. The space treaties were entered at the time when the states were the only actors in the field of outer space, and the concept of IPR was virtually unknown. Therefore the states are made the major subjects of space law, and consequently the rights conferred upon the space activities are public in nature.\textsuperscript{264} The space treaties are not oriented towards the protection of the private rights. Now with the increased private space activities, we are confronted with the challenge of striking a delicate balance between the private rights and the public rights. If the private rights are not guaranteed, no one would be willing to conduct innovative activities on the moon and other celestial bodies, which would in turn adversely effect the scientific and technological development.\textsuperscript{265}

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Developing a fair scheme to strike the balance between the private interests, which generate innovation and the wider interest of the mankind is not easy. Any solution to the problem would involve some compromise in both the fields. Therefore a viable solution to the problem is to grant a restricted IPR monopoly with some sort of compulsory licensing scheme under the fair and reasonable terms and conditions. The scope of the idealistic space law concepts should be limited to physical property and the intellectual property must be kept out of their ambit.

Now, if we assume that the intellectual creations on the moon and other celestial bodies can be subject to IPR regime, an incidental question arises in the field of patents, i.e., who has the right to patent protection? Whether it is the one who has first invented or the one who has first filed application for patent? Both these patent systems are strongly supported by different countries of the world. Therefore at present, identification of the patent

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268 The United States follows the first to invent system and therefore whoever proves that they were the first to develop the invention have priority in obtaining the patent, even if someone else files first. The
rights’ holder depends on the nationality of the inventor.\textsuperscript{269} This would create problem in cases where the invention on the moon and other celestial bodies is conducted or sponsored by a group of people belonging to different states. The problem becomes further complicated if the invention is partly carried on the earth and partly on the moon and other celestial bodies.

\textbf{5.6.2: Violation of IPR on the Moon and Other Celestial Bodies}

Another important problem existing in the field of IPR regime on the moon and other celestial bodies is the question of availability of remedies in case of the violation of earthly IPRs on the moon and other celestial bodies. The strong national roots of IPR have confined their protection only to the states in which they are registered.\textsuperscript{270} Moreover, in case of the violation, the courts of the state where violation takes place exercise the jurisdiction, and the

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\textsuperscript{269} If the inventor belongs to United States, he should be the first person to invent, and if he belongs to other states, he should be the first person to file application for getting patent rights. Bradford Lee Smith, ‘Intellectual Property Issues for the Galileo Project’, \textit{Proceedings of the Forty-fourth Colloquium on the Law of Outer Space}, 1 - 5 October 2001, Published in 2002, pp. 207 - 211 at p. 210.

law of that state becomes applicable. As the moon and other celestial bodies do not belong to any state, the complicated question of jurisdiction and applicable law comes into picture in every case of violation of earthly IPR.

**Jurisdiction**

In any case of violation of earthly IPR on the moon and other celestial bodies, the first task is to ascertain the jurisdiction. The Outer Space Treaty read with the Registration Convention provides a special regime for the exercise of jurisdiction. Article VIII of the Outer Space Treaty expressly confers the jurisdiction and control over the objects launched to the moon and other celestial bodies and the personnel thereof to the state of registry.

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272 A State Party to the treaty on whose register an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the earth...

273 The principles of territoriality and nationality have got widespread recognition in the international law as grounds for the exercise of jurisdiction. The Outer Space Treaty has adopted the principle of
Article II (1)²⁷⁴ of the Registration Convention supplements the above provision by imposing an obligation on the launching state to register, nationally and internationally, any object launched by it. In case of joint launching, the states must jointly determine which one of them would register the object.²⁷⁵ Accordingly the registering state exercises jurisdiction and control.

The jurisdiction provided under the space treaties is different from the flag state jurisdiction²⁷⁶ under law of the sea. Flag State jurisdiction confers quasi-territorial jurisdiction to the Flag State over the ships of its nationality.
Whereas, the jurisdiction under the Outer Space Treaty is not only confined to space object registered with the state, but also extends over any personnel thereof, while in outer space or on a celestial body. In other words, the state of registry exercises jurisdiction on the personnel even when such personnel are outside the space object. Therefore any IPR violation on the moon and other celestial bodies is subject to the jurisdiction of the state where the space object is registered.

However this would not suffice to solve the problem when a permanent station is constructed on the moon or other celestial body. The issue of conflicting jurisdiction would arise in cases where the station on the moon or other celestial body is registered in one state and the space vehicle carrying the astronauts conducting the inventions therein is registered in another state. The same problem would arise in case of exchange of crew between two or more stations on the moon or other celestial body. In the wake of private space activities, the issue needs to be clarified immediately due to the fact that it might result in the forum shopping by the private entities. The void in the law

would provide an opportunity to the private entities to register their objects under the most favourable regime to defeat the purpose of the law.  

Applicable Law

Second essential element in seeking remedy for IPR violation on the moon and other celestial bodies is the determination of applicable law. It is not susceptible to easy answer. The principle of *lex situs* cannot be applied, as there is no national or international law governing every IPR violation on the moon and other celestial bodies. Though the territoriality principle prevents the extraterritorial application of the municipal laws, only solution to the problem

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An Insight into Some Issues of Practical Significance

is the transposition of municipal law to the moon and other celestial bodies based on the connecting factors. There is a wide-ranging debate over the issue between the group supporting nationality\textsuperscript{282} and the group supporting registration as connecting factor.

Use of nationality as a connecting factor for the determination of applicable law may result in absurd consequences. Complications would arise in the case where the violation of IPR is done by a group of persons having different nationality. In a hypothetical case, where an IPR is registered in India, United States, Japan, France and Germany, the application of nationality as a connecting factor would mean that a national of any state, other than the above five, could violate the IPR on the moon and other celestial bodies without attracting liability. Even if the nationals of above states violate the IPR, they would be subject to different laws.

