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The International Law of Outer Space and its Effect on Commercial Space Activity

The United Nations, through a series of five treaties, has created a body of international space law which controls the activities in space of states, international organizations, and private interests. Corporations planning an investment in commercial space ventures must consider the restrictions and obligations which space law will impose on their activities. This article discusses the substantive principles of the law of outer space and focuses on those provisions which will affect commercial space activities.

I. INTRODUCTION

On October 4, 1957, the Soviet Union launched Sputnik 1, the first satellite to orbit Earth. This achievement marked the opening of a new territory, full of vast resources and exciting opportunities. Advancements in technology have increased access to outer space and its resources, but "to fully benefit from these new opportunities, the need invariably [arose] for a body of International Law describing the ground rules for their use."¹

Within a year after the Sputnik launch, both the Soviet Union and the United States called upon the United Nations to adopt proposals aimed at inducing international cooperation in outer space. It was hoped that such proposals would address the legal problems arising from national space programs.² In a spirit of mutual cooperation, space would be explored and exploited, not for the good of only one nation, but for the benefit of all humanity.³

1. VON BRAUN, *Conclusions to the Development of the Law of Outer Space*, in *SPACE LAW PERSPECTIVES* 301, 301 (M. Schwartz ed. 1976). Commentators contend that despite even the most sophisticated technology, humanity will never be able to survive in outer space without rules of law. See Menter, *The Impact of Treaties on Commercial Space Operations*, 1 *HASTINGS INT'L & COMP. L. REV.* 389 (1978) [hereinafter cited as *Impact of Treaties*]; Menter, *STS—Legal Connotations*, 13 *AKRON L. REV.* 629, 631 (1980) [hereinafter cited as *STS*] (quoting Ambassador Arthur Goldberg, the United States' permanent representative to the United Nations).

2. See *STS*, *supra* note 1, at 631-32, for a sample of the many problems created by space transportation. See also Vereshchetin, *International Space Law and Domestic Law: Problems of Interrelations*, 9 *J. SPACE L.* 31, 35 (1981) (addressing problems involving jurisdiction).

3. Some commentators believe that the act of creating international space law has gone beyond the mere adoption of a set of rules. In creating this body of

Due in part to their expense and risks, space programs were first established by governmental organizations.⁴ Presently, the United States civil space efforts are carried out by the National Aeronautics and Space Administration (NASA), a government agency.⁵ For example, NASA is currently involved in the development and operation of the Space Shuttle program.⁶ The Space Shuttle, and the increased feasibility of manufacturing in space which the Shuttle provides, has generated interest within the private sector concerning the future role of private enterprise in the development and use of outer space and its resources.⁷

The international law of outer space will affect corporations and other non-governmental entities as they increase their role in space activities.⁸ Space law grants certain rights to private enterprise,⁹ while also placing limits upon space activities.¹⁰ The nature of these rights and the extent of the limitations may determine whether a given space venture, although technically feasible, will be profitable. Thus, it is vitally important that pri-

law, "[h]uman spirits have been enlarged and liberated by a greater awareness of mankind's full potential." C. CHRISTOL, *THE MODERN INTERNATIONAL LAW OF OUTER SPACE* xi (1982).

4. Diederiks-Verschuur & Gormley, *The Future Legal Status of Nongovernmental Entities in Outer Space: Private Individuals and Companies as Subjects and Beneficiaries of International Space Law*, 5 J. SPACE L. 125, 125 (1977). The exploration of space was first undertaken by governments due to the tremendous amount of financial resources and the sophisticated technology required. This is a reversal of the pattern of early land-based exploration where private groups such as the Hudson Bay Company conducted the initial expeditions. *Id.*

5. NASA was created by the National Aeronautics and Space Act of 1958 (NASA Act), 42 U.S.C. §§ 2451-2484 (1976 & Supp. V 1981). Space efforts dealing with weapons systems, military operations, or defense are reserved to the Department of Defense, subject to the direction of the President. 42 U.S.C. § 2451(b) (1976).

6. See *infra* note 21 for information respecting the Space Shuttle.

7. See generally DeSaussure, *The New Era in Outer Space*, 13 AKRON L. REV. 593 (1980) (discussion of the transformation of outer space resulting from use of the Space Shuttle).

8. See *infra* notes 15-23 and accompanying text for a discussion of future space activities which may be carried out by private enterprise.

9. Private enterprise has always been expected to participate in the use and exploitation of outer space. See C. CHRISTOL, *supra* note 3, at 831; Menter, *Legal Regime of International Space Flight*, in *SPACE SHUTTLE AND THE LAW* 61, 61 (S. Gorove ed. 1980) ("It is thus apparent that the 1967 Treaty envisions activities in space by private enterprise"). For a discussion of the Soviet Union's attempt to exclude private enterprise from outer space, and the United States' response, see Dula, *Management of Interparty and Third-Party Liability for Routine Space Shuttle Operations*, in *SPACE SHUTTLE AND THE LAW* 93, 95 (S. Gorove ed. 1980) [hereinafter cited as *Management*]; Dula, *Regulation of Private Commercial Space Activities*, 23 JURIMETRICS J. 156, 172 (1982) [hereinafter cited as *Regulation*]. See also Jaksetic, *The Peaceful Uses of Outer Space: Soviet Views*, 28 AM. U.L. REV. 483 (1979) (a discussion of the Soviet Union's views on space law in general).

10. Many of these limits are not yet clearly defined. See, e.g., *Management, supra* note 9, at 102-03.

vate enterprise have an understanding of international space law and its effects on commercial space activities.

Following a brief discussion of the space activities which private enterprise might undertake, this comment will examine the development of the substantive principles of space law. Next, the impact of space law upon private investment in outer space will be addressed.

II. ACTIVITY BY PRIVATE ENTERPRISE IN OUTER SPACE

A. *Current Activities*

Satellites are currently the predominant commercial activity in outer space.¹¹ These satellites are used primarily in telecommunications, but they are also used for navigation, remote sensing of Earth's resources, and meteorology.¹² "Spin-offs"¹³ from technology developed in the course of NASA's space programs have proven to be another successful commercial benefit linked to outer space. These spin-off products have been particularly important in the area of medical technology, but have had an impact in many other industries such as communication and travel.¹⁴

11. Tennen, *Outer Space: A Preserve for All Humankind*, 2 HOUS. J. INT'L L. 145, 146 (1979). The first operational commercial satellite was launched on April 6, 1965, by the Communications Satellite Corporation (COMSAT). Corporations such as RCA and Western Union have launched their own satellites. Revenues from the use of these satellites exceed \$1 billion per year. *Id.* at 147.

12. *See id.* at 146-47; Diederiks-Verschoor & Gormley, *supra* note 4, at 133-40.

Remote sensing satellites have been of particular help in the areas of agriculture and marine resources, oil and gas exploration, forestry, land use and geology, cartography, hydrology, and pollution detection. *Id.* at 137-39. At present, the remote sensing program operated by the United States, Landsat, is not controlled by the private sector, but rather is supervised by NASA. There is a possibility that Landsat, along with this country's meteorological satellite systems, will soon be turned over to the private sector. Pikus, *Law and Security in Outer Space: Private Sector Interests*, 11 J. SPACE L. 111, 112 (1983).

13. "Spin-offs" are products and processes that emerge from secondary application of technology NASA develops for its space programs. Tennen, *supra* note 11, at 146.

14. *See* Robinson, *Legal Problems of Sustaining Manned-Space Flights, Space Stations and Lunar Communities Through Private Initiative and Non-Public Funding*, 7 INT'L LAW. 455, 455 n.2 (1973).

See also NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, SPINOFF 1982 (1982) which discusses NASA's major aeronautical and space programs and ways in which technology originally developed for NASA is being adapted for use by private firms. This report is published annually by NASA's Office of External Relations, Technology Utilization and Industrial Affairs Division. Examples of "spin-off" products include: airline wheelchairs, wind turbine blades, sportswear with

B. Future Activities

Commercial satellites will continue to play a large part in private space ventures, but government and industry are beginning to think of space as an attractive location for manufacturing.¹⁵ The lack of gravity in space will allow a company to manufacture certain products in increased quantities and at greater levels of quality, all at a lower price than could be achieved on Earth.¹⁶ Many research programs are already under way in areas ranging from electronics to pharmaceuticals in an effort to discover items that can be manufactured in outer space on a cost-effective basis.¹⁷ Construction of solar power satellites, communications platforms,¹⁸ and mining facilities on the Moon or other celestial bodies¹⁹ are further examples of possible future commercial space ventures.

Some manufacturing processes have already been tested on Space Shuttle flights and private companies are seriously contemplating the first steps towards building factories in outer space.²⁰

special cooling systems, advanced welding tools, computer programs, a human tissue stimulator, and fire resistant materials. *Id.*

15. See Fuqua, *Space Industrialization: Some Legal and Policy Considerations for Private Enterprise*, 8 J. SPACE L. 1, 2-3 (1980) ("Private enterprise interest in space will center around goods and services for use on earth which can be produced either uniquely in space or better in space than on earth").

16. See Smith, Lopatkiewicz & Rothblatt, *Legal Implications of a Permanent Manned Presence in Space*, 85 W. VA. L. REV. 857, 858 (1983).

17. See *Management*, *supra* note 9, at 94 (discussing semiconductor crystals and pharmaceuticals); Tennen, *supra* note 11, at 147 (manufacture of ball bearings, pharmaceuticals, optical components, metal foams, and novel alloys not cost-effective or possible in gravity); *Impact of Treaties*, *supra* note 1, at 390 (electronic materials, biological preparations, glass and ceramics, physical processes in fluids, and metallurgical, chemical, and electrochemical processes).

18. See *1979 Annual Meeting: Space Commerce and the Space Shuttle, Its Development: Legal, Scientific and Practical Implications*, 21 JURIMETRICS J. 73, 76 (1980) (summary of paper delivered by Dr. Christopher Kraft, Director, Lyndon B. Johnson Space Center, Houston, Texas) [hereinafter cited as *Space Commerce*].

19. See Diederiks-Verschoor & Gormley, *supra* note 4, at 139-40.

20. McDonnell Douglas Astronautics and the Ortho Pharmaceuticals Division of Johnson & Johnson are interested in establishing a space facility to manufacture a wide assortment of pharmaceuticals through a process called electrophoresis. This process was successfully tested on the fourth American Space Shuttle flight. Smith, Lopatkiewicz & Rothblatt, *supra* note 16, at 858-59. International Satellite Industries, Inc., was incorporated in Delaware on August 3, 1978, for the purpose of furthering the construction of solar power satellites. Tennen, *supra* note 11, at 148.

Private commercial ventures in space should benefit from President Reagan's recent proposal to construct a permanently manned space station within a decade. President's State of the Union Address, 20 WEEKLY COMP. PRES. DOC. 87, 90-91 (Jan. 25, 1984). In a national radio address three days after his State of the Union address, the President discussed the role of private enterprise in America's space strategy:

The third goal of our space strategy will be to encourage American industry to move quickly and decisively into space. Obstacles to private sec-

The successful operation of the Space Shuttle is a key part in any space manufacturing plans,²¹ and if the Shuttle program continues at its present rate of development, the era of full-scale manufacturing may be realized in the very near future.²²

tor space activities will be removed, and we'll take appropriate steps to spur private enterprise in space.

We expect space-related investments to grow quickly in future years, creating many new jobs and greater prosperity for all Americans. Companies interested in putting payloads into space, for example, should have ready access to private sector launch services.

Transportation Secretary Elizabeth Dole will work to stimulate the private sector investment in commercial, unmanned space boosters. We need a thriving, commercial launch industry. NASA, along with other departments and agencies, will be taking a number of initiatives to promote private sector investment to ensure our lead over current and potential foreign competitors. So, we're going to bring into play America's greatest asset—the vitality of our free enterprise system.

20 WEEKLY COMP. PRES. DOC. 113, 113-14 (Jan. 28, 1984).

"By constructing and launching the facility, along with several unmanned platforms, the government increases the predictability associated with investing in an otherwise risky area. Private industry will have a safe, reliable habitat in space—created and maintained by the resources of the entire nation." Meslin & Lippy, *Should We Construct a Space Station? Yes, Its Potential is Vast*, L.A. Times, Feb. 1, 1984, Part II, at 5, col. 3 (the authors specialize in analyzing commercial and industrial opportunities in space).

See generally Fuqua, *supra* note 15, at 4-6 (proposal for a Space Industrialization Corporation to provide investment capital and establish the proper business climate so that industries will enter into space manufacturing); Smith, *International Utilization and Management of Space Systems*, 2 HOUS. J. INT'L L. 113 (1979) (proposal for development of space platforms with private sector participation in the form of a "Space Industrialization Corporation"); Robinson, *supra* note 14, at 457-58 (discussion of efforts by the Committee for the Future to undertake a lunar exploration program supported by private funding, noting that people around the world are "convinced that a rational space research and exploration program is essential to a positive and effective transition from dissipatory political, economic, ideological, and technological parochialisms to a truly global awareness of Earth's ecosphere and its inhabitants." *Id.* at 474).

21. For a discussion of the Space Shuttle program see NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, *supra* note 14, at 6. See also Good, *Earth Space Transport Systems—Concepts, Criteria & Constraints*, 2 HOUS. J. INT'L L. 35 (1979) (discussion of the practical, commercial, and economic problems in the development of a private sector Earth-space transport system, with a view that such a system can and should be developed immediately); Smith, *Current Issues Before Congress Affecting Space Activities—Checklist and Summary*, 10 J. SPACE L. 41, 50 (1982) (The Space Transportation Co., a private corporation, has offered to purchase a fifth shuttle orbiter which it will then give to NASA, or to whomever else operates the Space Shuttle, in exchange for all marketing rights for non-government shuttle users).

