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SHARING THE BENEFITS OF OUTER SPACE EXPLORATION: SPACE LAW AND ECONOMIC DEVELOPMENT

Edwin W. Paxson III*

We regard the sending of the rocket into outer space, and the delivering of our pennant to the moon as our achievement, and by this word "our," we mean the countries of the entire world, i.e., we mean that this is also your achievement and the accomplishment of all the people living on earth.

—Nikita Khrushchev, 1959

That’s one small step for a man. One giant leap for mankind.

—Neil Armstrong, 1969

Humanity has a common stake in space exploration, as suggested by the words that accompanied the first important ventures into outer space. The basic instruments of space law support this contention. Yet space law is typically vague, and the great cost and potential benefits of space exploration have sparked controversy about the obligations of spacefaring nations to share the fruits of their ventures into space with other countries. In particular, developing countries favor a broad obligation to share the tangible benefits derived from space exploration as a means of promoting economic development, while industrialized nations advocate minimal sharing obligations so they may retain control over

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2. Neil Armstrong’s first words upon becoming the first human to set foot on the Moon, on July 20, 1969, quoted in id. at 127.

3. See infra Part I.


5. This controversy will be generally referred to throughout the Note as the "sharing of benefits" debate.

6. See, e.g., the discussion of the New International Economic Order, infra Part III.

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their space programs and keep them economically viable. This Note argues that space-faring nations have only vague legal obligations to share benefits derived from their exploration of outer space, and that while the pressing needs of the developing world militate in favor of sharing to the greatest extent possible, a system of sharing will succeed only if it addresses the interests of space-faring nations.

Part I of this Note will outline the evolution of space law as it concerns the sharing of benefits debate. Part II will analyze interpretations of the provisions of the two treaties central in the sharing of benefits debate, and will focus the debate by discussing the lunar mining issue. Part III will consider the challenge the New International Economic Order concept poses to legal obligations to share benefits. Part IV will evaluate various ways to share benefits and propose a new method which could promote economic development without hampering the incentive to conduct outer space exploration.

I. EVOLUTION OF SPACE LAW

The international community became concerned with the regulation of outer space activities almost immediately after space exploration began with the Soviet Union's successful launch of the Sputnik I satellite in 1957. The United Nations created the Committee on the Peaceful Uses of Outer Space (COPUOS) in 1958 to study the technical and legal problems of space exploration.

Several early U.N. General Assembly resolutions expressed a desire to use outer space for the good of humanity as a whole. However, international lawyers in the early space age were concerned mostly with State sovereignty and militarization in outer space, and the "benefit of mankind" clauses contained in these resolutions were rarely viewed as calls to bolster economic development.

The early U.N. resolutions

7. See Smith, supra note 4, at 45, 55.


9. G.A. Res. 1348 (XIII) (1958) proclaimed that outer space should be used in the "common interest of mankind" and for "the benefit of mankind." G.A. Res. 1472 (XIV) (1959) also spoke of the "common interest of mankind" and of "the betterment of mankind." G.A. Res. 1721 (XVI) (1961) stated a belief in its preamble that "exploration and use of outer space should be only for the betterment of mankind and to the benefit of States irrespective of the stage of their economic or scientific development."

10. The discussions in the first several Colloquia on the Law of Outer Space, conducted by the International Institute of Space Law of the International Astronautical Federation, focus almost exclusively on military uses of outer space. "Benefit of mankind" provisions in space law are still sometimes viewed today as expressing the duty of States to refrain from military activity in outer space. See Zhu Qiwu, Some Reflections on the Most Important Principle of Outer Space Law: To the Common Interests of All Mankind, in
mentioned above and the quick response to widely publicized space exploration fostered the rapid formation of customary law principles, which became the first sources of space law. However, no obligations to share space benefits emerged among the important customary principles that developed, which included: that outer space is open and free for exploration and use by all States; that the sovereignty of States does not extend to outer space; that outer space is not subject to national appropriation; and that States retain jurisdiction and control over space objects launched into outer space.

These customary principles and the "benefit of mankind" provisions of early resolutions were ultimately codified in the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and other Celestial Bodies (Outer Space Treaty) of 1967. This Treaty is viewed as the "Magna Carta" of space law; it establishes broad, general principles for the use and exploration of outer space. The interpretation of the Treaty regarding sharing benefits from space exploration is the subject of great controversy, and will be examined in detail in Part II(A). Three additional treaties, concerning the status of astronauts and objects launched into space, the liability for damage caused by space

PROCEEDINGS OF THE THIRTY-SECOND COLLOQUIUM ON THE LAW OF OUTER SPACE 25, 30 (1989). Professor Cocca was perhaps one of the first commentators to suggest using space to promote economic development. He suggested: "By application of the principles contained in Resolution 1721, the celestial product should serve for the welfare of Humanity and the benefit of the States, irrespective of the stage of their economic or scientific development. W[e] should assign to Resolution 1721 an economic content—which it has not—solving the questions with an idea of a condominium universalis." Aldo Armando Cocca, Legal Status of Celestial Bodies and Economic Status of the Celestial Products, in PROCEEDINGS OF THE SEVENTH COLLOQUIUM ON THE LAW OF OUTER SPACE 15, 20–21 (1964).

