Moon and Mars Exploration and Use

By Paul B. Larsen, Georgetown University Law Center*

Introduction

In this paper I will examine the legal basis for the newly announced US Moon and Mars exploration initiative. Exploration and use of outer space are usually linked. That often results in a singular focus on the law governing uses of outer space. Therefore I focus first on the law governing space exploration only. I recognize that exploration may likely lead to use, but perhaps not so. There are significant legal differences between space exploration and use of outer space. For one thing, exploration does not entail permanent appropriation and the host of legal issues peculiar to permanent appropriation do not occur. Next I briefly discuss uses of the Moon and Mars. Lastly I focus on the effect of military space activities on exploration and use of the Moon and Mars and finally make some recommendations towards international coordination and cooperation.

I. Moon/Mars Exploration

Encouragement of space exploration is particularly evident in the 1967 Outer Space Treaty. [1] Exploration is encouraged more so than use as will be apparent in the following discussion. Scientific exploration has been one of the cornerstones of human venture into outer space. Exploration of Antarctica is a relevant analogy. Originally many states claimed exclusive rights to sections of Antarctica. But then in the Antarctic Treaty[2] states acknowledged

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[1] Treaty on Principles Governing the Activities of States n the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies(hereinafter Outer Space Treaty), 610 UNTS 205 (1967).

Agreement on Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (hereinafter Aid to Astronauts Convention), 672 UNTS 1119 (1968).

Convention on International Liability for Damage Caused by Space Objects (hereinafter Liability Convention) 691 UNTS 18 (1972)

Convention on Registration of Objects Launched into Outer Space (hereinafter Registration Convention), 1023 UNTS 15 (1975).

Agreement Concerning Activities of States on the Moon and other Celestial Bodies (hereinafter Moon Treaty), 1363 UNTS 21

[2] Antarctic Treaty, 402 UNTS 71 (1959)

the importance of exploration and created freedom to explore Antarctica "on the basis of freedom of scientific investigation" in accord with the International Geophysical Year.

Building on the Antarctic Treaty, the 1967 Outer Space Treaty also encourages exploration of outer space. The purpose of the Outer Space Treaty is "to contribute to broad international cooperation in the scientific as well as the legal aspects of the exploration and use of outer space for peaceful purposes." [3] This is very similar to the purpose of the Antarctic treaty. Furthermore, the substantive part of the Outer Space Treaty provides that there "shall be free access to all areas of celestial bodies." [4] "The Moon and celestial bodies shall be free for exploration and use by all States without discrimination of any kind, on the basis of equality and in accordance with international law." [5] "Promoting the development of space science and technology and of its application" is also the objective of the UNGA Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries. [6]

The freedom to explore is closely linked to the fact that outer space is not subject to claims of sovereignty.[7] On the other hand, exploration of the Moon and Mars must be carried on "in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding." [8] OST, Art. IV, provides: "The use of any equipment or facility necessary for peaceful exploration of the Moon and other celestial bodes shall also not be prohibited." [9] Military uses of the Moon and Mars will be discussed below; here it is merely noted that peaceful exploration is encouraged under international space law.

Non-governmental parties may explore the Moon and Mars. The Outer Space Treaty, Art. VI,[10] requires that their exploration is under the supervision of the appropriate state in order to insure that the state's obligations under the Outer Space Treaty are being performed. Therefore, the United States requires that private space activities be licensed. [11]

Exploratory expeditions "shall conduct all their activities in outer space, including the Moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty." [12] They shall conduct exploration of outer space so as to "avoid harmful interference" and they shall avoid harmful contamination and adverse changes in Earth's environment resulting from introduction of extraterrestrial matter. [13] The Moon Treaty, Art 7, re-emphasizes these precautions. Launches of exploratory expedition from Earth are also subject to national environmental laws applicable

[3] Outer Space Treaty, Preamble, supra n. 1.
[4] Outer Space Treaty, Art. I, supra n. 2
[5] Id.
[6] UN Doc. A/51/20
[7] Outer Space Treaty, Art. II, supra n. 1
[8] Id. Art II
[9] Id. Art IV
[10] Id. Art. VI
[11] Public Law 103-272 (1994)
[12] Outer Space Treaty, Art IX, supra n. 1
[13] Id.