22. It has been predicted that "revenues from commercial operations in [outer] space over the next 25 years will grow to tens of billions of dollars per year." STS, *supra* note 1, at 645 (quoting Disher, *Space Transportation, Satellite Services and Space Platforms*, ASTRONAUTICS AND AERONAUTICS 42, 67 (1979)). Some studies indicate that the number of jobs in the space industry will increase

Future commercial utilization of outer space by private enterprise, however, depends on a continued expansion of technology. The law of outer space which will regulate the private sector's space activities is equally important.²³

III. INTERNATIONAL SPACE LAW

A. *The Historical Development of International Space Law*²⁴

The United Nations, through its Committee on the Peaceful Uses of Outer Space (COPUOS), is the primary source of international law dealing with outer space. The first major United Nations action directed toward establishing a body of law for outer space came in the form of a resolution adopted on December 13, 1958.²⁵ This resolution was important in two respects: first, it established the direction of subsequent international agreements by stressing international cooperation and the peaceful use of outer space;²⁶ and second, it created the Ad Hoc Committee on the Peaceful Uses of Outer Space, which later became COPUOS.²⁷

The Committee was charged with investigating the legal and political problems posed by the use of outer space and determining what role the United Nations should play in solving those problems. A report was submitted on June 25, 1959, which set out the major legal problems requiring further study. These

by 5 million by the year 2000, and tax revenues from all space industries will approach \$50 billion annually. Meslin & Lippy, *supra* note 20. *But see*, Sandler & Schulze, *The Economics of Outer Space*, 21 NAT. RESOURCES J. 371 (1981) (in an economic analysis of various space activities, "club arrangement" satellite systems, financed by tolls charged to users, are presently the only feasible commercial space activity).

23. "For the time being, law and science have marched forward together." Finch, *Outer Space Liability: Past, Present, and Future*, 14 INT'L LAW. 123, 127 (1980).

24. The material in this section is taken from C. CHRISTOL, *supra* note 3, at 12-20, 61-88, 154-70, 217-34, 246-48, unless otherwise noted.

25. Resolution 1348 (XIII), *reprinted in* 4 MANUAL ON SPACE LAW 492 (N. Jasentuliyana & R. Lee ed. 1981). *See also* Resolution 1148 (XII). This resolution focused on disarmament in general, and thus is not strictly a resolution respecting space law. Passed soon after the launch of Sputnik 1, this resolution expressed a concern that objects sent into outer space be used "exclusively for peaceful and scientific purposes." C. CHRISTOL, *supra* note 3, at 13.

26. "*Recognizing* the common interest of mankind in outer space and recognizing that it is the common aim that outer space should be used for peaceful purposes only. . . ." Resolution 1348, *supra* note 25 (emphasis in original).

27. The Committee was composed of representatives from Argentina, Australia, Belgium, Brazil, Canada, Czechoslovakia, France, India, Iran, Italy, Japan, Mexico, Poland, Sweden, the Union of Soviet Socialist Republics, the United Arab Republic, the United Kingdom, and the United States.

Resolution 1472 (XIV), *reprinted in* 4 MANUAL ON SPACE LAW, *supra* note 25, at 492, made the *ad hoc* committee a permanent body of the General Assembly. Membership in COPUOS has been increased to 53 members. *See* C. CHRISTOL, *supra* note 3, at 915, for a list of members as of 1982.

problems were in the following areas: (1) freedom of outer space for exploration and use; (2) liability for damages caused by space objects; (3) allocating radio frequencies; (4) avoiding interference between aircraft and space vehicles; (5) registering and coordinating space vehicle launches; and (6) reentry and landing of space vehicles.

Since its inception, COPUOS has worked to find solutions to these legal problems through the creation of international agreements.²⁸ Five such agreements have been adopted by the United Nations: (1) the 1967 Outer Space Treaty;²⁹ (2) the Rescue and Return Agreement of 1968;³⁰ (3) the Liability Convention of 1973;³¹

28. COPUOS operates on a basis of consensus in negotiating agreements. This means that no voting takes place, but instead a decision is made whenever there is no objection by a member state. The Committee has operated with this system since 1962 when it was chosen as a compromise between making decisions based on a majority of votes or based on unanimity. The system has the advantage of forcing the Committee members to work out a mutually acceptable agreement without giving a single state the power to veto an agreement. If an objection is raised to a particular section of a proposed agreement, the entire agreement is not struck down, but rather, additional negotiations can take place concerning only the portion in contention.

Since the final agreement is acceptable to all parties, there is a greater likelihood that all members will comply with the agreed terms. The consensus procedure has received a great deal of praise and has been called "one of the most efficient and effective, if not widespread, means to develop international law." C. CHRISTOL, *supra* note 3, at 18. *But see* Gorove, *NGO's at UNISPACE 82: Session on Legal and Political Aspects, Vienna, Aug. 19, 1982*, 10 J. SPACE L. 198, 201 (1982) (quoting Professor Krateros M. Ioannou for the argument that the consensus principle is being endangered by third world countries who claim they are ignored in COPUOS and, therefore, are attempting to bypass the Committee by taking resolutions directly to the United Nations General Assembly, where they hold the majority of seats).

For a more detailed discussion of the consensus principle and COPUOS, see generally Galloway, *Consensus Decisionmaking by the United Nations Committee on the Peaceful Uses of Outer Space*, 7 J. SPACE L. 3 (1979); Hosenball, *The United Nations Committee on the Peaceful Uses of Outer Space: Past Accomplishments and Future Challenges*, 7 J. SPACE L. 95 (1979).

29. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, *opened for signature* Jan. 27, 1967, 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205, *reprinted in* 2 UNITED STATES SPACE LAW I.I.A.2 (S. Gorove ed. 1982) [hereinafter cited as Outer Space Treaty]. Negotiation of the Outer Space Treaty began in 1962 following the presentation of draft principles by the Soviet Union. Subsequent discussion and input from several countries led to proposed draft treaties in 1965 and the complete agreement in 1967.

30. Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, *opened for signature* Apr. 22, 1968, 19 U.S.T. 7570; T.I.A.S. No. 6599, 672 U.N.T.S. 119, *reprinted in* 2 UNITED STATES SPACE LAW, *supra* note 29, at I.I.A.3. [hereinafter cited as Rescue and Return Agreement]. Debate on the Rescue and Return Agreement began in 1962 follow-

(4) the Registration Convention of 1976,³² and (5) the Moon Treaty of 1979.³³ The United States is a party to all of these agreements except the Moon Treaty, which is the only agreement not yet ratified by the required number of nations.³⁴

The Outer Space Treaty is the "main base for the legal order of the space environment."³⁵ All subsequent international agreements concerning outer space are to a great extent simply amplifications and clarifications of the principles set forth in the Outer Space Treaty.

The United Nations, through these various international agreements, has developed a broad body of international space law which reaches states, international organizations, and private interests.³⁶ The future commercial exploration, use, and exploita-

ing proposals by the United States and the Soviet Union, the only countries then engaged in manned space programs. A final agreement was not reached until 1968, principally due to the Committee's focus on completion of the Outer Space Treaty. The substance of the Rescue and Return Agreement is discussed *infra* in text accompanying notes 63-75.

31. Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1973, 24 U.S.T. 2399, T.I.A.S. No. 7762, *reprinted in* 2 UNITED STATES SPACE LAW, *supra* note 29, at II.A.4. [hereinafter cited as Liability Convention]. The Liability Convention was first discussed in 1962 as a result of a proposal by the United States. Consensus on basic principles of international responsibility was quickly achieved, but implementation of the principles in the form of an international agreement was not achieved until 1972. The area of responsibility for damages is discussed *infra* in text accompanying notes 84-109.

32. Convention on Registration of Objects Launched into Outer Space, *opened for signature* Jan. 14, 1975, 28 U.S.T. 695, T.I.A.S. No. 8480, *reprinted in* 2 UNITED STATES SPACE LAW, *supra* note 29, at II.A.5 [hereinafter cited as Registration Convention]. Registration of space objects was assumed in the Outer Space Treaty, *supra* note 29, art. VIII, but disparity in the nature and amount of information made available concerning space objects prompted the drafting of the Registration Convention. France made the first proposal in 1968 and consensus on a final agreement was eventually achieved in 1975. Details of the Registration Convention are discussed *infra* in text accompanying notes 112-15.

33. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, *opened for signature* Dec. 5, 1979, 18 I.L.M. 1434, *reprinted in* 2 UNITED STATES SPACE LAW, *supra* note 29, at II.A.7 [hereinafter cited as Moon Treaty]. The Outer Space Treaty applies to the Moon as well as to outer space, but the Apollo Moon landings beginning in 1969 sparked a demand for guidelines covering exploitation of lunar and celestial resources. Argentina submitted the first proposal in 1970 and a final draft of the Moon Treaty was approved by COPUOS nine years later. The Moon Treaty is discussed *infra* in text accompanying notes 135-63.

34. The Moon Treaty has been signed by eleven nations and ratified by two others. Five ratifications are necessary for the agreement to enter into force. The Soviet Union is one nation that has not yet signed the Moon Treaty. See *infra* text accompanying notes 135-63 for discussion of the Moon Treaty and why it has not been adopted. For a list of the current status of ratifications of the five United Nations space treaties, see C. CHRISTOL, *supra* note 3, at 908-12.

35. C. CHRISTOL, *supra* note 3, at 20.

36. The international law of outer space is not limited to the treaties drafted by COPUOS, although they do constitute the largest and most important part of international space law. Other sources of space law include general international

tion of space by the private sector will be greatly affected by this law of outer space, and by future international agreements.³⁷

B. *The Basic Principles of International Space Law*³⁸

1. Freedom of exploration, use, and scientific investigation in outer space.

Article I of the Outer Space Treaty establishes that all nations are equally free to explore and use outer space, including the Moon and other celestial bodies, and that such exploration and use shall be conducted to benefit all countries, and shall be the province of all humanity.³⁹ This freedom creates certain rights for

law, the United Nations charter, other United Nations treaties, private agreements between government organizations such as those between NASA and the European Space Administration (ESA), and the rules and regulations relating to radio frequencies promulgated by the International Telecommunications Union (ITU). See Galloway, *supra* note 28, at 9.

37. COPUOS presently has three primary items on its agenda. These are discussed *infra* in text accompanying notes 168-214.

38. The principles of space law rely on a basic underlying philosophy that is expressed in the preamble to the Outer Space Treaty:

Inspired by the great prospects opening up before mankind as a result of man's entry into outer space,

Recognizing the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes,

Believing that the exploration and use of outer space should be carried on for the benefit of all peoples irrespective of the degree of their economic or scientific development,

Desiring to contribute to broad international co-operation in the scientific as well as the legal aspects of the exploration and use of outer space for peaceful purposes,

Believing that such co-operation will contribute to the development of mutual understanding and to the strengthening of friendly relations between States and peoples

Outer Space Treaty, *supra* note 29, preamble. See also Gorove, *Session on "Outer Space, International Law, International Regimes and the Common Heritage of Mankind"*, 10 J. SPACE L. 41, 65 (1982) (quoting a speech by Edward R. Finch, Jr.) (includes a list of additional principles affecting the law of outer space).

The legal principles established by the space treaties are binding only upon states which ratify the agreement. In the following discussion, "state" refers to a nation which is a party to the treaty, unless otherwise indicated. See *infra* note 47 for discussion of when these principles might be binding on all nations.

39. The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.

Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.

There shall be freedom of scientific investigation in outer space, includ-

countries, while also imposing certain obligations upon them. Every state has the right to explore and use outer space, the Moon, and other celestial bodies. The negotiations involved in drafting the treaty indicate that the language of Article I encompasses not only the space environment, but also the natural resources located in that spatial area.⁴⁰ The word "use" has been interpreted to mean "exploitation" on a non-exclusive basis. Thus, all countries have an equal right to exploit the resources of space, subject to other provisions of the treaty.⁴¹

Access to space can not be denied to any state. This provision, however, does not create a right of "innocent passage" through the airspace of another country to reach outer space. Some authorities, however, contend that a customary international right of free passage has developed. This right of passage has resulted from the current practice of states failing to seek permission to pass through foreign airspace en route to orbit, coupled with the lack of protest from countries whose airspace has been previously violated by space-bound objects.⁴²

The requirement that all exploration and use be carried out for the benefit of all countries is a general provision intending only to "serve as a guide for space powers in developing their programs and conducting their activities in space."⁴³ Thus, a state or private entity would not be required to relinquish its intellectual property rights or profits from space ventures.⁴⁴

A further limitation on the freedom to explore and use space is the expression that such activity will be "the province of all man-

ing the moon and other celestial bodies, and States shall facilitate and encourage international co-operation in such investigation.

Outer Space Treaty, *supra* note 29, art. I.

40. C. CHRISTOL, *supra* note 3, at 39.

41. *Id.* at 39-42.

42. See *Regulation*, *supra* note 9, at 183-84; Lachs, *Some Reflections on the State of the Law of Outer Space*, 9 J. SPACE L. 3, 8 (1981) (this customary route would be limited to objects en route to outer space to "explore it and use it in a lawful way").

43. C. CHRISTOL, *supra* note 3, at 42-43 (quoting a legal opinion prepared for the United States Senate Foreign Relations Committee by the Department of State). See *supra* text accompanying notes 11-14.

44. Hoover, *Law and Security in Outer Space from the Viewpoint of Private Industry*, 11 J. SPACE L. 115, 122-24 (1983).

When the U.S. Senate ratified the Outer Space Treaty it attached an understanding setting forth its interpretation of Article I, paragraph 1. It states: "[N]othing in Article I, paragraph 1 of the treaty diminishes or alters the right of the United States to determine how it shares the benefits and results of its space activities." C. CHRISTOL, *supra* note 3, at 43, (quoting SENATE COMM. ON FOREIGN RELATIONS, TREATY ON OUTER SPACE, S. EXEC. REP. NO. 8, 90th Cong., 1st Sess. 4 (1967)). The understanding has the effect of limiting the legal obligations of the United States to the interpretation of the treaty adopted by the Senate.

kind."⁴⁵ This is the first formal international agreement to include a provision demonstrating a concern for all humanity. This principle is also a general provision intended to guide the development of space in a productive and peaceful direction. The "all mankind" condition also serves to unify other parts of the Outer Space Treaty which attempts to provide a framework of international cooperation and mutual enrichment from space activities.⁴⁶ Thus, one of the basic principles of international space law is the universal freedom to explore and use outer space, guided by a concern for all people.⁴⁷

2. Nonappropriation of Outer Space.

Article II of the Outer Space Treaty states that outer space, including the Moon and other celestial bodies, may not be appropriated by any nation.⁴⁸ Thus, no part of the space environment may be placed under the exclusive control of any nation. Taken in conjunction with Article I of the Outer Space Treaty, this principle helps to maintain the freedom to explore and use all portions of space, as well as the Moon and other celestial bodies.