12. Id.
15. Smith, supra note 4, at 46.
16. See Mateesco Matte, supra note 14, at 319.
objects,18 and the registration of space objects,19 entered into force before the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement)20 was adopted.

The Moon Agreement applies to the Moon and all other celestial bodies in our solar system apart from the Earth, expands on principles embraced in the Outer Space Treaty, and contains provisions relating to the exploitation of natural resources that have fueled the debate on the sharing of benefits from space exploration.21 The Moon Agreement will be studied in section II(B).

Treaty law rather than custom is the dominant source in space law, and will thus be the focus of the legal analysis of obligations to share in Part II. Treaties are better suited to governing activities in space for three main reasons. First, many States explore space and elaborate space law norms. Second, the subjects of space law are highly specialized. Third, the regulation of space activities develops more quickly than the actual practice of States in the exploration and exploitation of space.22

Because there is very little practice in the sharing of benefits of outer space exploration, particularly in such cases as potentially lucrative as lunar mining,23 an examination of the Outer Space Treaty and the Moon Agreement will be central to understanding whether legal obligations to share the benefits of space exploration exist.

II. TREATY INTERPRETATION

The Outer Space Treaty binds most States, including the major space-faring ones. An analysis of the Treaty reveals that while nations are obliged to share benefits from their ventures into space, they are

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21. See Smith, supra note 4, at 50-54; see also Martin Menter, Commercial Space Activities Under the Moon Treaty, in PROCEEDINGS OF THE TWENTY-THIRD COLLOQUIUM ON THE LAW OF OUTER SPACE 35 (1980).
22. Vereshchetin & Danilenko, supra note 11, at 22-23.
under no definite obligation to share anything beyond what they think is reasonable. The Moon Agreement is binding on few States, none of which are major space-faring nations. The principal value of the agreement is that it reflects the current sharing of benefits debate, and provides an avenue for further developments in space law.

A. The Outer Space Treaty

Article I(1) of the Outer Space Treaty states:
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.24

Article I(1) has been described as the most important principle of space law because it permeates its whole fabric and provides a fundamental guide for all activities conducted in outer space.25 Yet, others suggest that Article I(1) does not satisfactorily establish the rights of States not involved in space exploration in the achievements of space-faring nations, that the "flow of fine words" in Article I serves merely to conceal unsolved conflicts of interest, and that Article I expresses a broad statement of general policy describing a state of affairs yet to be attained rather than a binding legal obligation.26 These allegations, then, suggest that the basis of space law is tenuous at best. However, Article I imposes on nations binding obligations to share, even if these obligations remain ill-defined.

The Outer Space Treaty27 has been ratified by ninety-eight States, and consequently any obligations contained in the Treaty will extend to those States. However, under Article 35 of the Vienna Convention on the Law of Treaties28 the consent of a third-party State is necessary for obligations on its part to arise under a treaty, and hence any obligations

under Article I will not attach to third-party States. 29 This does not materially diminish the importance of the Outer Space Treaty, however, because all the major space-faring nations are parties. 30

The fact that the Outer Space Treaty is binding cannot alone dispel the criticism that it imposes no present obligation on States and that it is only expressive of a future goal. However, this criticism is invalid for several reasons. The provision in Article I requiring space exploration to be carried out for the benefit of all countries was not relegated to the preamble of the Outer Space Treaty, and consequently has the full strength of a duly formulated international contractual norm. 31 The contractual nature of the norm gives it binding force, and while its non-self-executing character may diminish its efficacy, it does not eliminate its operability. 32 Moreover, no written reservations to the Outer Space Treaty were made by any country, and tacit reservations are invalid under Article 23 of the Vienna Convention. 33 Hence, Article I(1) imposes a present obligation on States Parties to carry out their space activities for the benefit and in the interests of all countries, even though this norm remains vague and requires further clarification. 34

The non-self-executing character of Article I implies that absent further U.N. agreements supplementing the Outer Space Treaty, 35 the sharing obligations of Article I will only be rendered more precise when States Parties interpret these obligations themselves, 36 or give

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30. These include: Belgium, Brazil, Byelorussia, Canada, China, Denmark, Federal Republic of Germany, France, Greece, India, Italy, Japan, Netherlands, Spain, Ukraine, Union of Soviet Socialist Republics, United Kingdom, United States. See TREATIES IN FORCE, supra note 27, at 378.

31. See MARCO G. MARCOFF, TRAITÉ DE DROIT INTERNATIONAL PUBLIC DE L’ESPACE 351 (1973). A note on style: Professor Marcoff’s name is spelled variously as “Marcoff,” “Markov,” and “Markoff” throughout space law literature. When referring to Professor Marcoff, this Note will use the spelling used in the source quoted.


33. See MARCOFF, supra note 31, at 352. Article 23(1) states: “A reservation . . . must be formulated in writing and communicated to the contracting States and other States entitled to become parties to the treaty.” Vienna Convention, supra note 28, art. 23(1).