in the country in which the space craft is being launched. [14]

The Outer Space Treaty, Article X, promotes space exploration by stating that States shall permit international observers to observe flight of their space craft. [15] Art. XI requires States to share with other states "the nature, conduct, locations and results of exploratory activities" in outer space. [16] Art XII opens " [a]ll stations, installations, equipment and space vehicles on the Moon and other celestial bodies" to other States Parties to the treaty which is virtually everybody because of the general acceptance of the Outer Space Treaty. [17]
States' liability for damages incurred in space exploration is subject to international law. A State Party to the Outer Space Treaty is internationally liable "for damage to another State Party to the treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or outer space, including the Moon and other Celestial bodies." [18] This liability is further elaborated in the Liability Convention. [19] ""For damages caused elsewhere than on the surface of the Earth to a space object of one launching state or to persons or property on board a space objects 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." [20] The treaty allows exoneration only when activities conducted by a launching state conform with the U.N. Charter and other international law.[21] This provision may be viewed as enforcement of the Outer Space Treaty.

The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Space Objects [22] is intended to aid space explorers wherever they are. This treaty was concluded in 1968 with a view of rescuing the astronauts that landed on the moon in 1969, in case they got marooned there. The treaty is a further elaboration and implementation of the Outer Space Treaty, Art. V, requiring assistance to astronauts and their safe return to the state of registry. As the US Ambassador Arthur Goldberg said: this Agreement is " a tribute of those who venture forward into the new world of outer space. We shall work to make that venture one of benefit to all, as we hope it will be." [23]

Spacecraft must be registered. The 1975 Convention on Registration of Objects Launched into Outer Space is based on the belief that mandatory registration of objects launched into outer space would "contribute to the application and development of international law governing the exploration and use of outer space." [24] The state registering a space object thereby establishes its jurisdiction over the space object and

[14] The US National Environmental Policy Act (NEPA), 42 U.S.C. 4321 et seq., applies in US territory; see Purvis, The Long Arm of the Law? Extraterritorial Application of U.S. Environmental Legislation to Human Activity in Outer Space, VI Georgetown Int. Env. Law J. 455 (1994)
[15] Outer Space Treaty, Art IX, supra n. 1.
[16] Id. Art XI.
[17] Outer Space Treaty, Art XII, supra n. 1
[18] Outer Space Treaty, Art VII, supra n. 1
[19] Liability Convention, supra n. 1
[20] Id. Art III
[21] Id. Art. VI.
[22] Supra n. 2
[23] UN Treaties and Principles on Outer Space, UN Doc. A/AC.105/722 at 71
[24] Registration Convention, Preamble, supra n. 1

receives international recognition of its jurisdiction. [25] Consequently, the state is assured not only that its international responsibility for their national exploratory activities in outer space is carried out, but it also assured that its authority over its exploratory space craft is not challenged by other states.

The Moon Treaty, [26] in contrast to the Outer Space Treaty, is not generally adopted by states. Thus this treaty is less important to space exploration than the Outer Space Treaty. All provisions in the Moon Treaty also apply to Mars and the other celestial bodes. [27] The following provisions of the Moon Treaty are relevant to space exploration: Art. 6 reemphasizes the freedom of scientific exploration. Art. 7 provides that "States Parties shall report to other States Parties and to the Secretary General concerning areas of the Moon having special scientific interest in order that, without prejudice to the rights of other States Parties, consideration may be given to the designations of such areas as international scientific preserves."[28]

The Moon Treaty, Article 8, gives States Parties wide latitude to pursue exploration activities on the Moon: "Personnel, space vehicles, equipment, facilities, stations and installations may move or be moved freely over or below the surface of the Moon." States may establish manned and unmanned stations on the Moon (Art. 9). "States Parties have the right to exploration and use of the Moon without discrimination of any kind, on the basis of equality and in accordance with international law and the terms of this Agreement." (Art. 11(4)) The common heritage of mankind (CHM) issue does not affect exploration of the moon and celestial bodies. [29]

Finally, use of radiofrequencies to communicate with exploratory space craft must be cleared by the ITU, [30] as administered by the national regulatory administrations. In the United States the regulator is the Federal Communications Commission (FCC). [31]