Although the Treaty expressly forbids appropriation by "use or occupation," this is not a ban on the construction of manned

45. C. CHRISTOL, *supra* note 3, at 44. For discussion of the impact of such a provision on international law as a whole, see Cocca, *The Advances in International Law Through the Law of Outer Space*, 9 J. SPACE L. 13 (1981). See also Diederiks-Verschoor & Gormley, *supra* note 4, at 155 (considering humanity to be the "beneficiary" of international space law).

46. C. CHRISTOL, *supra* note 3, at 45-46 ("[I]ts function has been to unify and promote the terms and goals of the . . . [Outer Space] Treaty").

47. The Outer Space Treaty has been ratified by 84 countries. Some commentators believe the provisions for freedom of exploration and use would also apply to non-signatory states. They argue that this principle is legally binding as international customary law based on common usage and lack of opposition from states not party to the agreement. See Diederiks-Verschoor, *Space Law as It Effects Domestic Law*, 7 J. SPACE L. 39, 41 n.10 (1979); Galloway, *Perspectives of Space Law*, 9 J. SPACE L. 21, 28 (1981) ("[T]he practice of nations has been to abide by some principles recognized as customary international space law"); Goedhuis, *Some Recent Trends in the Interpretation and the Implementation of the Rules of International Space Law*, 19 COLUM. J. TRANSNAT'L L. 213, 214-15 (1981). But see *Regulation*, *supra* note 9, at 186-87 ("[T]here is not a widely accepted, codified and agreed upon space law that applies to all countries." SENATE COMM. ON COMMERCE, SCIENCE AND TRANSPORTATION, AGREEMENT GOVERNING THE ACTIVITIES OF STATES ON THE MOON AND OTHER CELESTIAL BODIES, Comm. Print. 96th Cong., 2d Sess. 3, 317 (May 1980) (emphasis in original)).

48. "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." Outer Space Treaty, *supra* note 29, art. II.

space facilities.⁴⁹ The building of a space station or lunar base would not constitute an act of appropriation. Neither would the removal of resources for manufacturing or other use violate Article II.⁵⁰ Such a broad interpretation of Article II would render meaningless the provision for the freedom to explore and use space granted under Article I.

3. The activities of nations must be in accordance with international law, including the Charter of the United Nations.

Activities in the exploration and use of outer space, including the Moon and other celestial bodies, must be conducted in accordance with international law. This principle is established by Article III of the Outer Space Treaty with the intent of maintaining peace and promoting cooperation among nations.⁵¹ By adopting this provision, the drafters of the Treaty intended to provide for a rule of law that would bring some order to activities occurring in space. Application of the rules of international law to outer space provides greater protection of the interests of "all mankind" as declared in Article I.⁵²

4. Limits on the military use of outer space.

The military use of outer space, the Moon, and other celestial bodies is limited by Article IV of the Outer Space Treaty.⁵³ In

49. A study prepared by the Congressional Office of Technology Assessment indicates that the Soviet Union is actively engaged in developing space stations which will allow "permanent settlements off-planet." Current Soviet efforts are centered in the Salyut Space Station Program which began twelve years ago. The Salyut 7 space station now in orbit was recently manned for 150 days by two cosmonauts. L.A. Times, Dec. 22, 1983, Part I, at 1, col. 3.

50. See Gorove, *The Space Shuttle and Some of Its Legal Implications*, in *SPACE SHUTTLE AND THE LAW* 1, 10 (S. Gorove ed. 1980); *Impact of Treaties*, *supra* note 1, at 394.

51. States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding.

Outer Space Treaty, *supra* note 29, art. III.

52. C. CHRISTOL, *supra* note 3, at 47-48. Some of the fundamental principles of international law that would be incorporated by this Article are the "principle of nonaggression, the principle of pacific settlement of disputes, . . . the principle of prohibition of war propoganda and . . . the principle of disarmament." Diederiks-Verschoor, *supra* note 47, at 42.

53. States Parties to the Treaty undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.

The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of mil-

early discussions of principles for outer space, the belief was commonly held that the entire realm of outer space, including the Moon and other celestial bodies, would be limited to use for strictly peaceful purposes. The restrictions of Article IV, however, are not so encompassing, but place only certain limitations on military activities in outer space. This is largely the result of positions taken by the United States and the Soviet Union during treaty negotiations.⁵⁴

Article IV, paragraph 1, applies to the totality of the space environment, but prohibits only nuclear weapons and weapons of mass destruction.⁵⁵ The use of conventional weapons, or other military activities, is not proscribed. Article IV, paragraph 2, which applies to the Moon and other celestial bodies, states that these areas are reserved exclusively for peaceful purposes.⁵⁶

Much discussion has been generated over the exact meaning of "peaceful purposes." The United States has continually asserted that peaceful purposes means non-aggressive uses of the space environment.⁵⁷ In addition, the United States has maintained the right of any state to defend itself against foreign aggression. Under the United States' position, the military would be free to use the Moon and other celestial bodies, as long as the use was non-aggressive and the restriction on the establishment of military bases, the testing of weapons, and the conduct of maneuvers was followed.⁵⁸

The Soviet Union originally took the position that all military activities are potentially aggressive and, therefore, not peaceful.⁵⁹

itary bases, installations and fortifications, the testing of any type of weapons and the conduct of military maneuvers on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the moon and other celestial bodies shall also not be prohibited.

Outer Space Treaty, *supra* note 29, art. IV.

54. C. CHRISTOL, *supra* note 3, at 22-23.

55. *See supra* note 53.

56. *Id.*

57. "It is the view of the United States that outer space should be used only for peaceful—that is, non-aggressive and beneficial—purposes." Cheng, *The Legal Status of Outer Space and Relevant Issues: Delimitation of Outer Space and Definition of Peaceful Use*, 11 J. SPACE L. 89, 99 (1983) (quoting Senator Gore of the United States speaking to the First Committee of the United Nations on December 3, 1962).

58. C. CHRISTOL, *supra* note 3, at 29.

59. *Id.* at 27. "[T]he concept of the 'peaceful use' of outer space excludes any

In response, authorities argued that some military uses, such as reconnaissance satellites, had a stabilizing effect by helping to prevent surprise attacks and would thus ease world tensions.⁶⁰ Whether this is true or not is subject to debate, but as a result of such arguments and the realities of the world's political situation, "peaceful purposes" is now generally interpreted to mean "non-aggressive."⁶¹ Any application of this principle must ultimately take into account the other basic principle of international space law, specifically, the beneficial use of outer space for humanity called for in Article I of the Outer Space Treaty.⁶²

5. The rescue and return of astronauts and space objects.

Article V of the Outer Space Treaty requires each nation to render all possible assistance to astronauts in distress.⁶³ States are further required to report any phenomena they discover which might pose a threat to astronauts.⁶⁴ Underlying this principle is a basic humanitarian desire to protect and save human

measures of a military nature." Zhukov, *Practical Problems of Space Law*, INT'L AFF. (MOSCOW), May 1963, at 27-28 (quoted in C. CHRISTOL, *supra* note 3, at 27).

60. C. CHRISTOL, *supra* note 3, at 28.

61. *Id.* at 27-30. Although the issue of what constitutes a peaceful purpose seems to be settled, i.e., non-aggressive, there may be a weakness in the United States' position. The United States has used military satellites as an example of a military space activity that is non-aggressive. A satellite functions in outer space, but the "peaceful purposes" restriction of Article IV, paragraph 2, does not apply to outer space, only to the Moon and other celestial bodies. Thus, even if the military satellite were aggressive, Article IV would not prohibit its use, unless it contained a nuclear weapon or other weapon of mass destruction. The question of what is a peaceful purpose when applied to some future activity on the Moon or other celestial body will probably depend on the political climate existing at that time. *See also* Cheng, *supra* note 57, at 99 (criticism of the United States' position).

62. *See supra* notes 43-47 and accompanying text. To some extent, the law of outer space is a unique branch of international law due to its devotion to peaceful purposes. Diederiks-Verschoor, *supra* note 47, at 39-41.

63. States Parties to the Treaty shall regard astronauts as envoys of mankind in outer space and shall render to them all possible assistance in the event of accident, distress, or emergency landing on the territory of another State Party or on the high seas. When astronauts make such a landing, they shall be safely and promptly returned to the State of registry of their space vehicle.

In carrying on activities in outer space and on celestial bodies, the astronauts of one State Party shall render all possible assistance to the astronauts of other States Parties.

States Parties to the Treaty shall immediately inform the other States Parties to the Treaty or the Secretary-General of the United Nations of any phenomena they discover in outer space, including the moon and other celestial bodies, which could constitute a danger to the life or health of astronauts.

Outer Space Treaty, *supra* note 29, art. V.

64. *See supra* note 63.

lives.⁶⁵

The Rescue and Return Agreement of 1968 expands upon the Outer Space Treaty, and provides a framework for implementation of these humanitarian concerns. Article 1 of the Agreement requires a state which learns of personnel of a spacecraft having suffered an accident, experiencing distress, or making an emergency or unintended landing to notify the launching authority.⁶⁶ If a spacecraft has made an unintended landing, or a landing due to accident, distress, or emergency, Article 2 imposes a duty upon the country in which the landing occurred to rescue the personnel of that spacecraft. That duty requires the taking of "all possible steps" to effectuate the rescue and to provide all necessary assistance. In some circumstances, the launching state may join with the state of landing to carry out a more effective rescue attempt.⁶⁷ When the personnel of a spacecraft land in an area outside the jurisdiction of any country, Article 3 requires any state which is in a position to help to offer whatever assistance is necessary.⁶⁸ Arti-

65. See, e.g., Rescue and Return Agreement, *supra* note 30, preamble ("Prompted by sentiments of humanity").

66. Each Contracting Party which receives information or discovers that the personnel of a spacecraft have suffered accident or are experiencing conditions of distress or have made an emergency or unintended landing in territory under its jurisdiction or on the high seas or in any other place not under the jurisdiction of any State shall immediately:

(a) Notify the launching authority or, if it cannot identify and immediately communicate with the launching authority, immediately make a public announcement by all appropriate means of communication at its disposal;

(b) Notify the Secretary-General of the United Nations, who should disseminate the information without delay by all appropriate means of communication at his disposal.

Rescue and Return Agreement, *supra* note 30, art. 1.

67. If, owing to accident, distress, emergency or unintended landing, the personnel of a spacecraft land in territory under the jurisdiction of a Contracting Party, it shall immediately take all possible steps to rescue them and render them all necessary assistance. . . . If assistance by the launching authority would help to effect a prompt rescue or would contribute substantially to the effectiveness of search and rescue operations, the launching authority shall co-operate with the Contracting Party with a view to the effective conduct of search and rescue operations. Such operations shall be subject to the direction and control of the Contracting Party, which shall act in close and continuing consultation with the launching authority.

Id. art. 2.

68. If information is received or it is discovered that the personnel of a spacecraft have alighted on the high seas or on any other place not under the jurisdiction of any State, those Contracting Parties which are in a position to do so shall, if necessary, extend assistance in search and rescue operations for such personnel to assure their speedy rescue. They shall

cle 4 provides that personnel of a spacecraft shall be safely and promptly returned to the launching authority.⁶⁹ The return of space objects or their component parts and payment for any expenses incurred by the rescuing country are governed by Article 5.⁷⁰

The provisions of the Rescue and Return Agreement extend greater protection to space personnel than granted by Article V of the Outer Space Treaty. The Agreement encompasses "personnel of a spacecraft," not just astronauts. Thus, any crew member who ventures into space will be protected by the Agreement.⁷¹ The Agreement also broadens the definition of types of incidents for which aid must be given. The new area which is not listed in the Outer Space Treaty is "unintended landings."⁷² Basically, this covers any landing due to inadvertence or mistake made by the personnel of the spacecraft or the organization which has control

inform the launching authority and the Secretary-General of the United Nations of the steps they are taking and of their progress.

Id. art. 3.

69. If, owing to accident, distress, emergency or unintended landing, the personnel of a spacecraft land in territory under the jurisdiction of a Contracting Party or have been found on the high seas or in any other place not under the jurisdiction of any State, they shall be safely and promptly returned to representatives of the launching authority.

Id. art. 4.

70. 1. Each Contracting Party which receives information or discovers that a space object or its component parts has returned to Earth in territory under its jurisdiction or on the high seas or in any other place not under the jurisdiction of any State, shall notify the launching authority and the Secretary-General of the United Nations.

2. Each Contracting Party having jurisdiction over the territory on which a space object or its component parts has been discovered shall, upon the request of the launching authority and with assistance from that authority if requested, take such steps as it finds practicable to recover the object or component parts.

3. Upon request of the launching authority, objects launched into outer space or their component parts found beyond the territorial limits of the launching authority shall be returned to or held at the disposal of representatives of the launching authority, which shall, upon request, furnish identifying data prior to their return.

4. Notwithstanding paragraphs 2 and 3 of this article, a Contracting Party which has reason to believe that a space object or its component parts discovered in territory under its jurisdiction, or recovered by it elsewhere, is of a hazardous or deleterious nature may so notify the launching authority, which shall immediately take effective steps, under the direction and control of the said Contracting Party, to eliminate possible danger of harm.

5. Expenses incurred in fulfilling obligations to recover and return a space object or its component parts under paragraphs 2 and 3 of this article shall be borne by the launching authority.

Id. art. 5.

71. C. CHRISTOL, *supra* note 3, at 183. Thus, civilian scientists or engineers who conduct experiments during Space Shuttle flights will receive the same protection as the astronauts who pilot the Shuttle.

72. *See supra* note 66. *Cf. supra* note 63 (provisions of Outer Space Treaty).

over it.⁷³ The notice requirement of Article 1⁷⁴ is also an expansion of the duty imposed on a state when faced with a situation where personnel of a spacecraft need assistance.⁷⁵ Finally, Article 5 of the Rescue and Return Agreement expands on a duty first created in Article VIII of the Outer Space Treaty.⁷⁶ By creating clear guidelines concerning the return of space objects and their component parts, the Agreement makes possible the implementation of the duty to return both personnel and equipment.