35. To date, the only effort in this regard has been the elaboration of the 1979 Moon Agreement, discussed infra Part II(B).

36. Cf. MARCOFF, supra note 31, at 354–55. Marcoff suggests that use for the benefit of all countries should be interpreted in a way to neutralize economic inequalities between nations.
them effect through instances of actual international cooperation.\textsuperscript{37} Thus, from a practical point of view, space-faring countries can themselves determine their obligations under Article I, which implies that a space-faring nation can share whatever—and as much or little as—it likes so long as it shares something.

The lunar mining issue has focused the sharing of benefits debate by making it concrete, and has shown that the Outer Space Treaty is insufficient to restrict the activities of space-faring nations. Although perhaps not a pressing concern because of the remoteness of its potential implementation, lunar mining is an important issue in space law because scientists believe that selenological resources are plentiful and that harvesting them is possible and probably lucrative.\textsuperscript{38} Through the instruments of space law, developing countries have sought to forbid lunar mining and to secure a claim to resources obtained from any future lunar mining, and at the very least have tried to prevent space-faring countries from arrogating unto themselves a right to engage in lunar mining without a concomitant obligation to share their bounty in some fashion. Arguments by those who support the liberal position of the developing countries and those who support the more restrictive approach of space-faring countries\textsuperscript{39} ultimately show that, at least within the context of the Outer Space Treaty, the position of the industrialized space-faring States prevails.

It is unlikely that the Outer Space Treaty can be taken to prohibit lunar mining. No such prohibition is made explicit anywhere in the Treaty, and the Treaty is explicit when it wishes to prohibit specific activities.\textsuperscript{40} Moreover, interpreting the Treaty to forbid commercial

\textsuperscript{37} See Wolfgang Hampe et al., The Legal Order for the Exploration and Use of Outer Space—Basic Principles, Scope of Application, Trends of Development, in PROCEEDINGS OF THE THIRTY-FIRST COLLOQUIUM ON THE LAW OF OUTER SPACE 98, 103–04 (1988). The authors offer the example of cooperation in the fields of communication and outer space research that has developed outside the United Nations as helping to substantiate article I. They see organizations such as INTERSPUTNIK, INTELSAT, INMARSAT, ARABSAT and INTERCOSMOS as consistent with article I and helping to promote its objectives.


\textsuperscript{39} While Brazil, China, and India are space-faring nations, they may also be classified as developing countries. How their double status might affect the sharing of benefits debate is not central to the discussion in this Note, and will not be explored.

\textsuperscript{40} Böckstiegel, supra note 38, at 6-7. Interpreting the Treaty in this way is also in accord with the general legal principle that "what is not prohibited is permitted." See L.F.E. Goldie, Is There a General International Law of Original Ownership? The Possible Relevance of General Doctrines Governing the Possession of Deep Ocean-Bed Resources, in PROCEEDINGS OF THE NINETEENTH COLLOQUIUM ON THE LAW OF OUTER SPACE 287, 289 (1976).
lunar mining would work to the detriment of developing countries because their limited capabilities for space applications mean that in order to take advantage of space exploration, they would be obliged to avail themselves of the services of space-faring nations. Consequently, forbidding commercial space mining would actually work against a use of space for the benefit of humanity.\(^\text{41}\)

Nor can it be said that treaty provisions dictating space activities should be conducted for "the benefit and in the interests of all countries" should be interpreted as meaning that fruits of lunar mining must be shared with other countries when the resources are returned to Earth. In the absence of an agreed upon interpretation of the Treaty, it is safer to assume that its value lies more in what it excludes rather than what it commits States to do in a positive sense.\(^\text{42}\) In particular, the Treaty prohibits States from disregarding or harming the interests of any country in outer space when conducting space activities.\(^\text{43}\)

Article II of the Outer Space Treaty seems to support the argument that commercial lunar mining should be prohibited, even though the Treaty does not say so expressly.\(^\text{44}\) In relevant part, Article II states: Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use, or by any other means.\(^\text{45}\)

Article II might prohibit commercial lunar mining because any private appropriation would require a State's protection.\(^\text{46}\) Since no State is entitled under the Outer Space Treaty to extend administrative or judicial authority over planetary areas beyond the sites where bases or stations are established, there remains no legal basis for individuals to occupy parts of celestial objects or appropriate their resources.\(^\text{47}\) However, Article II was designed only to avoid potential conflicts over sovereignty rights that might arise once nations establish settlements in space, and the prevailing view among commentators is that it should not be taken to preclude exploitation of selenological resources.\(^\text{48}\)

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41. See Böckstiegel, supra note 38, at 6-7.
43. Id.
45. Outer Space Treaty, supra note 13, art. II.
46. See Markoff, supra note 44, at 81.
47. Id.
48. Menter, supra note 21, at 35.
It might still be argued that mining requires exclusive claims to some territory in which to mine, and that such claims to sovereignty are forbidden under Article II of the Outer Space Treaty. However, by restricting claims to a time period reasonably necessary to mine effectively a given area, and by disavowing expressly any intent to appropriate territory, a mining claim could be distinguished from extension of sovereignty. Claims to use without sovereignty have historical precedents. In the early twentieth century many nations, including the United States, mined resources in the Spitzbergen Archipelago in the Arctic Sea without laying any sovereign claims to the islands themselves.