II. Moon/Mars Use

Uses of the Moon and Mars raise numerous issues in addition to the those affecting exploration of outer space. These issues have been discussed extensively by others. I discussed them in some detail in my article in the Space Policy magazine regarding possible use of Moon resources for building a space solar power system, [32] so I will not discuss extensively the space law applicable to use. The applicable law is essentially found in the same space law treaties that govern exploration; but there are additional legal limitations because uses of outer space celestial bodies approximate appropriation. Appropriation of outer space by individual states easily collides with the Outer Space Treaty, Art II, stating that "Outer Space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of

[25] Id. Art. II, supra n. 1
[26] Moon Treaty, supra n. 1
[27] Id. Art. 1
[28] Id. Art 7.
[29] Id. Art 11
[30] ITU Legal Instruments in Project 2001, Legal Framework for the Commercial Use of Outer Space, (Satellite Communication), Berlin, Germany
[31] 47 U.S.C. 151-609 (2004)
[32] Larsen, Current Legal Issues Pertaining to Space Solar Power Systems, 16 Space Policy 139 – 144 (2000)

sovereignty, by means of use or occupation, or by any other means." Thus the Moon and Mars may not become the property of States and of their non-governmental entities.

Licensing is a factor both in space exploration and in use of space resources. While operation of government-owned spacecraft does not require a license, a non-governmental operator will need a launch license. [33] Furthermore, activities of private spacecraft operators on the Moon and Mars would "require authorization and continuing supervision by the appropriate State Party to the [Outer Space] Treaty." [34] Thus activities on the Moon by U.S. citizens would be subject to U.S. oversight pursuant to Article VI.[35]

Non-governmental activities on the Moon and Mars could be privately financed. Private financiers would want financial security (either title, mortgage or a leasehold interest) in the space craft and in whatever space assets, including government issued permits and licenses, that the venture operators would possess or acquire. The financiers would seek protection for their loans under existing national laws. [36] However, they would prefer to have the kind of global protection that could be provided under the proposed UNIDROIT treaty instrument on secured interests in space assets. [37]

[33] Supra n. 11
[34] Outer Space Treaty, Art. VI, supra n. 1,
[35] Id.
[36] Larsen and Heilbock, UNIDROIT Project on Security Interests: How the Project affects Space Objects, 64 J. Air L. &Com.1, at 6 (1999).
[37] Larsen, Future Protocol on Security Interests in Space Assets, 67 J. Air. L.& Com 1071 (2002)

III. Military Uses of Moon and Mars

Demilitarization of Antarctica facilitated freedom to explore Antarctica. The Antarctica treaty recognized "that it is in the interest of all mankind that Antarctica shall continue forever to be used exclusively for peaceful purposes and shall not become the scene or object of international discord." [38] Article I of the Treaty provides:

1. Antarctica shall be used for peaceful purposes only. There shall be prohibited, inter alia, any measures of military nature, such as the establishment of military bases and fortifications, the carrying out of military maneuvers, as well as the testing of any type of weapons.
2. The present treaty shall not prevent the use of military personnel or equipment for scientific research or for any other peaceful purpose.

The Antarctica Treaty, Art. IV, then goes on to provide that "[no] acts or activities taking place while the present Treaty is in force shall constitute a basis for asserting, supporting of denying a claim to territorial sovereignty in Antarctica or create any rights of sovereignty in Antarctica."[39] Considering the historic close link between the two treaties, the drafters of the Outer Space Treaty apparently sought to create in outer space the same freedom that exists in Antarctica. That is relevant towards establishment of the major purposes of the Outer Space Treaty in interpreting the Treaty.

[38] Antarctic Treaty, Preamble, supra n. 2
[39] Id. Art. IV.