The Rescue and Return Agreement, as well as Article V of the Outer Space Treaty, is important for many reasons, but its greatest impact is found in the concrete and practical manner in which it expresses a deep concern for humanity and the preservation of life.

6. International responsibility for national activities in outer space.

The Outer Space Treaty imposes two types of responsibility on states. First, Article VI requires that a state bear national responsibility for all of its activities in space, whether carried out by governmental agencies or non-governmental entities. The activities of the non-governmental entity must be authorized and supervised by the state in order to assure compliance with international law.⁷⁷ Second, Article VII places international liability for any damages caused by a space object or its component parts

73. C. CHRISTOL, *supra* note 3, at 183-84. The "most obvious example of an unintended landing . . . is one caused by a navigational error, either by the astronaut in the spacecraft, the controllers on Earth, or by automatic equipment." Dembling & Arons, *The Treaty on Rescue and Return of Astronauts and Space Objects*, 9 WM. & MARY L. REV. 630, 646 (1968).

74. See *supra* note 66.

75. C. CHRISTOL, *supra* note 3, at 184-85.

76. See *infra* note 110.

77. 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.

Outer Space Treaty, *supra* note 29, art. VI.

upon the initial launching state and the state from whose territory the object was actually launched.⁷⁸

The most important aspect of the national responsibility established by Article VI is the inclusion of non-governmental agencies.⁷⁹ The effect of Article VI is to place obligations on states and limitations upon private individuals within those states. The state must establish some framework which will allow it to authorize and supervise private space activities and assure that those activities are not in violation of international space law.⁸⁰ The non-governmental organization must follow the mandates established by the state pursuant to carrying out its responsibility. It then follows that some activities might not be open to the private sector should the national government pass laws prohibiting that activity.⁸¹ Since the laws of the state from which the launch takes place are controlling, the possibility arises that a non-governmental entity in one country would be allowed to engage in a certain space project which a non-governmental entity in another country could not undertake.⁸² In allocating responsibility for the space activities of non-governmental entities to states, Article VI also implicitly grants those entities the right to undertake space activities.⁸³

The Liability Convention of 1972⁸⁴ provides, in great detail, for the implementation of international liability for damages imposed

78. 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 natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the moon and other celestial bodies.

Id. art. VII.

79. By including "non-governmental entities" within the scope of national responsibility, the Outer Space Treaty mandates that all future space activities, whether public or private, will to some extent involve the national government. Thus, there can never be any truly "private" space activity.

80. See DeSaussure, *Toward a Law for Space Transport, The Maritime Analogy*, 14 LINCOLN L. REV. 1, 42 (1983); Diederiks-Verschoor & Gormley, *supra* note 4, at 141; Dula, *Free Enterprise and the Proposed Moon Treaty*, 2 HOUS. J. INT'L L. 3, 6 (1979); Vereshchetin, *supra* note 2, at 35-37. The steps taken by the United States to carry out this obligation are discussed *infra* in text accompanying notes 220-39.

81. See *supra* note 12 for a discussion of the Landsat program.

82. See C. CHRISTOL, *supra* note 3, at 831-32. In the future, countries desiring to have private groups use their launching facilities might lower the restrictions they impose under Article VI. A state that undertakes such an incentive program must bear in mind, however, that it will ultimately be held internationally responsible for the actions of its customers.

83. Menter, *supra* note 9, at 61. The effect of this grant upon private investment in outer space is discussed *infra* note 217 and accompanying text.

84. See *supra* note 31.

upon states by Article VII of the Outer Space Treaty.⁸⁵ The Liability Convention is "the most complex single international space treaty presently in force as the positive law of the United States."⁸⁶ The scope of this article, however, allows for only a very general discussion of its terms.⁸⁷

Article I of the Liability Convention provides important definitions.⁸⁸ In establishing which parties are subject to liability, the Convention allocates responsibility based upon a state's role in the launch of the space object which caused the damage. Ownership of the object is irrelevant.⁸⁹ Thus, all of the states involved in the launch may be liable rather than the one state which is technically the "owner" of the object.⁹⁰ The definition of damages given in Article I would allow recovery for only the direct damages caused by the space object. There is no recovery of nominal or punitive damages.⁹¹ The definition of "space object" would include payloads, e.g., an experiment carried into space by the Space Shuttle.⁹²

Articles II through VI establish the extent of a state's liability

85. See *supra* note 78.

86. *Management, supra* note 9, at 96-97. Much of the complexity arises in the detailed claims procedure contained in the Convention.

87. For an exhaustive discussion of all aspects of liability in outer space, and a proposal for an International Court of Outer Space, see M. FORKOSCH, *OUTER SPACE AND LEGAL LIABILITY* (1982). See also Christol, *International Liability for Damage Caused By Space Objects*, 74 AM. J. INT'L L. 346 (1980); Diederiks-Verschoor & Gormley, *supra* note 4, at 145-52; Finch, *supra* note 23, at 123-27.

88. (a) The term "damage" means 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;

(b) The term "launching" includes attempted launching;

(c) The term "launching state" means:

(i) A state which launches or procures the launching of a space object;

(ii) A state from whose territory or facility a space object is launched;

(d) The term "space object" includes component parts of a space object as well as its launch vehicle and parts thereof.

Liability Convention, *supra* note 31, art. I.

89. See *Impact of Treaties, supra* note 1, at 396.

90. For example, the United States' Space Shuttle will be used to carry the European Space Agency's Spacelab into Earth orbit. If the Spacelab were to fall to Earth and cause damage, the United States would be liable by virtue of launching the Spacelab, even though it does not "own" the Spacelab.

91. *Space Commerce, supra* note 18, at 82-83.

92. *Id.* at 81.

under different circumstances.⁹³ Absolute liability is placed on a

93.

Article II

A launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight.

Article III

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.

Article IV

1. 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, and of damage thereby being caused to a third State or to its natural or juridical persons, the first two States shall be jointly and severally liable to the third State, to the extent indicated by the following:

(a) If the damage has been caused to the third State on the surface of the earth or to aircraft in flight, their liability to the third State shall be absolute;

(b) If the damage has been caused to a space object of the third State or to persons or property on board that space object elsewhere than on the surface of the earth, their liability to the third State shall be based on the fault of either of the first two States or on the fault of persons for whom either is responsible.

2. In all cases of joint and several liability referred to in paragraph 1 of this article, the burden of compensation for the damage shall be apportioned between the first two States in accordance with the extent to which they were at fault; if the extent of the fault of each of these States cannot be established, the burden of compensation shall be apportioned equally between them. Such apportionment shall be without prejudice to the right of the third State to seek the entire compensation due under this Convention from any or all of the launching States which are jointly and severally liable.

Article V

1. Whenever two or more States jointly launch a space object, they shall be jointly and severally liable for any damage caused.

2. A launching State which has paid compensation for damage shall have the right to present a claim for indemnification to other participants in the joint launching. The participants in a joint launching may conclude agreements regarding the apportioning among themselves of the financial obligation in respect of which they are jointly and severally liable. Such agreements shall be without prejudice to the right of a State sustaining damage to seek the entire compensation due under this Convention from any or all of the launching States which are jointly and severally liable.

3. A State from whose territory or facility a space object is launched shall be regarded as a participant in a joint launching.

Article VI

1. Subject to the provisions of paragraph 2 of this article, exoneration from absolute liability shall be granted to the extent that a launching State establishes that the damage has resulted either wholly or partially from gross negligence or from an act or omission done with intent to cause damage on the part of a claimant State or of natural or juridical persons it represents.

2. No exoneration whatever shall be granted in cases where the damage has resulted from activities conducted by a launching State which are not in conformity with international law including, in particular, the Charter of the United Nations and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

launching state if the damage occurs on the surface of the Earth or to aircraft in flight.⁹⁴ Liability based on fault is applied to a launching state if the damage occurs "elsewhere than on the surface of the earth to a space object of [another] launching State or to persons or property on board such a space object. . . ."⁹⁵ When damage is caused by a space object that was jointly launched by two or more states, the Liability Convention provides that they shall be held jointly and severally liable for the damages.⁹⁶ In cases where two or more states are held to be jointly and severally liable, provision is made for apportionment and indemnification.⁹⁷ In addition, states engaging in a joint launch are free to draft an agreement apportioning responsibility among themselves.⁹⁸ Article VI grants exoneration from absolute liability if the state making the claim is shown to have acted with gross negligence or intentionally acted or failed to act with the intent to cause damage, and these actions contributed to the damage. No exoneration is allowed for a launching state that was not in compliance with international law.⁹⁹

Parties which are allowed to make claims are specified in Articles VII¹⁰⁰ and VIII.¹⁰¹ Citizens of the launching state and foreign citizens involved in the launch or operation of the space object

Liability Convention, *supra* note 31, arts. II-VI.

94. *Id.* arts. II, IV(1)(a).

95. *Id.* arts. III, IV(1)(b). In keeping with the state's responsibility for the actions of its citizens, the fault of persons for whom it is responsible will be imputed to the launching state. *Id.* The state's recourse against its citizen will depend upon the laws of that state. *Impact of Treaties, supra* note 1, at 396.

96. Liability Convention, *supra* note 31, art. V(1). If one launching state's space object damages the space object of a second state elsewhere than on the Earth's surface, and as a result a third state is damaged, the first two states are also jointly and severally liable. *Id.* art. IV(1).

97. *Id.* arts. IV(2), V(2).

98. *Id.* art. V(2). *See, e.g.,* Support of United States Activities at the Canadian National Research Council Space Research, Sept. 20, 1979, art. XI, 30 U.S.T. 7565, T.I.A.S. No. 9601, *reprinted in* 2 UNITED STATES SPACE LAW, *supra* note 29, II.B.5 at 47.

99. Liability Convention, *supra* note 31, art. VI. As a result of this last consideration, any state that was not fulfilling its obligations to authorize and supervise the space activities of its non-governmental entities would not be entitled to exoneration. This is a great incentive for states to take their international responsibilities seriously.

100. The provisions of this Convention shall not apply to damage caused by a space object of a launching State to:

(a) Nationals of that launching State;

(b) Foreign nationals during such time as they are participating in the operation of that space object from the time of its launching or at any stage thereafter until its descent, or during such time as they are in the

are not covered by the Convention.¹⁰² Such parties would have to resort to standard national and international avenues for compensation.

The claims procedure under the Liability Convention is set out in Articles IX through XI,¹⁰³ and the procedure to be followed in resolving any disputes that arise is set forth in Articles XIV

immediate vicinity of a planned launching or recovery area as the result of an invitation by that launching State.

Id. art. VII.

101. 1. A State which suffers damage, or whose natural or juridical persons suffer damage, may present to a launching State a claim for compensation for such damage.

2. If the State of nationality has not presented a claim another State may, in respect of damage sustained in its territory by any natural or juridical person, present a claim to a launching State.

3. If neither the State of nationality nor the State in whose territory the damage was sustained has presented a claim or notified its intention of presenting a claim, another State may, in respect of damage sustained by its permanent residents, present a claim to a launching State.

Id. art. VIII.

102. *Id.* art. VII. It is assumed that the parties involved in the launch will be able to work out claims among themselves. The Convention is more concerned with claims brought by states who had no role in the launch.

103. Article IX

A claim for compensation for damage shall be presented to a launching State through diplomatic channels. If a State does not maintain diplomatic relations with the launching State concerned, it may request another State to present its claim to that launching State or otherwise represent its interests under this Convention. It may also present its claim through the Secretary-General of the United Nations, provided the claimant State and the launching State are both Members of the United Nations.

Article X

1. A claim for compensation for damage may be presented to a launching State not later than one year following the date of the occurrence of the damage or the identification of the launching State which is liable.

2. If, however, a State does not know of the occurrence of the damage or has not been able to identify the launching State which is liable, it may present a claim within one year following the date on which it learned of the aforementioned facts; however, this period shall in no event exceed one year following the date on which the State could reasonably be expected to have learned of the facts through the exercise of due diligence.

3. The time-limits specified in paragraphs 1 and 2 of this article shall apply even if the full extent of the damage may not be known. In this event, however, the claimant State shall be entitled to revise the claim and submit additional documentation after the expiration of such time-limits until one year after the full extent of damage is known.

Article XI

1. Presentation of a claim to a launching State for compensation for damage under this Convention shall not require the prior exhaustion of any local remedies which may be available to a claimant State or to natural or juridical persons it represents.

2. Nothing in this Convention shall prevent a State, or natural or juridical persons it might represent, from pursuing a claim in the courts or administrative tribunals or agencies of a launching State. A State shall not, however, be entitled to present a claim under this Convention in respect of the same damage for which a claim is being pursued in the courts or administrative tribunals or agencies of a launching State or under another international agreement which is binding on the States concerned.

through XX.¹⁰⁴ Article XII is concerned with the manner by which the amount of compensation is to be determined.¹⁰⁵ This provision is critical because it calls for the application of an international rule of law rather than that of any one particular country. Thus, the amount of compensation will not depend on the laws of either the responsible launching state or states or those of the claimant state.¹⁰⁶

The Liability Convention does not cover all areas of liability.¹⁰⁷ In those areas not covered, existing national and international law must be considered for relief. Opinions as to the effectiveness of the Convention vary. Some experts believe the agreement is inadequate,¹⁰⁸ others claim it "satisfactorily meet[s] the goal of providing prompt and adequate compensation to injured parties."¹⁰⁹ In any event, the Convention reinforces the basic principle that

Id. arts. IX-XI.

Under these procedures a claim must be made through diplomatic channels by a state. There is no provision under this agreement for individuals to make their own claims, although they could pursue a claim through the normal judicial or administrative channels of the launching state.

104. *Id.* arts. XIV-XX. These articles provide for the establishment of a Claims Commission to resolve the dispute.

105. The compensation . . . shall be determined in accordance with international law and the principles of justice and equity, in order to provide such reparation in respect of the damage as will restore the [one] on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred.

Id. art. XII.