A further claim of those supporting the position of the developing countries is that, assuming lunar mining is allowed under the Outer Space Treaty, the provision in Article I(1) of the Treaty stating that the "use of outer space . . . shall be carried out for the benefit and in the interests of all countries" must be interpreted to mean that once mined, selenological products may not be appropriated and must be shared. The "Argentine Doctrine" maintains that benefits derived from harvesting space resources must be made available without discrimination to all humanity, and that an effort should be made to distribute these benefits in a way to promote higher living standards and conditions of economic development pursuant to Article 55(a) of the U.N. Charter. One commentator believes that current State practice, such as the sharing of selenological samples by the United States, constitutes compliance with the Outer Space Treaty rather than a courtesy.

Even if the sharing of lunar samples is State practice, it is unlikely that vague proposals advocating some form of redistribution of profits obtained from lunar mining will help developing countries, because such proposals hinder the creation of the stable legal environment necessary to encourage entrepreneurs to venture into lunar mining. Marcoff's more precise suggestion is even less helpful. According to Marcoff, Article I(1) requires that once a moon mining entity fully

49. See Smith, supra note 4, at 47–49.
50. Id.
51. See Goldie, supra note 40, at 289.
53. Id. at 157.
54. See Smith, supra note 4, at 53.
recoups the costs of its mining efforts, all profits resulting from its mining activity must be placed in a common fund which would go to the benefit of "needy peoples." Its validity notwithstanding, this position forecloses the economic viability of lunar mining by eliminating any profits that might have been shared.

Ultimately, Marcoff admits the impossibility of full compensation of Moon miners, even if only because current technology does not allow the hope that lunar mining would even pay for itself. He nevertheless maintains that it is reasonable to expect that countries will share the fruits of their space exploration for the benefit of the global community. Even Smith concedes this, although he differs with Marcoff in what should be done to share space benefits. Smith believes that countries should be free to determine when and how to share the benefits of their exploration, while Marcoff believes that an additional agreement governing the use of planetary resources is required.

Marcoff's call was answered on December 5, 1979, when the U.N. General Assembly by resolution recommended the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (an expansion of the Outer Space Treaty) for signature and ratification. Part II(B) will explore how the introduction of the Agreement has redefined the debate between supporters of the space-faring nation and those of the developing countries.

B. The Moon Agreement

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (the Moon Agreement) has been ratified by only eight countries: Australia, Austria, Chile, Mexico, the Netherlands, Pakistan, the Philippines, and Uruguay. In accordance with Article 19(3) of the Moon Agreement, it entered into force on July 11, 1984, when Austria became the fifth country to ratify. One striking aspect of

55. MARCOFF, supra note 31, at 671-72.
56. See Smith, supra note 4, at 45.
57. MARCOFF, supra note 31, at 672.
58. Id.
59. Smith, supra note 4, at 55.
60. Id; MARCOFF, supra note 31, at 672.
62. Menter, supra note 21, at 35.
63. Multilateral Treaties Deposited with the Secretary General, Status as of Dec. 31, 1990, ST/Leg 1 Ser. E/9.
64. Mateesco Matte, supra note 14, at 319.
the Moon Agreement is that unlike the Outer Space Treaty, which binds ninety-eight nations including all the major space powers, the Moon Agreement is only binding on eight nations, none of which is a major space power. However, the restricted application of the Moon Agreement does not render it irrelevant or marginal in the debate on the sharing of benefits of outer space. To the contrary, the Moon Agreement, particularly Article 11, reflects a highly significant effort to codify the space law of commercial activities. In relevant part, Article 11 states:

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 régime 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 the basis of equality and in accordance with international law and the terms of this Agreement.
5. States Parties to this Agreement hereby undertake to establish an international régime, including appropriate procedures, to govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible. This provision shall be implemented in accordance with article 18 of this Agreement.
6. In order to facilitate the establishment of the international régime referred to in paragraph 5 of this article, States Parties shall 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 any natural resources they may discover on the moon.

65. See TREATIES IN FORCE, supra note 27, at 378–79.
66. However, the Netherlands is a member of the European Space Agency, a major player in contemporary space exploration. The effects of the Moon Agreement on the European Space Agency are beyond the scope of this Note.
67. See Bückstiegel, supra note 38, at 7.
7. The main purposes of the international régime to be established shall include: (a) The orderly and safe development of the natural resources of the moon; (b) The rational management of those resources; (c) The expansion of opportunities in the use of those resources; (d) An equitable sharing by all States Parties in the benefits derived from those resources, whereby the interests and needs of the developing countries, as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the moon, shall be given special consideration.