The Outer Space Treaty is later in time thus allowing ample time to be influenced by the Antarctic Treaty. The Preamble to the Outer Space Treaty states that the drafters recognize "the common interest of all mankind in the progress of exploration and use of outer space for peaceful purposes." Then they went on to call specifically "upon States to refrain from placing in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction or from installing such weapons on celestial bodies." [40] These concepts came to expression in Art. 1 by providing that exploration and use of outer space "shall be the province of all mankind"; and that there shall be free access to all areas of celestial bodies. [41] The Outer Space Treaty, Article II, like the Antarctic Treaty, states that "Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means. Article III states that the U.N. Charter and international law apply in outer space. Article IV prohibits placing weapons of mass destruction in orbit and stationing such weapons in outer space. Article IV goes on to state that "The Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes." Establishment of military fortifications are forbidden but military personnel may be used for scientific research. "Use of any equipment or facility necessary for peaceful exploration of the Moon and other celestial bodies shall also not be prohibited." [42]

[40] Outer Space Treaty, Art IV, supra n. 1
[41] Id. Art. I
[42] Id. Art IV, supra n. 1.

Did the Outer Space Treaty accomplish what the drafters intended? Scholars disagree on many issues: What is the definition of peaceful purposes? Does it mean non-aggressive purposes or is it more restrictive? What are weapons of mass destruction? Much space equipment, like GNSS, has dual uses, both civilian and military. Will dual use equipment be legal on the Moon and Mars? Much space weaponry has developed since 1967 and could not have been known by the drafters of the Outer Space Treaty. Later efforts to clarify the Outer Space Treaty in the Moon Treaty merely resulted in further uncertainty because the 1979 Moon Treaty is in force but has not become generally accepted like the other space law treaties. [43] Some states are bound by the Moon Treaty, but many are not. Thus, there are many ambiguities in the exploration and use of outer space.

IV. International Cooperation and Coordination

International cooperation in outer space is difficult to arrange. Governments have legal and policy differences. Legislation may require a government to spend funds a specific way. For example the U.S. - Iran Nonproliferation Act, Public Law 106-178, requires the U.S. government to refrain from spending NASA funds to purchase Russian transportation of astronauts and supplies to the Space Station. The recent agreement between the United States and the European Union on coordination of Galileo and GPS required resolution of very difficult military and civilian policy differences

[43] Nine countries are parties to the Moon Treaty.

between the United States and ESA/EU. [44] The coordination agreement concluded in the Spring of 2004 included both military and civilian matters. In the end the United States and Europe were able to agree that both parties could do what they wished to do with exchange of information and mutual coordination. The coordination agreement does not involve the United Nations COPUOS. The result of the arrangement will be a global seamless satellite navigation network in which users will be able to use both Galileo and GPS without requiring special user attention when they shift from use of GPS to Galileo.[45] Can this precedent be applied to other outer space activities, for example the US Moon/Mars exploration and use initiative?

The issue of international coordination and cooperation is crucial to current space initiatives. All the space treaties encourage international coordination and cooperation. One state's use of outer space may tend to exclude other states. The excluded states insist that the Outer Space Treaty, Art II, precludes appropriation "by means of use or occupation." [46] In my paper on Legal Issues Pertaining to Space Solar Power Systems I argued that uses of outer space resources are different from use of domestic resources because the outer space resource are held in common by all the states. Exploitation of outer space resources is possible under treaty law but requires international coordination and cooperation. Experience shows that agreement can be reached if every state finds a benefit. Recent international non-governmental space enterprises, for example Intelsat and Iridium, carefully spread ownership very widely among the states thereby motivating these states to support the outer space enterprises. Galileo is also spread among multiple stakeholders including not only European countries but also China and India. I suggested in my solar power paper that an outer space solar power system would be possible only if ownership is spread very widely so as to create many stakeholders. Now I suggest that careful international coordination and cooperation would be advantageous for most new outer space enterprises.[47] U.S. – European Union Coordination of GNSS suggests that such coordination may be possible even when the uses involve national security policy issues.

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[44] White House Fact Sheet: US-EU Summit: Agreement on GPS-Galileo Cooperation, June 26, 2004. "The Agreement ensures that Galileo's signals will not harm the navigation of warfare capabilities of the United States and the North Atlantic Treaty Organization military forces, ensures that both the United States and the European Union can address individual and mutual security concerns, and calls for non-discrimination and open markets in terms of trade in civil satellite navigation-related goods and services." http://www.whitehouse.gov/news/2004/06/20040626-8.html

[45] Id.

[46] Supra n. 32

[47] Id.