106. Some consider this article to be the "most critical part of the existing international law on this subject." *Space Commerce, supra* note 18, at 82. Use of this standard avoids the conflict between compensation laws used by western countries and those used by socialist countries. *Id.*

107. Haanappel, *Product Liability in Space Law*, 2 HOUS. J. INT'L L. 55, 56 (1979). Some areas not covered by the Liability Convention are: 1) the liability of a private person or organization to an injured party and to the launching state which bears liability under the Convention; 2) the liability if damage occurs in a state not party to the agreement or is caused by the space object of a non-party; and 3) the liability for injury to citizens of the launching state or foreign citizens involved in the operation. *Id.*

There is also uncertainty as to recovery for damage done in space by a person rather than a space object. Hoover, *Law and Security in Outer Space from the Viewpoint of Private Industry*, 11 J. SPACE L. 115, 119 (1983).

108. *E.g.*, Tamm, *Hail? No—It's Skylab*, 2 HOUS. J. INT'L L. 131 (1979).

109. Christol, *supra* note 87, at 369. For an example demonstrating the effective use of the Liability Convention, see *Canada's Claim Against the U.S.S.R. Arising out of the Cosmos 954 Incident and the Claim's Settlement, reprinted in 2 UNITED STATES SPACE LAW, supra* note 29, II.D.2. Canada eventually received three million Canadian dollars in settlement for the costs incurred by the Canadian government in cleaning up the radioactive debris from Cosmos 954. *Id.* at 8.

states are internationally responsible for their national activities in outer space.

7. The state of registry retains jurisdiction and control over a space object and its personnel.

The seventh basic principle of international space law is established by Article VIII of the Outer Space Treaty.¹¹⁰ Under the terms of this Article, jurisdiction and control over a space object and its personnel remains with the state of registry while the object and personnel are in outer space or on a celestial body.¹¹¹ Thus, a space object and its personnel have the same status with regard to the state of registry, whether they are on Earth or in outer space.

“The term State of registry means a launching State on whose registry a space object is carried in accordance with article II” of the Registration Convention.¹¹² Article II of the Registration Convention requires a launching state to register any object it launches into Earth orbit or beyond. The contents of the registration and the procedures for maintaining it are left to the discretion of the individual state.¹¹³ Where two or more states join in launching a space object, they must agree between themselves as to which will be the state of registry.¹¹⁴ Their agreement on which party will be the state of registry does not prohibit them from making additional agreements to allocate jurisdiction and control over the object and its personnel.¹¹⁵

Although Article II of the Outer Space Treaty prohibits national

110. A State Party to the Treaty on whose registry 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. Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return.

Outer Space Treaty, *supra* note 29, art. VIII.

111. Article VIII also provides for the return of space objects to their state of registry. *See supra* text accompanying notes 68-75.

112. Registration Convention, *supra* note 32, art. I.

113. *See infra* notes 239-40 and accompanying text.

114. *See, e.g.*, Memorandum of Understanding Between the Department of Space of the Government of India and the United States National Aeronautics and Space Administration Concerning the Furnishing of Launching and Associated Services for Indian National Satellite System - I Spacecraft, July 18, 1978, art. V, 30 U.S.T. 1751, T.I.A.S. No. 9285, *reprinted in* 2 UNITED STATES SPACE LAW, *supra* note 29, II.B.10 at 12. The agreement calls for India to register each satellite launched for it by NASA under the agreement.

115. Registration Convention, *supra* note 32, art. II.

appropriation of space by claims of sovereignty, by use or occupation, or by any other means,¹¹⁶ the state of registry is not forbidden to "exercise sovereign rights unrelated to national appropriation."¹¹⁷ Thus a state could "require other States to refrain from interfering with the direction and supervision of [an] object or with any of the technical arrangements necessary for the fulfillment of its mission of exploration and use of outer space."¹¹⁸ In addition to exerting control over the object, the state may also enforce its jurisdiction over space personnel.¹¹⁹ In other words, the civil and criminal laws of the state of registry may be extended to include nationals of that state who are in outer space or on a celestial body.

It is important that a state retain jurisdiction and control over its space objects and personnel while they are in space or on a celestial body because of the state's international responsibility for national activities in space. Without jurisdiction and control, the state could not ensure that the object or personnel obey international space law. Thus, Article VIII¹²⁰ and the Registration Convention¹²¹ provide states with the means to carry out the obligations imposed upon them by the international agreements respecting space activities.

8. The exploration and use of outer space and celestial bodies is to be guided by the principle of international cooperation.

The principle of exploration and use of space appears in the preamble,¹²² Article I,¹²³ and Articles IX through XI of the Outer Space Treaty.¹²⁴ International cooperation is intended to permeate all space activity, and certain concrete steps to achieve this

116. Outer Space Treaty, *supra* note 29, art. II. See also *supra* text accompanying notes 48-50.

117. Gorove, *supra* note 50, at 9.

118. M. LACHS, *THE LAW OF OUTER SPACE* 69-70 (1972).

119. "If a genuine link exists between a State and individuals deemed to be its nationals, it is settled that the jurisdiction of the state of nationality will follow all such persons into outer space." Glazer, *Domicile and Industry in Outer Space*, 17 *COLUM. J. TRANSNAT'L L.* 67, 104 (1978).

120. See *supra* note 110.

121. See *supra* note 32.

122. See *supra* note 38.

123. See *supra* note 39.

124. Outer Space Treaty, *supra* note 29, arts. IX-XI. See *infra* notes 125, 128 & 129 for the text of these articles.

goal have already been taken. Article IX requires that all states conduct their activities with due regard to the corresponding interests of other states.¹²⁵ States must also avoid harmful contamination or adverse changes of the Earth's environment in the course of their activities.¹²⁶ Finally, Article IX requires a state which has reason to believe its space activities might cause potentially harmful interference with the lawful space activities of another state to undertake appropriate international consultations before carrying out its activity. Likewise, a state may request consultation if it has reason to believe another state's activities might harmfully interfere with its own lawful space activities.¹²⁷

Additional steps to promote international cooperation are provided in Articles X¹²⁸ and XI¹²⁹ of the Outer Space Treaty. Arti-

125. In the exploration and use of outer space, including the moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and 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. States Parties to the Treaty shall pursue studies of outer space, including the moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose. If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its national in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the moon and other celestial bodies, may request consultation concerning the activity or experiment.

Id. art. IX.

126. *Id.*

127. *Id.* The channels through which such consultations would take place have not been established. One possibility would be for the United States to use the State Department to respond to any requests or to make any requests of its own. A United States corporation would have to go through the government to request such consultations.

128. In order to promote international co-operation in the exploration and use of outer space, including the moon and other celestial bodies, in conformity with the purposes of this Treaty, the States Parties to the Treaty shall consider on a basis of equality any requests by other States Parties to the Treaty to be afforded an opportunity to observe the flight of space objects launched by those States.

The nature of such an opportunity for observation and the conditions under which it could be afforded shall be determined by agreement between the States concerned.

Id. art. X.

129. In order to promote international co-operation in the peaceful exploration and use of outer space, States Parties to the Treaty conducting activities in outer space, including the moon and other celestial bodies, agree to

cle X requires a state to consider, on an equal basis, any requests by other states to observe the flight of space objects launched by that state.¹³⁰ Article XI requires launching states to inform the world of the nature, conduct, locations, and results of their space activities.¹³¹ Through international cooperation, it is hoped that conflict in space can be avoided and there will be no interference in the freedom to explore and use outer space and celestial bodies.¹³²

C. *Current Issues in International Space Law*

The Outer Space Treaty and the international agreements¹³³ that followed cover many different legal issues which might arise during the exploration and use of outer space and the celestial bodies. There are some important legal issues, however, that have not yet been resolved. The eventual solutions to these questions will undoubtedly have an impact on the commercial use of outer space. The main issues of current interest and importance are: (1) ratification of the Moon Treaty; (2) direct broadcast satellites; (3) remote sensing; (4) the definition and/or delimitation of space and the geostationary orbit; and (5) the use of nuclear power sources in outer space.¹³⁴

1. Ratification of the Moon Treaty.

The purpose of the Moon Treaty,¹³⁵ as set forth in its preamble,

inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of the nature, conduct, locations and results of such activities. On receiving the said information, the Secretary-General of the United Nations should be prepared to disseminate it immediately and effectively.

Id. art. XI.

130. See *supra* note 128.

131. See *supra* note 129.

132. One criticism made of this principle, and the agreements creating it, is the lack of any effective relief for a state or non-governmental entity that experiences interference with its rights. Hoover, *supra* note 107, at 121. A possible solution would be the drafting of a treaty, patterned after the Liability Convention, which would allow recovery for damages caused by unlawful interference with rights respecting outer space.

133. See *supra* text accompanying notes 29-32.

134. See generally Galloway, *supra* note 47, at 26-29; Gorove, *Current Issues of Space Law Before the United Nations*, 11 J. SPACE L. 5 (1983); Small, *Security Aspects of the Current United Nations Space Law Agenda*, 11 J. SPACE L. 51 (1983).

135. Moon Treaty, *supra* note 33. Article 1 of the Moon Treaty applies to the Moon, orbits around or to the Moon, and orbits to other celestial bodies within the

is to promote cooperation among states on an equal basis in exploring the Moon, to prevent international conflict, and to define and develop the existing legal documents relating to the Moon.¹³⁶ The overall emphasis is on controlling the exploitation of the natural resources of the Moon. Article 11¹³⁷ is the primary section dealing with lunar natural resources. This Article is also the center of debate over ratification of the Treaty.¹³⁸ Critics argue that the provisions of Article 11 will hinder the future exploitation of the Moon's resources.¹³⁹ Proponents feel that the Treaty is necessary to ensure that mutual exploitation of the lunar resources

solar system. *Id.* art. 1. Therefore, all references herein made to the Moon shall also include these other segments of the space environment, unless otherwise indicated.

136. *Determined* to promote on the basis of equality the further development of co-operation among States in the exploration and use of the moon and other celestial bodies,

Desiring to prevent the moon from becoming an area of international conflict,

Taking into account the need to define and develop the provisions of these international instruments in relation to the moon and other celestial bodies, having regard to further progress in the exploration and use of outer space

Id. preamble (emphasis in original).

137. 1. The moon and its natural resources are the common heritage of mankind, which finds its expression in the provisions of this Agreement, in particular in paragraph 5 of this article.

2. The moon is not subject to national appropriation by any claim of sovereignty, by means of use or occupation, or by any other means.

3. Neither the surface nor the subsurface of the moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental organization, national organization, or non-governmental entity or of any natural person. The placement of personnel, space vehicles, equipment, facilities, stations and installations on or below the surface of the moon, including structures connected with its surface or subsurface, shall not create a right of ownership over the surface or the subsurface of the moon or any areas thereof. The foregoing provisions are without prejudice to the international regime referred to in paragraph 5 of this article.

4. States Parties have the right to exploration and use of the moon without discrimination of any kind, on a basis of equality and in accordance with international law and the provisions of this Agreement.

5. States Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible

Moon Treaty, *supra* note 33, art. 11(1)-(5).

138. The other articles of the Moon Treaty add to or clarify existing law in many areas, including peaceful use of the Moon, information about lunar missions, use of lunar samples for scientific purposes, protection of personnel on the Moon, and liability and jurisdiction on the Moon. None of these articles have met with any significant criticism. See Hosenball, *supra* note 28, at 100-05 (containing a comprehensive list of the areas of international space law clarified by the Treaty).

139. See, e.g., Walsh, *Controversial Issues under Article XI of the Moon Treaty*, 6 ANNALS AIR & SPACE L. 489 (1981); Comment, *Americans and the Moon Treaty*, 46 J. AIR L. & COM. 729 (1981).

will be possible.¹⁴⁰

Generally, Article 11 states that the Moon and its natural resources are the "common heritage of mankind." The Moon and its resources are not subject to appropriation by any claims of sovereignty or to ownership by any state, intergovernmental organization, or non-governmental entity.¹⁴¹ According to Article 11, states shall have the freedom to explore and use the Moon on an equal basis. An international regime to govern the exploitation of the Moon's resources shall be established when such exploitation becomes feasible.¹⁴²

The rules set forth in Article 11 do not appear out of line with the provisions of existing space law. The Article emphasizes three principles: international cooperation; no national appropriation; and freedom to explore and use space. These three principles are set forth in the Outer Space Treaty.¹⁴³ Why, then, are so many countries hesitant to sign and ratify the Treaty?¹⁴⁴ One underlying reason is a lack of urgency since there are no present plans to exploit the natural resources of the Moon or other celestial bodies. The more important reason, however, is the concern over the different interpretations of the "common heritage of mankind" principle as it applies to an equitable sharing of resources, and the establishment of the future international regime.¹⁴⁵

Opponents of the Moon Treaty interpret paragraph 1, taken in conjunction with paragraph 5,¹⁴⁶ as placing a moratorium on the commercial exploitation of resources until the international regime is established. This interpretation is supported by the terms of the Treaty itself. Article 6 specifically allows scientific investigation of the Moon,¹⁴⁷ but nowhere in the Treaty is commercial

140. See, e.g., Christol, *The Common Heritage of Mankind Provision in the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, 14 INT'L LAW. 429 (1980); Menter, *Commercial Space Activities Under the Moon Treaty*, 7 SYRACUSE J. INT'L L. & COM. 213 (1979).

141. See *supra* note 137.

142. *Id.*

143. See *supra* text accompanying notes 39-50, 122-132.

144. See *supra* note 34.

145. Galloway, *Law and Security in Outer Space: The Role of Congress in Space Law and Policy*, 11 J. SPACE L. 35, 49 (1983).

146. See *supra* note 137.

147. "There shall be freedom of scientific investigation on the moon by all States Parties without discrimination of any kind, on the basis of equality and in accordance with international law." Moon Treaty, *supra* note 33, art. 6(1).

exploitation specifically approved.¹⁴⁸ The purported basis for this moratorium would be to protect those resources which are the common heritage of the world until such time as the international regime can oversee commercial exploitation.¹⁴⁹

The second argument advanced by Moon Treaty opponents is that the international regime will be unsympathetic to free enterprise. The socialist states and third world countries will allegedly have the power to regulate and control commercial use to such an extent that it will be economically unfeasible for companies to undertake private ventures.¹⁵⁰ In examining the Moon Treaty, opponents conclude that "the marginal advantages which might be made in a few provisions are far outweighed by the enormous sacrifice that would be required of our Nation's future economic interests in space development."¹⁵¹

Supporters of the Moon Treaty reject the idea that Article 11 imposes a moratorium on commercial exploitation of the Moon's resources.¹⁵² This interpretation of the Treaty is based on two

148. See Christol, *The American Bar Association and the 1979 Moon Treaty: The Search for a Position*, 9 J. SPACE. L. 77, 79 (1981); Dula, *supra* note 80, at 16; Comment, *supra* note 139, at 750-53.