8. All the activities with respect to the natural resources of the moon shall be carried out in a manner compatible with the purposes specified in paragraph 7 of this article and the provisions of article 6, paragraph 2, of this Agreement.\(^6\)

Article 11 is especially important because it places economic activities in space in the context of current understanding of the economic interests involved. Thus, Article 11 is of primary concern both as part of the existing space law and as an indication for possible future regulations regarding commercial space activities.\(^6\) Moreover, even if the Moon Agreement is not universally ratified, it is important in the questions it raises. In particular, Article 11 of the Moon Agreement is the first Treaty in force to give effect in international law to the concept of the "common heritage of mankind" (the "CHM" concept).\(^7\) The CHM concept is an important step in the evolution of space law, and thus should be studied in an analysis of the current debate on the sharing of benefits of space exploration.\(^7\)

An examination in Part II(B)(1) below of interpretations of the Moon Agreement will show that the Agreement has not changed the prevalent view presented in Part III(A) restricting the sharing the benefits of space exploration. Part II(B)(2) below will show that although the CHM concept is still vague, it constitutes the main hope the Moon Agreement has to change the restrictive view of sharing space benefits. Again, as in the examination of the Outer Space Treaty in Part II(A), the lunar mining issue will help focus the inquiry.

\(^6\) Moon Agreement, supra note 20, art. 11.
\(^6\) Böckstiegel, supra note 38, at 7.
\(^7\) Mateesco Matte, supra note 14, at 319.

1. Moon Mining and the Moon Agreement

The fact that the Moon Agreement did not resolve the lunar mining issue is a further indication that such mining was previously allowed by the Outer Space Treaty. Although no moratorium on lunar mining is stated in the Moon Agreement, Article 11(5) leaves some uncertainty as to whether any potential exploitation of Moon resources would be allowable before the establishment of a régime designed to govern such exploitation. However, Böckstiegel suggests that despite the mention of the régime, no moratorium on lunar mining is contemplated in the Moon Agreement. According to Böckstiegel, it is significant that while Article 11(5) speaks of an international régime, it does not say that exploitation of resources will have to await this régime. Moreover, the drafters of the Article could have created a moratorium explicitly had they wished, perhaps using terms similar to those in the 1969 U.N. General Assembly resolution calling for a moratorium on the exploitation of the resources of the deep seabed. Thus, there is a presumption in favor of liberty of exploitation, which has force in light of the presumption of free space activities absent specific prohibitions drawn out in the Outer Space Treaty.

The travaux préparatoires of the Moon Agreement in COPUOS strengthen this view because they show that the drafters of the Agreement did not intend to imply a moratorium on commercial space activities. The U.S. Delegate to COPUOS stated:

The draft agreement . . . as part of the compromise made by many delegations, places no moratorium upon exploitation of the natural resources on celestial bodies, pending the establishment of an international régime. This permits orderly attempts to establish that such exploitation is in fact feasible and practical, by making possible experimental beginnings and, then, pilot operations, a process by which we believe we can learn if it will ever be feasible to commercially exploit the mineral resources of celestial bodies. My Government will, when and if these negotiations for such a régime are called for, under articles XI and XVIII, make every

72. See Smith, supra note 4, at 47.
73. Böckstiegel, supra note 38, at 8
74. Id.
75. Id.
76. Id.
77. For a summary of the travaux préparatoires showing that no moratorium is intended see Menter, supra note 21, at 40.
effort to see that the regime is successfully negotiated.\textsuperscript{78} Moreover, proposals suggesting that lunar resource exploitation "cannot be carried out until the establishment of an international régime regulating that exploitation" were not incorporated into the agreement.\textsuperscript{79} Furthermore, referring to the problem of the protection of the lunar environment, it was pointed out in COPUOS that the relevant provisions of the Moon Agreement were "not intended to result in prohibiting the exploitation of natural resources which may be found on celestial bodies."\textsuperscript{80}

Indian commentators have recognized that the drafters of the Moon Agreement rejected the idea of a moratorium on lunar mining pending the establishment of an international régime, but argue that the plain language of the Moon Agreement militates in favor of restricting the exploitation of selenological resources.\textsuperscript{81} Rao suggests three reasons why the exploitation of Moon resources is limited.

First, he argues that Article 11(8) of the Moon Agreement subjects all "activities with respect to the natural resources of the Moon"\textsuperscript{82} to Article 6(2), which states:

\begin{quote}
In carrying out scientific investigations . . . the States shall have the right to collect on and remove from the Moon samples of its mineral resources and other substances[,] . . . States Parties may in the scientific investigations also use mineral and other substances of the moon in quantities appropriate for the support of their mission.\textsuperscript{83}
\end{quote}

Consequently, Rao sees that all exploitation of selenological resources falls under this provision, and that this provision does not allow unlimited commercial exploitation of the Moon.\textsuperscript{84}

Second, Rao invokes the prohibition of claiming property rights over the surface, subsurface, or resources of the Moon in Article 11(3) to assert that it is impossible for a country to own mined resources.\textsuperscript{85}

Third, he juxtaposes the obligation under Article 11(6) to inform the U.N. Secretary General and the world scientific community of any lunar

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\textsuperscript{78} Verbatim Record of the Two Hundred and Third Meeting of the Committee on the Peaceful Uses of Outer Spaces, U.N. Doc. A/AC.105/PV.203 (1979).


\textsuperscript{80} Id.


\textsuperscript{82} Moon Agreement, \textit{supra} note 20, art. 11(8).