Similar problems can also be seen in cases where the activities are conducted by the multinational firms. Since it is very difficult to establish the nationality of firms in most of the cases, determination of applicable law also

becomes difficult. Therefore the nationality principle cannot be accepted as decisive factor.

Registration as the connecting factor for determination of applicable law finds support from the juristic writings\textsuperscript{283} as well as from the US Space Bill, 1990 and the Inter-Governmental Agreement on the ISS.\textsuperscript{284} The US Space Bill, 1990 added section 105 to US patent legislation,\textsuperscript{285} which states that any invention made, used or sold in outer space on a space object or component thereof under the jurisdiction and control of the United States must be considered to be made, used or sold within the United States.\textsuperscript{286} As discussed


\textsuperscript{285} \textit{Supra} note 262, p. 177.

\textsuperscript{286} Section 105: (a) Any invention made, used or sold in outer space on a space object or component thereof under the jurisdiction or control of the United States shall be considered to be made, used or sold within the United States for the purposes of this title, except with respect to any space object or component thereof that is specifically identified and otherwise provided for by an international agreement to which the United States is a party, or with respect to any space object or component
above, Article VIII of the Outer Space Treaty confers jurisdiction and control over space objects and personnel thereof to the state of registration. This leads to series of consequences. If United States launches any object to the moon and other celestial bodies, it must register the object in its national registry according to Article II of the Registration Convention. Once the object is registered in the national registry, United States exercises jurisdiction and control over that object and personnel thereof and once the United States exercises jurisdiction and control over the space object and personnel thereof, any activity conducted in the object or by the personnel thereof is subject to US laws. Though the US legislation speaks only about the patents, the same principle would be applied to the violation of other IPR on the moon and other celestial bodies.

287 Article VIII of the Outer Space Treaty.

The Inter-Governmental Agreement on ISS also supports the above view by stating that an activity occurring in any part of the space station complex is deemed to have conducted in the territory of the state in which that element is registered.\textsuperscript{289} This clause would also be included in the regime governing the future stations on the moon and other celestial bodies. However this does not solve the problem completely. Firstly, the Inter-Governmental Agreement on ISS is based on the legal fiction that the European states constitute a single territory subject to same regulations. But in reality they do not form single territory and are subject to different laws.\textsuperscript{290} Secondly and more importantly, the ISS consists of different elements contributed by different member states, and these elements are registered in the national registry of respective contributing state.\textsuperscript{291} In effect, different state laws govern the activities conducted in different elements of ISS. In case of an activity violating the IPR conducted collectively in the laboratories situated in different elements of ISS, the determination of applicable law by using registration as the connecting

\textsuperscript{289} Article 21 of the Inter-Governmental Agreement on ISS.


\textsuperscript{291} Article 5, of the Inter-Governmental Agreement on ISS.
factor would fail. The same problem would be encountered in a station established by a group of states on the moon or other celestial body.

Another issue associated with the use of registration as connecting factor is the question of status of the activities in the unregistered objects found on the moon and other celestial bodies. These unregistered objects may be those that are naturally found on the moon and other celestial bodies or those that are launched from the earth. It is worth to note here that though the Registration Convention imposes an obligation on the states to register the objects launched by them, it is binding only on the parties to the Convention. To date, not every state is party to the Registration Convention. Therefore if registration is considered as the connecting factor, the question of applicable law remains unsolved in cases of unregistered objects. Moreover the place of registration would remain in limbo, when the future plans for launching of objects from one celestial body to another are realized.

The above discussion shows that the existing legal regime, being uncertain, is not conducive to attract the much-needed private investment for the activities on the moon and other celestial bodies. Therefore this is the

292 Supra note 277, pp. 75 & 76.

293 Supra note 253, p. 370.
high time for having an international framework to govern the IPR regime on the moon and other celestial bodies. In 1999, an attempt was made to find out the solution to problems relating to IPR regime in the outer space by conveying a Workshop on Intellectual Property and Space Activities at UNISPACE III.\footnote{Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, 19 - 30 July 1999.} The participants in the Workshop, which was conducted under the auspices of the UNCOPUOS, came out with a recommendation for the harmonization of the IPR regime with the space law principles.\footnote{http://www.nationsencyclopedia.com/United-Nations/Peaceful-Uses-of-Outer-Space-UN-CONFERENCES-ON-OUTER-SPACE.html (Accessed on 25 December 2007, 4:55 pm)} It was also recommended that the UNCOPUOS, in collaboration with World Intellectual Property Organization, should take up the initiative to investigate the legal uncertainties existing in the field. Unfortunately, no further progress is made to solve the existing problems.

5.7: Chapter Conclusion

The failure of the Moon Agreement to become a binding norm in the international level has resulted in many consequences, which are by no means acceptable. The legal uncertainty in the field is used for their own advantage by both the states as well as the individuals. On the one hand, the states used it for
claim of sovereignty, resource exploitation, human habitation and promoting military activities. On the other hand, the individuals used the legal uncertainty as a means for claiming private rights over the moon and other celestial bodies. Unfortunately, none of this activity is carried out in conformity with the basic principles of space law.

Added to this, the space treaties also fail to address some of the important issues relating to the activities on the moon and other celestial bodies. These issues are the liability for the damage caused to the environment of the moon and other celestial bodies, extent of responsibility and liability of the states for the private activities and the scope of IPR protection on the moon and other celestial bodies. The clarification of these issues is of utmost importance for the furtherance of the activities on the moon and other celestial bodies, while striking a delicate balance between the conflicting public rights and the private rights.