149. Comment, *supra* note 139, at 750-53. Commercial entities fear such a moratorium because of the uncertainty surrounding the proposed legal regime. The regime is not to be established until exploitation becomes feasible, but if there is a moratorium on commercial activities, a corporation might not be able to proceed with pilot projects necessary for establishing feasibility. Thus, the moratorium could continue for an indefinite period of time and commercial activities on the Moon would be foreclosed.

150. Christol, *supra* note 148, at 79; Dula, *supra* note 80, at 16; Comment, *supra* note 139, at 750-53.

Much of this concern is generated by an examination of the international regime set forth in the Law of the Sea Treaty. If this regime was used as a pattern, industry's "right to participate, or to continue operating, or to retain its technology, or to retain and control the benefit derived from its activities" would be affected. All of these areas would be "subjected to the economic, political, and nationalistic considerations of an international body or organization and the member states thereof. . . ." Hoover, *supra* note 107, at 121.

The concerns over the international regime are valid, yet one important factor is often overlooked. Any regime charged with overseeing the exploitation of the Moon's resources will have to take into account the interests of the states actually involved in the exploitation. Otherwise, these states will not join in the regime and it will be powerless. Thus, the United States, as one of the few countries with the capital and technology to engage in lunar exploitation, would be able to play a determinative role in the creation of the international regime. If third world nations try to set up an oppressive regime, the United States would simply refuse to take part, thus depriving the other countries of any of the benefits of the Moon.

151. Comment, *supra* note 139, at 754 (quoting a memorandum written by the L-5 Society in rebuttal to a State Department Bulletin supporting the Moon Treaty).

152. "The purpose and intent of the Moon Treaty . . . is to allow for the present exploitation of moon resources. It is only the establishment of the international regime that is to await exploitation The regime is to follow the exploitation—not the exploitation to follow the regime." Christol, *supra* note 140, at 476.

factors. First, the Outer Space Treaty grants the right to exploit the lunar resources and the Moon Treaty does not expressly overrule that right. Second, the negotiated history of the Moon Treaty supports the "no moratorium" interpretation.¹⁵³ During preliminary Treaty negotiations, the United States made unilateral statements defining its position that the Treaty would not create a moratorium.¹⁵⁴ These statements were never contradicted by any other country. Therefore, the statements of the United States must be recognized in interpreting the Treaty.¹⁵⁵ Based on these uncontradicted assertions, the Moon Treaty's proponents are confident that ratification of the Treaty would not create a moratorium on exploitation of lunar resources. The Moon Treaty's supporters are also confident that the proposed international regime will not be prohibitive to commercial exploitation. The proponents argue that an international regime will not be created for many years and will not be obligated to assume any special form.¹⁵⁶ If the United States desires to participate in the eventual creation of the international regime, it must ratify the Treaty.¹⁵⁷ Pro-Treaty forces also assert that developing countries will not have any greater power in the operation of the international re-

153. See Comment, *supra* note 139, at 755-56. See also C. CHRISTOL, *supra* note 3, at 278-79 (the phrase "in place" in paragraph 3 allows ownership by the acquirer of lunar resources after they are removed from the Moon).

154. "[T]he United States is not prepared to accept an express or implied prohibition on the exploitation of possible natural resources In our view, the Moon agreement cannot reasonably seek to require that exploitation must await the establishment of the treaty-based regime." Hosenball, *supra* note 28, at 103 (quoting the United States representative's statement before the Legal Subcommittee of COPUOS, April, 19, 1973). "The draft agreement . . . as part of the compromises made by many delegations, places no moratorium upon the exploitation of the natural resources on celestial bodies, pending the establishment of an international regime." *Id.* at 104 (quoting a statement made by the United States representative on July 3, 1979). The Soviet Union also expressed its opposition to any pre-regime moratorium. Comment, *supra* note 139, at 756.

155. Customary international law, as reflected in the Vienna Convention on the Law of Treaties, U.N. Doc. A/CN. 39/27, opened for signature May 23, 1969, provides that United Nations documentation of a treaty's negotiation shall be used in interpreting the provisions of the agreement. See Menter, *supra* note 140, at 222.

156. See *supra* note 137. Article 11(5) of the Moon Treaty, *supra* note 137, gives no indication of what form the international regime is to take. All that is mandated is the creation of "appropriate procedures" to govern exploitation of the Moon's resources.

157. The rebuttal to this argument is that no international regime will be likely to arise if the two space powers, the United States and the Soviet Union, do not ratify the Treaty. Even if the rest of the world undertook to create such a regime, it would be useless if the countries involved in exploitation of the Moon's resources were not a part of the organization.

gime than they had in drafting the Moon Treaty.¹⁵⁸

Some Treaty supporters have called for the ratification of the Treaty to be accompanied by understandings and declarations expressing the United States' interpretation of the Treaty.¹⁵⁹ An "understanding" filed by a state is an interpretation of the treaty's terms. A "declaration" is a national statement of policy concerning the treaty. "When such qualifications relate to the international application of the agreement, such formal statements become binding in international law between the United States and those States which either accept or do not object to the indicated national position."¹⁶⁰ Thus, the United States could not be held to an interpretation in conflict with its own expressed interpretation of the Moon Treaty.¹⁶¹ There is a risk, however, that all states might ratify the Treaty with their own understandings. In that event, the general agreement and its negotiated history would lose all meaning—it would be as if no Treaty existed at all.¹⁶² Presently, the opponents of the Moon Treaty appear to have persuaded the United States not to ratify the Treaty. As long as the United States and the Soviet Union elect not to ratify the agreement, the Moon Treaty is unlikely to become effective. It is clear, however, that the Treaty still has significance. When technology develops to the point at which exploitation of the Moon's natural resources is imminent, the Moon Treaty will be the starting point for developing the international law that will control lunar exploitation.¹⁶³

158. See Comment, *supra* note 139, at 755-58. This argument assumes the validity of the earlier pro-Moon Treaty arguments. If these arguments are incorrect and the Treaty does create a moratorium, developing countries should be able to create an equally oppressive international regime, since they will have as much power as they had in drafting the Moon Treaty.

159. The American Bar Association Section of International Law and the Section of Natural Resources have taken this position and have also outlined the principles that should be included in the United States' declarations. American Bar Association, *Report to the House of Delegates* 1 (1981), reprinted in Christol, *supra* note 148, at 90-91.

160. Christol, *supra* note 148, at 88.

161. *Id.*

162. *Id.* at 82.

163. The United States, by failing to ratify the Moon Treaty, seems to have accepted the arguments of the Treaty's opponents. The basic principle behind all of these arguments is the fear that private enterprise will not be able to engage in commercial exploitation of the Moon. An argument can be made that this attitude is exactly why the Moon Treaty is needed. If "international co-operation" and the "common heritage of mankind" are to have any real effect, the profit motive must be subordinated in favor of a service motive. In ratifying the Outer Space Treaty, the United States agreed that it would carry out its space activities for the benefit and in the interest of all countries. See art. I, *supra* note 39. This country's commitment to that principle is questionable when the primary factor in judging the

2. Direct broadcast satellites.

Direct broadcast satellites may be used to transmit directly into a country without that country's consent. The members of COPUOS,¹⁶⁴ and of the United Nations General Assembly differ sharply regarding the type of international restrictions, if any, that should be placed upon the use of direct broadcast satellites.¹⁶⁵

The United States views all people as having an unrestricted right of access to information.¹⁶⁶ Third world nations assert that every country has a sovereign right to control the information entering it if that country deems it necessary to protect its citizens.¹⁶⁷ There is, however, general agreement that some form of international agreement dealing with direct broadcast satellites should be sought. The different views respecting such an agreement are based on fundamentally opposing political philosophies and any mutually acceptable agreement is unlikely at the present time.¹⁶⁸ As a result, there is little discussion concerning this issue and COPUOS has removed the issue from its agenda.¹⁶⁹

merits of the Moon Treaty is whether or not American businesses will be able to retain all their profits.

The greatest obstacle to ratification of the Moon Treaty in the United States is the split within this country as to how the rest of the world will interpret the Moon Treaty. The negotiated history, besides clarifying the United States' position, also expresses the views of the other states involved in drafting the Moon Treaty. When the anti-Treaty forces within the United States put aside their "what-ifs" and look at what is, the Moon Treaty stands a good chance of ratification. This point may not come, however, until the United States actually begins to exploit the Moon's resources and the Treaty's opponents realize how strong the United States' bargaining position really is.

164. For a discussion of COPUOS, see *supra* notes 27-28 and accompanying text; Gorove, *supra* note 28, at 201.

165. See Galloway, *supra* note 47, at 26; Gorove, *supra* note 28, at 201.

166. See Galloway, *supra* note 47, at 26.

167. See Gorove, *supra* note 28, at 201.

168. The United Nations General Assembly passed a resolution in 1982 which consisted of principles for regulating direct broadcast satellites. This resolution bypassed the normal procedure of achieving a consensus in COPUOS before going to the General Assembly. Thus, many countries disagree with some or all of the principles. There is some question whether this resolution will have any value in the drafting of an international agreement. See *Current Documents*, 10 J. SPACE L. 252 (1982) reprinting the General Assembly's resolution; Gorove, *supra* note 134, at 5; Jasentuliyana, *Review of the Work of the United Nations Committee on the Peaceful Uses of Outer Space*, 11 J. SPACE L. 125, 129 (1983); *supra* note 28.

169. See Gorove, *supra* note 134, at 5.

3. Remote sensing.

The current agenda before COPUOS includes the “[l]egal implications of remote sensing^[170] of the Earth from space, with the aim of formulating draft principles.”¹⁷¹ Draft principles have been developed, but many of its portions do not have the consensus approval of all countries in COPUOS.¹⁷² The basic question which remains to be answered is “whether there should be unlimited freedom to disseminate data and information gained by remote sensing or whether it [is] necessary to require consent by the sensed state^[173] and impose restrictions” upon the dissemination of the data.¹⁷⁴

Three different views relating to remote sensing have been presented and argued before COPUOS. The underdeveloped countries contend that they have a sovereign right to any information regarding their own resources, and a right to forbid dissemination of the data to other nations.¹⁷⁵ The Soviet Union and other socialist states have taken the position that certain types of data should be freely available while other types should be restricted,¹⁷⁶ and that states should be responsible for all remote sensing activities because private, non-governmental entities might misuse the technology.¹⁷⁷ The United States believes that all states should be able to conduct remote sensing and that information generated should be freely disseminated.¹⁷⁸ In addition, the United States contends that a sensed state has no sovereign

170. Remote sensing is the use of satellites to obtain data regarding the natural resources of a specific region on the Earth's surface.

171. Gorove, *supra* note 134, at 5. COPUOS meets annually and utilizes an agenda containing the issues that were not decided during negotiations at the previous year's meetings.

172. *Id.* at 6. See *Current Documents*, 11 J. SPACE L. 165 (1983) (texts of draft principles on remote sensing).

173. A sensed state is the country whose natural resources have been explored by remote sensing satellites.

174. Gorove, *supra* note 134, at 6.

175. *Id.* at 7.

176. *Id.* One criterion that might be used to differentiate would be the degree of resolution of the data. That is, data with a very high resolution, or showing great detail, would be restricted. No threshold of resolution has been established. *Id.*

177. *Id.* “If receiving stations were in private hands and the operators of these stations felt free to treat the data they received as a marketable commodity . . . a very different and unpleasant situation could arise.” *Id.* (quoting Soviet Union views expressed during 1983 COPUOS meeting). The Soviet Union's position probably grows out of its basic political and philosophical distrust of private enterprise.

178. “All countries should have an opportunity to participate in remote sensing activities through international cooperation, and remote sensing data should be as freely accessible as possible” *Id.* at 8 (quoting statement by United States at the 1983 meeting of COPUOS).

rights in data concerning it; and furthermore, that the United States has no international responsibility for the manner in which its nationals make use of data collected by the United States.¹⁷⁹

Resolution of this philosophical conflict is more likely to come through the world-wide availability of remote sensing technology than from political change. The basic concern of the developing countries is not the gathering of information; rather, it is the manner in which the information is used.¹⁸⁰ No consent is required to engage in remote sensing. If all countries had remote sensing capability, they would all have access to the information and, thus, the question of dissemination would be moot. As more countries participate in remote sensing projects, emphasis will shift away from controls on access to data towards control of the use of data.¹⁸¹ When this stage is reached, an international agreement will be more likely since principles banning the misuse of data should be agreeable to most countries.¹⁸²

4. The definition and/or delimitation of space and the geostationary orbit.

The question of where outer space begins has been debated since interest in international space law first began.¹⁸³ Since 1976, concerns over use of the geostationary¹⁸⁴ orbit have been considered along with the delimitation/definition question. COPUOS'

179. *Id.* Even if the United States has no legal responsibility to control the private use of data it collects, it would seem that the United States should feel some sense of moral responsibility not to allow or participate in the misuse of data it gathers concerning another country's natural resources.

180. *Id.*

181. See Gorove, *supra* note 134, at 13; Small, *Security Aspects of the Current United Nations Space Law Agenda*, 11 J. SPACE L. 51, 53 (1983). It is both impractical and unnecessary to require all countries to launch their own remote sensing satellites. A few satellites servicing all nations is more efficient. But the realization that all countries could legally engage in remote sensing helps to focus on the important issue—how the data is used.

182. Establishing controls on the fair use of data should be an easier task than creating a compromise between the philosophies of national sovereignty and freedom of access to information. The existing international laws regulating unfair competition and unfair trade practices might provide a starting point for dealing with these problems. Gorove, *supra* note 134, at 13.