\textsuperscript{83} Id. art. 6(2).

\textsuperscript{84} See \textit{Rao, supra} note 81, at 277.

\textsuperscript{85} Id.
resources a State discovers with the obligation under Article 11(5) to establish an international régime to govern the exploitation of lunar resources, once such exploitation is about to become feasible. He argues that together these obligations imply that once harvestable resources are identified, the obligation to establish the international régime comes into play before any individual exploitation is allowed.\(^\text{86}\) Sehgal reinforces Rao's views, and underlines that any retrieval of lunar resources must be for either scientific investigations, which are covered by articles 11(8) and 6(2), or for utilization and appropriation in accordance with the purposes of the international régime, as set out in Article 11(7).\(^\text{87}\)

Ultimately, although the preparatory work of Article 11 suggests that the prevalent view in space law is that there is no moratorium on lunar mining, some advocates of that view admit the article does not rule out a moratorium and thus uncertainty remains.\(^\text{88}\) Because of the opposing views of different States involved in the Article 11 debate, consensus on a common meaning is difficult and to the extent any consensus is reached, it only disguises continued disagreement.\(^\text{89}\)

A challenge in making rights and obligations to share benefits of Moon exploration for the benefit of humanity more precise lies in an understanding of how the CHM concept should be viewed in space law, because of the obligation in Article 11(5) to establish an "international régime" to govern the exploitation of the natural resources of the Moon.\(^\text{90}\)

2. The Common Heritage of Mankind and Space Law

The Common Heritage concept took form in the United Nations in discussions on the law of the sea.\(^\text{91}\) In 1967, the Maltese ambassador to the United Nations, Arvid Pardo, proposed in a memorandum to the General Assembly that it was necessary to declare the seabed and ocean floor a "common heritage of mankind" and to draft a treaty to implement the concept.\(^\text{92}\) The common heritage principle consisted of five essential

86. Id. at 278.
87. See Sehgal, supra note 81, at 110–11.
88. See Smith, supra note 4, at 52.
90. Id. at 243.
91. See Mateesco Matte, supra note 14, at 320. However, the concept may have appeared even earlier in the space law context. See Progressive Development of the Principles and Norms of International Law Relating to the New International Economic Order 100, U.N. Doc. A/39/504/Add.1 (1984) [hereinafter Progressive Development].
92. Mateesco Matte, supra note 14, at 320.
elements: (1) the area under consideration cannot be subject to appropriation; (2) all countries must share in its management; (3) there must be an active sharing of the benefits reaped from the exploitation of resources; (4) the area must be dedicated to exclusively peaceful purposes; and (5) the area must be preserved for future generations.\textsuperscript{93}

In an effort to show that developing countries should enjoy substantive property rights over the natural resources of the Moon, some commentators have tried to ascribe a broad meaning to the CHM concept by importing interpretations of the concept from the law of the sea.\textsuperscript{94} However, while the historical origins of the CHM concept and its understanding in non-space law contexts are informative in illustrating the spirit of the concept, one should be cautious in trying to import meaning from outside sources into Article 11. Indeed, confining the meaning of the CHM concept to the terms of Article 11(5) allowed successful conclusion of the Moon Agreement.\textsuperscript{95} Thus, supplementing the text of the Agreement with the law of the sea concept that all countries are entitled to substantive property rights over the natural resources of an area that are the common heritage of mankind\textsuperscript{96} would impair hope of extending the Agreement's already limited binding authority.

Thus, the challenge of the CHM concept in space law is to find a way to interpret its contours as set out in Article 11 of the Moon Agreement without unduly introducing concepts from the law of the sea. Article 11 is worded broadly, and can permit varying definitions of the CHM concept.\textsuperscript{97} The article calls for Parties to "undertake to establish" an international régime when exploitation of the Moon is about to become feasible.\textsuperscript{98} Indeed, the CHM as applied to the Moon will be defined not so much by any inherent characteristics of the CHM concept as by the way States decide to administer the exploitation of the CHM concept through a régime. The article does not define the details and procedures of the régime, but it does set out its main purposes, which include: the orderly and safe development of natural resources, their rational

\textsuperscript{93} Id.

\textsuperscript{94} See Sehgal, supra note 81, at 108-12.

\textsuperscript{95} See Carl Christol, An International Regime, Including Appropriate Procedures, for the Moon: Article 11, Paragraph 5 of the 1979 Moon Treaty, in PROCEEDINGS OF THE TWENTY-THIRD COLLOQUIUM ON THE LAW OF OUTER SPACE 139, 146 (1980). The CHM concept has given rise to much controversy in the law of the sea and other contexts. A full examination of the CHM is beyond the scope of this Note, whose purpose requires only an overview of the CHM as it concerns the space law area.

\textsuperscript{96} See Smith, supra note 4, at 51.

\textsuperscript{97} Id. at 52.