183. See *supra* text accompanying note 25.

184. The geostationary orbit is an orbit around the Earth at approximately 22,300 miles. An object in this orbit travels at the same speed as the Earth's rotation. Thus, the object remains fixed over a specific location on Earth. Telecommunications satellites must be in a geostationary orbit to be effective. This orbit is sometimes referred to as a geosynchronous orbit.

agenda now includes “[m]atters relating to the definition and/or delimitation of outer space activities, bearing in mind, *inter alia*, questions relating to the geostationary orbit.”¹⁸⁵

The airspace above a country is within the territorial jurisdiction of that country.¹⁸⁶ The state has broad powers to control what goes on within the limits of its territorial jurisdiction. It may regulate or prevent access, exit, or transit of manned or unmanned aircraft.¹⁸⁷ Under the Outer Space Treaty, national sovereignty does not extend into outer space.¹⁸⁸ Thus, the question arises, where does airspace end and outer space begin? There is division within COPUOS whether the question really requires an answer. No clear consensus regarding where the line should be drawn has been reached by those countries that desire a definite demarcation.¹⁸⁹

Advocates of the need for a definition argue that the existing international treaties covering outer space require a precise definition of outer space for proper application of international treaties. The logical gap of creating a law of outer space without defining what constitutes outer space creates legal ambiguities requiring resolution.¹⁹⁰

Opponents of a definition claim that an arbitrary decision at this point in time might deter further developments in space.¹⁹¹ They argue that no problems have arisen due to the lack of a definition, and that it is better to maintain the status quo rather than risk creating a definition that may cause problems at a later date.¹⁹² Therefore, an international agreement is not presently

185. Gorove, *supra* note 134, at 5; *see also* Galloway, *supra* note 47, at 27.

186. *Regulation*, *supra* note 9, at 157.

187. *Id.*

188. *See* Outer Space Treaty, *supra* note 29, art. II; *supra* note 48 (text of Article II); *supra* text accompanying notes 48-50.

189. Gorove, *supra* note 134, at 10.

190. *See* Gorove, *supra* note 28, at 205 (quoting remarks made by Daniel Cassidy); *see also* Cheng, *supra* note 57 (author criticizes the United States for opposing any definition); Kopal, *The Question of Defining Outer Space*, 8 J. SPACE L. 154 (1980) (discussion of history of debate and proposal of a definition).

191. An arbitrary definition made in light of current technology may be overly restrictive when applied to future technology. The definition might affect developments which are presently beyond imagination.

192. *See* Gorove, *supra* note 28, at 205 (quoting remarks made by Daniel Cassidy); *see also* Gorove, *supra* note 134, at 14 (no pressing need for a definition or physical demarcation); *STS*, *supra* note 1, at 634 (Space Shuttle does not create a need for a definition of space); Rosenfield, *Where Airspace Ends and Outer Space Begins*, 7 J. SPACE L. 137, 147 (1979) (no present need to set a limit).

Some who argue against a definition believe that a customary rule of international law is developing which sets the boundary of outer space at a point just below the lowest altitude at which a satellite can orbit without falling back to Earth. *See* *Regulation*, *supra* note 9, at 157; Gorove, *supra* note 134, at 11; Kopal, *supra* note 190, at 172-73.

needed.

Those countries requesting a legal definition of outer space generally advocate a "spatial" definition, consisting of a precise physical demarcation line set at a specific altitude.¹⁹³ Those countries that believe there is no present need for a definition generally support a "functional" definition, if a definition must be made.¹⁹⁴ Based upon a functional definition, space would be defined according to activities rather than location. Certain activities would be considered space activities no matter where they occurred, and would be regulated by the law of outer space. Other activities would be classified as airspace activities and would be governed accordingly.¹⁹⁵ The "functional" definition allows for greater flexibility as technology develops new space capabilities. For instance, a new activity clearly affecting outer space might fall outside of space law simply because it was not foreseen when an arbitrary boundary was established. The flexibility of the "functional" definition would allow this type of activity to evolve under proper international rules.¹⁹⁶

On December 3, 1976, eight equatorial countries¹⁹⁷ meeting in Bogota, Columbia, issued a declaration which added to the definition/delimitation debate. The 1976 Bogota Declaration¹⁹⁸ asserted that the geostationary orbit¹⁹⁹ is a natural resource of the equatorial states and is thus subject to their sovereignty. The Declaration claimed that no object shall be placed in a geostationary orbit without the authorization of the underlying states. Further, it was asserted that the Outer Space Treaty does not apply to the geostationary orbit.²⁰⁰

Until the Bogota Declaration, the geostationary orbit was as-

193. At least nine different spatial approaches to defining and/or delimiting outer space have been suggested. See Rosenfield, *supra* note 192, at 139-40. The Soviet Union made a proposal in 1979 that the region above 100 or 110 kilometers above sea level be defined as outer space. C. CHRISTOL, *supra* note 3, at 488-89.

194. The United States falls into this category.

195. See Gorove, *supra* note 134, at 11-12.

196. See *infra* note 219.

197. An equatorial state is a country which is traversed by the Equator. The eight countries were Brazil, Colombia, the Congo, Ecuador, Indonesia, Kenya, Uganda, and Zaire. Gabon and Somalia are the only equatorial countries not joining in the declaration.

198. First Meeting of Equatorial Countries, *El Espectador* (Colombia), Dec. 3, 1976, reprinted in C. CHRISTOL, *supra* note 3, at 891-95.

199. See *supra* note 184.

200. See Sloup, *Outer Space Delimitation Proposals: Enlightened Jurisprudence*

sumed to be a part of outer space and was included in the Outer Space Treaty's provision forbidding national appropriation by claims of sovereignty.²⁰¹ Countries continually utilized the orbit in their space activities.²⁰² The equatorial countries challenged this idea based upon a declaration of legal conclusions arising out of scientific and technological data.²⁰³ Those states involved in space activities objected to the Declaration's scientific assumptions, arguing that the Outer Space Treaty does, in fact, apply to the geostationary orbit.²⁰⁴ These states viewed the Bogota Declaration as a political statement unsupported by either scientific and technological data or international law.²⁰⁵ Conversely, many third world countries expressed support for the Declaration. It is presumed that developing nations are seeking greater control over the allocation of radio frequencies for use by geostationary telecommunications satellites and acknowledge the Bogota Declaration as a means of attaining such control.²⁰⁶

Although the Bogota Declaration is generally held to have no legal merit,²⁰⁷ it has served to focus attention on third world concerns for equitable access to the geostationary orbit. Thus, the Bogota Declaration has been effective from a political standpoint.²⁰⁸ The future of the definition/delimitation question may well be decided by politics rather than any scientific distinction

or Celestial Shakedown? Some Implications for Private Enterprise, 2 HOUS. J. INT'L L. 87, 91-94 (1979).

The Bogota Declaration affects the definition/delimitation debate because of its claims of ownership. Under the Outer Space Treaty, no part of outer space is subject to claims of national appropriation. See *supra* text accompanying notes 48-50. If the equatorial states do in fact own the geostationary orbit then the boundary between airspace and outer space must be set above that orbit. All of the proposed spatial definitions fall well below the altitude of the geostationary orbit. See *supra* note 193.

201. See *supra* note 48 and accompanying text.

202. See *supra* text accompanying notes 11-14 & 184.

203. Sloup, *supra* note 200, at 94.

204. See *id.* at 95-97 ("[N]o scientific or legal basis for a unilateral claim to exclusive national sovereignty over that orbit").

205. *Id.* at 94.

206. Gorove, *supra* note 134, at 12.

207. See C. CHRISTOL, *supra* note 3, at 511-21. "Scholarly analyses of the claims of the equatorial States — except for those emanating from the equatorial States — have been uniformly adverse to the terms of the Bogota Declaration." *Id.* at 513.

208. The 1985 World Administrative Radio Conference (WARC) is expected to address procedures to "guarantee in practice equitable access to the geostationary orbit." Stowe, *The Legal and Political Considerations of the 1985 World Administrative Radio Conference*, 11 J. SPACE L. 61, 62 (1983); Gorove, *supra* note 134, at 14. It is hoped that a solution can be worked out that will be satisfactory to the countries using the geostationary orbit today and the countries concerned that they will be deprived of ever getting to use the orbit. But see Stowe, *supra* note 53, where the author warns that political factors have taken the place of technological factors and pose a threat to the United States' economic interests.

between airspace and outer space.²⁰⁹

5. The use of nuclear power sources in outer space.

The COPUOS agenda includes "[c]onsideration of the possibility of supplementing the norms of international law relevant to the use of nuclear power sources in outer space."²¹⁰ Interest in this subject arose as a result of the Cosmos 954 crash in 1978. This Soviet satellite was powered by a nuclear reactor which disintegrated during re-entry and caused radioactive contamination in Canada, the site of the crash.²¹¹

Some members of COPUOS believe that the Liability Convention²¹² is insufficient to deal with all the issues which may arise when a space object carrying radioactive materials crashes on Earth.²¹³ In response to the Cosmos incident, Canada submitted a working paper with the hope of establishing international rules governing the use of nuclear power sources in outer space.²¹⁴ So far, COPUOS has only agreed that if a space object utilizing a nuclear power source should malfunction, the launching state is obligated to notify any state which may be affected by the space object's re-entry.²¹⁵ The prospect of the use of nuclear power sources in outer space is controversial and there is little doubt it will be the subject of much debate in the future.

IV. THE EFFECT OF INTERNATIONAL SPACE LAW ON PRIVATE ACTIVITY IN OUTER SPACE

Private use and exploitation of outer space will require enormous amounts of capital. Before any company considers investing in a space project, it should examine all of the factors which might affect that project's success. International space law will be

209. Practically speaking, a political solution is probably more useful than a scientific solution. A stable political environment will benefit international cooperation in the exploration, use, and exploitation of outer space more than a technically correct definition of space that is ignored by the nations of the world.

210. Gorove, *supra* note 134, at 5.

211. *Id.* at 8-9; *see supra* note 109 (discussion of claims arising from the crash).

212. *See supra* text accompanying notes 79-109.

213. Gorove, *supra* note 134, at 9.

214. *Id.* at 9-10. These rules would include: (1) providing notice of the use of nuclear power sources to other countries; (2) giving notice of any reentry of space objects with nuclear power sources; and (3) liability for expenses and damages incurred during the search and subsequent clean-up of radioactive materials. *Id.*

215. *Id.* at 10.

one factor to consider because it has a definite impact on private space activities. The law of outer space has a direct effect on the relationships between private entities and the United States, as well as those with the world community. Furthermore, there are indirect effects which are equally as important as any direct action of international law.

A. *Direct Effects on Private Activity*

1. Corporations and the world.²¹⁶

The basic principles of the international law of outer space are as important to corporations as they are to states because these principles apply equally to both. The overriding principles of international cooperation and peaceful use establish a philosophy toward space that corporations must consider. The most important effect of space law may be that it characterizes outer space differently. The countries of the world have agreed to attempt to keep strife and dissension confined to Earth. The message of the Outer Space Treaty is simple—"We do not have to make the same mistakes again!"

Does this mean that corporations may not use outer space for commercial endeavors? The answer is clearly no. Corporations have the right to use all of outer space, including the Moon and other celestial bodies. The use for commercial gain, however, must remain peaceful and "the benefits derived from space must be shared with all humankind."²¹⁷ Sharing expected benefits does not necessarily mean sharing profits, but rather is intended more as a philosophical guideline. The manner in which a benefit will be shared depends upon the nature of the benefit and the activity which generates the benefit. Countries that use commercial satellites for world-wide, instantaneous communications are sharing in the benefits that come from space activities even though the profits go to the country or corporation which owns the satellite.

The freedom to exploit outer space is an important aspect of international space law. Corporations reap further benefits to the extent that peaceful coexistence is maintained in space. A peace-

216. The private entities which will make commercial use of space are not limited to corporations, but the corporate structure is such a common one that for purposes of this discussion "corporation" will be used to refer to any type of for-profit, non-governmental organization.

217. Tennen, *supra* note 11, at 149. *See also* Hoover, *supra* note 107, at 118 (private industry free to conduct its activities anywhere in space); Reijnen, *Outer Space Law and Private Enterprise in Outer Space: An International Perspective*, 2 HOUS. J. INT'L L. 65, 69 (1979) ("Outer space . . . can be used by private enterprise"); *supra* note 9.

ful environment is a commercially productive environment because corporations are able to operate without external disruption. Although elementary, it is true that "Outer Space Peace is essential to private enterprise."²¹⁸ The Outer Space Treaty promotes outer space peace and thus encourages private activity in outer space.

Another direct international effect upon corporations is the protection corporations receive under the Rescue and Return Agreement. Should a space vehicle operated by a corporation experience distress while in outer space, or have an accident on Earth, the personnel of that vehicle will receive assistance from a state which has joined in the Agreement.²¹⁹ Considering the physical dangers inherent in space activities and the technological resources that would be required to undertake a rescue effort, this is an important benefit for a corporation and its personnel working in outer space.

2. Corporations and the United States.

One of the basic principles of space law is that states are internationally responsible for all national, governmental, and non-governmental activities in outer space.²²⁰ The steps which the United States has taken, and in some instances has not taken, to implement its responsibility have a direct effect on United States corporations seeking to become commercially active in outer space.²²¹

International space law directly affects American corporations in two ways. First, the treaties entered into by the United States are a part of the positive law of this country.²²² Second, the space programs that the government undertakes through NASA are

218. Finch, *Law and Security in Outer Space: Implications for Private Enterprise*, 11 J. SPACE L. 107, 107 (1983). Peace in outer space also has an indirect effect which is discussed *infra* in text accompanying note 242.

219. See *Impact of Treaties*, *supra* note 1, at 398; *STS*, *supra* note 1, at 638. For a discussion of the Rescue and Return Agreement, see *supra* text accompanying notes 66-76.

220. See *supra* text accompanying notes 77-109.

221. See Hoover, *supra* note 107, at 117-18; Reijnen, *supra* note 217, at 69.

222. "This Constitution, and the Laws of the United States . . . and all Treaties made . . . shall be the supreme Law of the Land. . . ." U.S. CONST. art. VI. See *Whitney v. Robertson*, 124 U.S. 190, 194 (1888). See generally *Regulation*, *supra* note 9, at 163-66 for discussion of self-executing or non self-executing nature of the space treaties.

designed to comply with international law.²²³ Corporations which participate in NASA's programs are compelled to comply with international law as well.²²⁴

The United States has imposed its greatest restrictions upon corporate space activities in the area of third-party liability for damage caused by space objects or their component parts. The emphasis on this point is a direct result of the international liability imposed upon the United States by the Outer Space Treaty and the Liability Convention.²²⁵ By means of a launch agreement, NASA shifts this liability to the corporation.²²⁶

The launch agreement requires the corporation, referred to as the user, to purchase insurance which indemnifies the government against third-party claims.²²⁷ In the past, users have purchased up to \$300 million in liability insurance policies for a premium of approximately \$50,000 a launch.²²⁸

223. When NASA was created, Congress declared the policy of the United States to be "that activities in space should be devoted to peaceful purposes for the benefit of all mankind." 42 U.S.C. § 2451(a) (1976). One of the stated objectives for the United States' involvement with space activities is "[c]ooperation by the United States with other nations." *Id.* § 2451 (c) (7). See Diederiks-Verschuur, *supra* note 47, at 45-46.