\textsuperscript{98} Id.
management, expansion of opportunities for their use, and the "equitable sharing" by all Parties in the benefits derived from their use.\textsuperscript{99}

One radical view of equitable sharing of the benefits deriving from the CHM states that

[[the main objective of the common heritage principle and what differentiates it from the liberal and individualistic res communis regime is that what is "common" in it for all the members of the community is not merely the theoretical faculty to accede to the use of the common heritage and to benefit from it, but also the actual sharing of the benefits deriving therefrom, whether these members are in a position to use the common heritage themselves or not. Moreover, the canalization of the sharing and distribution of benefits through multilateral institutions provides the international community with the autonomous resources needed to finance development and give effect to solidarity. The sharing of benefits can thus be used as a means of preferential treatment and redistribution by following a scale geared to need, thus favouring developing countries and, to a greater degree, the least developed among them.\textsuperscript{100}]

However, the redistributionist ambitions of such a view are subject to the same criticisms leveled against the redistributionist interpretations of the Outer Space Treaty suggested in Part II(A), and thus do not offer much hope to help elaborate the CHM norm.\textsuperscript{101} Moreover, even commentators from developing countries are not unanimous in viewing the CHM as providing viable hope for redistribution. Hassani Ould-Derwich notes that the CHM may only indicate common interest, possibly to be implemented in the future.\textsuperscript{102} Hassani Ould-Derwich underlines the fact that the space powers have not signed the Moon Agreement, and practice indicates that we may be going the way of using outer space only for the benefit of the space-farers.\textsuperscript{103} It thus seems unrealistic to hope that the CHM norm can be developed without taking into account the interests of the space powers.

Another commentator stresses this pragmatic point while proposing an interpretation of the CHM.\textsuperscript{104} Postyshev acknowledges the principle

\begin{itemize}
\item \textsuperscript{99} Id.
\item \textsuperscript{100} PROGRESSIVE DEVELOPMENT, supra note 91, at 100.
\item \textsuperscript{101} See supra notes 54--56 and accompanying text.
\item \textsuperscript{102} Mounira Hassani-Ould Derwich, Le droit de l'espace: un droit à refaire?, 26 REVUE ALGÉRIENNE DES SCIENCES JURIDIQUES 677, 683 (1988).
\item \textsuperscript{103} Id.
\item \textsuperscript{104} V. M. POSTYSHEV, KONTSEPTSIYA OBSHEGO NASLEDIYA CHELOVECHESTVA PRIMENITEL'NO K LUNE I EE PRIRODNYM RESURSAM, SOVIETSKII EZEHOODNIK MEZHDUN-ARODNOGO PRAVA 223 (1987)(with English summary).
\end{itemize}
of equitable distribution of benefits derived from the exploration of the Moon inherent in the CHM concept, and suggests that one way to give effect to this principle is to grant developing countries the right to participate in international cooperation in the exploration of the Moon on favorable conditions. This could be accomplished by transferring to them relevant technology and giving them a portion of extracted resources in kind or of material benefits obtained as a result of their use.\textsuperscript{105} The content of the CHM concept and the implementation of ideas such as Postyshev's will be largely determined by ascertaining an efficient régime for governing the exploitation of Moon resources.\textsuperscript{106} The search for an appropriate CHM régime will be conducted in Part IV, after a consideration of the CHM in its fuller context.

III. THE CHALLENGE OF THE NEW INTERNATIONAL ECONOMIC ORDER

The CHM is but one principle of the larger framework of the New International Economic Order (NIEO).\textsuperscript{107} An overview of the NIEO will focus the sharing of benefits debate by placing the CHM in the context of other ideas advocated by developing countries, while showing why developing countries strenuously advocate a position that space-faring countries seem reluctant to accept.

The NIEO presents needs and developmental strategies of the developing countries. The NIEO concept was set forth in two 1974 U.N. General Assembly resolutions. The first, entitled “Declaration on the Establishment of a New International Economic Order”\textsuperscript{108} highlighted the needs and aspirations of the developing countries. It proclaimed:

\begin{quote}
[a] determination to work urgently for the establishment of a new international economic order based on equity . . . interdependence . . . and cooperation among all States . . . which shall correct inequalities . . . make it possible to eliminate the widening gap between the developed
\end{quote}

\textsuperscript{105} \textit{Id.}
\textsuperscript{106} Danilenko, \textit{supra} note 79, at 260.
\textsuperscript{107} \textit{See} \textit{Progressive Development}, \textit{supra} note 91, at 40. The principles and norms of the international law relating to the New International Economic Order identified by UNITAR and endorsed by the U.N. General Assembly are: (a) preferential treatment for developing countries; (b) stabilization of export earnings of developing countries; (c) permanent sovereignty over natural resources; (d) right of every State to benefit from science and technology; (e) entitlement of developing countries to development assistance; (f) participatory equality of developing countries international economic relations; (g) common heritage of mankind.
and the developing countries and ensure steadily accelerating economic and social development. . . . The benefits of technological progress are not shared equitably by all members of the international community. The developing countries, which constitute 70 per cent of the world's population, account for only 30 per cent of the world's income. . . . The gap between the developed and the developing countries continues to widen in a system which was established at a time when most of the developing countries did not even exist as independent States. . . . Since 1970, the world economy has experienced a series of grave crises which have had severe repercussions, especially on the developing countries because of their generally greater vulnerability to external economic impulses. . . . [T]here is a close interrelationship between the prosperity of the developed countries and the growth and development of the developing countries. 109

The resolution underscores the economic plight of developing nations and the industrialized world’s role in creating it, and its ability to mitigate it. While a recital of problems facing the developing world is perhaps old and familiar news, it nevertheless helps explain the developing countries’ vigorous advocacy of arguments for sharing the fruits of space exploration.