224. It is the policy of the United States to "encourage domestic commercial exploitation of space capabilities and systems for economic benefit." United States Presidential Decision Memorandum 37, White House Press Release, 14 WEEKLY COMP. PRES. DOC. 1135, 1136 (June 20, 1978). See *supra* note 20. As a result, NASA seeks to involve the private sector in its programs, especially with regard to the Space Shuttle. The need for government regulation to ensure compliance with international law must coexist with the need to attract corporations. The resultant tensions are most noticeable in the area of liability insurance discussed *infra* in text accompanying notes 225-32. See generally *Regulation*, *supra* note 9, at 187-88 (proposed space policy designed to encourage corporations through minimal regulations while still complying with international law).

225. See *supra* text accompanying notes 86-109.

226. For a sample Launch Agreement, see 1 UNITED STATES SPACE LAW, *supra* note 29, I.A.7. In situations where a corporation has not used NASA to launch its space objects, the government would be able to implead the corporation should a claim under the Liability Convention be made against the United States. *Regulation*, *supra* note 9, at 168.

227. In the case of the Space Shuttle, the terms of the Launch Agreement also require that all parties on the same flight agree not to hold each other liable for any damage caused by another party's payload or personnel. Each user is responsible for insuring himself. In addition, the Launch Agreement frees NASA from any liability for damages caused by delay, nonperformance, or improper performance of its services. See DeSaussure, *supra* note 80, at 2; Wolcott, *Some Aspects of Third Party Liability in Space Shuttle Operations*, 13 AKRON L. REV. 613, 615-16 (1980).

228. Mossinghoff, *Managing Tort Liability Risks in the Era of the Space Shuttle*, in SPACE SHUTTLE AND THE LAW 111, 112 (S. Gorove ed. 1980). As a result of the recent losses of satellites launched from the Space Shuttle, some underwriters and brokers of satellite insurance predict that premiums will increase considerably. The loss to insurers from the failure of Westar 6 and Palapa-B2 is estimated at between \$190 million and \$200 million. L.A. Times, Feb. 8, 1984, Part I, at 9, col. 1. On the subject of insurance available to corporations engaged in space activi-

In 1980, section 308 dealing with insurance and indemnification was added to the NASAct.²²⁹ This statute gives NASA the authority to provide liability insurance for users, and to indemnify the user for third-party claims in excess of the liability insurance.²³⁰ The cost of insurance will be reimbursed by the users to the maximum extent practicable.²³¹ This type of authority helps NASA solve the problem raised earlier of encouraging corporations while also complying with international law. Under this arrangement, the user is able to purchase enough insurance to cover most foreseeable risks and is indemnified for any damages his insurance does not cover. This allows the corporation to pay a smaller premium. At the same time, the United States is indemnified in the majority of cases and only has to pay damages in the event of some wholly unforeseeable accident.²³²

Space law has an additional effect on corporations' space activities through the grant of jurisdiction to the United States over space objects and their personnel. This jurisdiction provides the

ties, see generally Hosenball, *The Space Shuttle in Perspective: Commercial Aspects*, in *SPACE SHUTTLE AND THE LAW* 117, 122-23 (S. Gorove ed. 1980); Margo, *Some Aspects of Insuring Satellites*, 1979 *INS. L.J.* 555 (1979); *Space Commerce*, *supra* note 18, at 84 (summary of paper delivered by James W. Barrett).

229. Section 308 in the original statute has been codified at 42 U.S.C. § 2458b and provides as follows:

(a) The Administration is authorized on such terms and to the extent it may deem appropriate to provide liability insurance for any user of a space vehicle to compensate all or a portion of claims by third parties for death, bodily injury, or loss of or damage to property resulting from activities carried on in connection with the launch, operations or recovery of the space vehicle. Appropriations available to the Administration may be used to acquire such insurance, but such appropriations shall be reimbursed to the maximum extent practicable by the users under reimbursement policies established pursuant to section 2473(c) of this title.

(b) Under such regulations in conformity with this section as the Administrator shall prescribe taking into account the availability, cost and terms of liability insurance, any agreement between the Administration and a user of a space vehicle may provide that the United States will indemnify the user against claims (including reasonable expenses of litigation or settlement) by third parties for death, bodily injury, or loss of or damage to property resulting from activities carried on in connection with the launch, operations or recovery of the space vehicle, but only to the extent that such claims are not compensated by liability insurance of the user: *Provided*, That such indemnification may be limited to claims resulting from other than the actual negligence or willful misconduct of the user.

42 U.S.C. § 2458b (a)-(b) (Supp. V 1981) (emphasis in original).

230. *Id.* at § 2458b(b).

231. *Id.* at § 2458b(a).

232. See Mossinghoff, *supra* note 228, at 111 (discussion of section 308 and its importance).

United States with broad powers to regulate corporate activities in space.²³³ This authority is necessary in order for the United States to comply with its obligation to authorize and supervise the activities of its citizens in space.²³⁴ However, the United States has not yet exercised its jurisdiction in outer space. Neither the federal government's criminal jurisdiction nor civil jurisdiction has been extended to outer space.²³⁵ This nonexercise of jurisdiction is understandable given the nature of the United States' space efforts to date. As corporations become more active in space, however, the United States will be forced to extend its jurisdiction to fulfill its legal obligations.

The United States' concern for carrying out its international responsibilities, and the direct effect this has upon corporations, is evident in several provisions of the Launch Agreement. These provisions require that certain information be supplied to NASA by corporations.²³⁶ Although the corporation may retain the rights to any data it collects in space, or the patents on any inventions, it must supply NASA with enough information to verify that the activity has a peaceful purpose and that NASA and the federal government are complying with all laws and obligations.²³⁷ When corporate activity affects the public health, safety, or welfare, the government might require the corporation to make the results of its activities available to the public under reasonable terms and conditions.²³⁸ Through these devices, the government may ensure that the corporations are complying with

233. See Menter, *supra* note 140, at 229-31; Regulation, *supra* note 9, at 175; *supra* text accompanying notes 110-21.

234. If the United States did not have jurisdiction over its space objects and their personnel, there would be no means for the United States to exert control over the actions of the personnel or the space objects. They would be beyond the reach of United States law.

235. See Gorove, *supra* note 50, at 6 (no criminal jurisdiction); Regulation, *supra* note 9, at 183 ("No specific legislation presently exists by which independent private aerospace activities can be brought into conformity with national objectives"); STS, *supra* note 1, at 637-38 (no civil jurisdiction).

There are two exceptions to this situation. First, the Uniform Code of Military Justice extends to military personnel regardless of their location. 10 U.S.C. § 810 (1982). Since the vast majority of astronauts have been in the military, there has been some criminal jurisdiction in the past. The second exception is the absolute authority given to the commander of the Space Shuttle to enforce order and discipline and to take whatever action he deems necessary "for the protection, safety, and well-being of all personnel and on-board equipment, including the STS elements and payloads." 14 C.F.R. § 1214.7 (1983). See STS, *supra* note 1, at 636-37.

236. See *supra* note 226.

237. See 14 C.F.R. § 1214.104(a)-(b) (1983); Menter, *supra* note 1, at 390-91; Mossinghoff, *Intellectual Property Rights in Space Ventures*, 10 J. SPACE L. 107, 108 (1983).

238. See Mossinghoff, *supra* note 237, at 108; 14 C.F.R. § 1214.104(a) (1983). Under any other circumstances, however, NASA seeks not to receive any trade secrets. *Id.* at 110-11.

international law and that the benefits of the corporations' activities will be shared with the world.

A final effect of international law on private activity results from the Registration Convention.²³⁹ When corporations begin launching their own space objects they will be required to register them with the State Department. The State Department is the government's agency in charge of the United States' registry of space objects.²⁴⁰ A registration requirement will be necessary if the United States is to comply with the Registration Convention.

B. Indirect Effects on Private Activity

The greatest negative effect of international space law is the uncertainty of the principles contained in the space treaties.²⁴¹ A determinative factor in a corporate decision to undertake a commercial space venture will be to what extent the corporation believes international space law provides "freedom from danger, fear, anxiety and deprivation relating to its right to conduct business, its equipment, its employees, its technology, and its profits."²⁴²

A variety of issues may cause corporations to seriously question the feasibility of commercial space activities. The expanding role of the military in space creates doubt concerning continued peaceful international cooperation in space.²⁴³ The increased military space activity also causes a transfer of funds from civil programs to military programs.²⁴⁴ Coupled with this concern is the expectation that any loss that occurs will generate long and complex litigation.²⁴⁵ Another unsettled area concerns how much protection corporations will enjoy from interference by other states.²⁴⁶ There is no adequate relief granted to corporations

239. See *supra* text accompanying notes 112-15.

240. See *Regulation, supra* note 9, at 173-74; Reijnen, *supra* note 217, at 71-72.

241. The fears are most evident in the debate over the Moon Treaty. See *supra* text accompanying notes 135-63.

242. Hoover, *supra* note 107, at 115.

243. Reaves, *Commerce in Sky*, 69 A.B.A. J. 1371, 1371 (1983) ("Weapons in space greatly increase the risk to private sector investment") (quoting Rep. George Brown).

244. *Id.* If the United States diverts funds to military space activities, NASA must operate on a smaller budget. Since corporations currently depend on NASA for launchings, any decrease in NASA's capabilities impacts on corporate space activities.

245. See Hoover, *supra* note 107, at 119; *supra* note 107.

246. See *Management, supra* note 9, at 102-03. Interference with a corporation's

which experience interference with their activities, even though the Outer Space Treaty sets forth guidelines.²⁴⁷

The United States' response to its international space law obligations may create uncertainty regarding a commercial project's eventual success. If the United States does not make its positions clear, or overregulates space activities, corporations may be unlikely to undertake the development of space programs.²⁴⁸

The last area of major concern to private industry is the future of space law. Uncertainty over the direction international space law will take indirectly affects the decision of the type of space activities to promote.²⁴⁹ Thus, uncertainty is most evident with regard to the Moon Treaty. The main concerns respecting the Moon Treaty are what form an international regime will take, and the percentage of the benefits from space activities corporations would be allowed to retain.²⁵⁰ Even though the Moon Treaty may never receive the approval necessary to be effective, it still demonstrates the philosophy of many of the members of COPUOS. Future space treaties are likely to represent some of these views, which may be detrimental to the interests of private enterprise.

The indirect effect upon private space activity that results from uncertainty is great.

With the knowledge that rules will be established in the future to govern such [space] activity and without any guidelines to allow an economic

space activities could take many forms. There might be direct military acts taken during war or there could be indirect side effects of peaceful activities. For example, disruption of radio frequencies in the region of a corporation's space manufacturing plant could have serious consequences, especially if the plant depends on data from Earth for its operation.

247. See Hoover, *supra* note 107, at 120-21; *supra* text accompanying notes 122-32.

248. See Reaves, *supra* note 243, at 1371-72.

It is impossible for the private sector in America to establish a meaningful presence in space without a strong civil space program. The one thing that could stop us from developing space would be harsh regulation. Free enterprise does not move where there is no possibility of profit.

Id. at 1372 (quoting Arthur Dula).

249. If the uncertainty surrounding the Moon Treaty continues, corporations will not be able to go ahead with lunar activities. No corporation will devote large amounts of time and money to undertake a pilot project only to have a moratorium placed upon lunar exploitation. See *supra* text accompanying notes 146-55. Whether this fear is valid or not is irrelevant; if fear exists it discourages private enterprise. The same concerns may arise in the context of remote sensing, use of nuclear power sources, and the definition/delimitation question. If corporations cannot predict where the law is going, any investment in space activity would be unlikely. The delay caused by this uncertainty postpones the day when mankind will fully benefit from space and its resources. See *infra* text accompanying note 250.

250. See Dula, *supra* note 80, at 14-17; Hoover, *supra* note 107, at 121-24; *supra* text accompanying notes 135-63. The debate over defining and/or delimiting space also concerns private industry. See Gorove, *supra* note 28, at 205-06 (quoting Daniel Cassidy).

evaluation of the potential return on such activities, investment sources may hesitate or refuse to provide the financing necessary to support the entry into and continuance in outer space activities by private industry.²⁵¹

V. CONCLUSION

The nations of the world have responded to the potential of space by creating the international law of outer space. The Outer Space Treaty and its progeny were drafted in the hope that space will be saved from the conflicts and abuses that plague man's activities on Earth.

Corporations in the United States stand in a unique position to reap the benefits of the law of outer space. Space law has guaranteed the right to use and exploit outer space, and has provided answers to many legal questions that surround the use of space. Out of this legal framework comes an atmosphere which encourages future space activities.

The framework of space law also creates certain obligations for those who would utilize outer space. Chief among these obligations is the requirement that all space activities be carried out for the benefit of humanity. Although the resources of outer space belong to all, only a select few have the capability to exploit them. As a result, American private enterprise must act as a trustee for the world. Corporations may undertake space ventures with an expectation of retaining some of the profits to reward their efforts, but a portion of the proceeds and benefits must be made available to the world community. Sharing the benefits of outer space does not mean simply "cutting up the pie" so that each country receives a slice. Instead, the proceeds of space are to be used to increase the quality of life on Earth and not solely to increase the gross profits of major corporations.

It is vitally important that corporations understand the law of outer space and its basic principles. Not only will space law affect the ways in which corporations utilize space and its resources, but it will also hold the key whereby those resources may be fully exploited. A unique opportunity awaits, and a unique body of law exists to ensure that the opportunity becomes a reality.

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251. Hoover, *supra* note 107, at 122.