The second resolution sets out strategies for development, 110 and gives a broad context for these arguments. Some of the strategies in the resolution relevant to this discussion include: ending the exercise of permanent sovereignty over natural resources; 111 implementing measures for the recovery, exploitation, development, marketing and distribution of natural resources—particularly of developing countries—to serve their national interests; 112 improving financing schemes to meet the developmental needs of developing countries; 113 implementing the preferential treatment of developing countries in multilateral trade negotiations; 114 increasing net transfer of real resources from the developed to developing countries; 115 giving developing countries improved access to modern technology; 116 and stressing that all developed and some developing countries should aid the most seriously disadvantaged countries through

109. Id. (emphasis removed).
111. Id. at 5.
112. Id.
113. Id. at 6.
114. Id. at 7.
115. Id.
116. Id. at 8.
contributions according to their development and the capacity and strength of their economies.\textsuperscript{117}

The ideas propounded by advocates for the developing countries' position mentioned throughout Part II fit well into the NIEO development strategies. For example, proposals to distribute space resources to developing countries would further the goals of non-exploitation of permanent sovereignty over natural resources, distribution of those resources, and provision of aid to the neediest countries. However, ideas advocated by proponents of the developed countries' position could also fit into the NIEO. For example, the transfer of space technology\textsuperscript{118} might help developing countries in at least two ways: it might enable them to enjoy the satisfactions to be derived from an active participation in the applications aspects of space science, and might bolster the general scientific and technological bases of such States with the wide-ranging incremental benefits flowing from such bases.\textsuperscript{119} The discussion in Part II thus fits in neatly with the concerns of the NIEO. Future developments in consensus on NIEO issues are therefore likely to impact the inconclusive debate surveyed in Part II over how space benefits should be shared.

To form an opinion about the likelihood of success of developments in consensus of NIEO issues it is useful to appreciate that the NIEO is an even more radical concept than its catalogue of goals and strategies suggests. Thus, developed States might be quite cautious in accepting it.

One author lays down an ambitious path for the NIEO. Mohammed Bedjaoui examines the NIEO within the general context of international law and details how the NIEO proposes to change it from its foundations up. Bedjaoui posits that under the guise of neutrality, international law has allowed a continuation of inequality.\textsuperscript{120} U.N. international law is not different in kind from old international law: as "great power" law it represents a continuation of the law of the old European powers.\textsuperscript{121} This law is permissive, ignores the problems of developing countries, and consequently provides no solid basis for development. The law also ignores the activities of multinational corporations, leaving them free to

\begin{itemize}
  \item \textsuperscript{117} Id. at 11.
  \item \textsuperscript{118} For a proposal to this effect see Postyshev, supra note 104.
  \item \textsuperscript{119} Carl Christol, \textit{International Space Law and the Less Developed Countries, in Proceedings of the Nineteenth Colloquium on the Law of Outer Space} 243, 244 (1976).
  \item \textsuperscript{120} Mohammed Bedjaoui, \textit{Pour un nouvel ordre économique international} 50 (1979).
  \item \textsuperscript{121} Id. at 61.
\end{itemize}
continue to exploit resources at will.\textsuperscript{122} The NIEO seeks a complete, and greater-than-ever attempted, overhaul of this legal framework, and seeks to institute a mechanism whereby rich countries will no longer get richer at the expense of the poorer countries.\textsuperscript{123} The NIEO is global in scope and method, and strives for development of humanity in a full sense.\textsuperscript{124} Implementation of the NIEO requires new norms of international law, and corresponding new implementing institutions.\textsuperscript{125} The NIEO does not seek to halt the development of industrialized countries, but rather to integrate the development of developing countries within that of the industrialized nations.\textsuperscript{126} However, while the NIEO may impose costs on industrialized nations, outer space and the sea might be viewed as new frontiers from which the developed countries could extract compensation through exploitation.\textsuperscript{127}

Interestingly, neither side of the sharing of benefits debate has seized upon Bedjaoui's idea of granting space-faring nations substantial rights in the fruits of their space exploration, possibly because doing so would entail acceptance of the rest of the NIEO program by industrialized countries and, in any event, large profits from space exploration are still distant. It is more difficult to see, however, why developing countries have not sought to develop the idea, especially in light of their failure to extract binding commitments from space-faring nations to share specific benefits from their ventures. Indeed, developing countries might at the very least try to bargain for the advancement of other NIEO goals, such as debt forgiveness, by consciously desisting from their hard-line positions on the Moon Agreement.

Binding commitments to share specific benefits are generally absent in the NIEO, as they were in the documents examined in Part II. However, simply because the NIEO is a radical program that has little more chance of fostering firm and precise agreements on the obligations of developed countries to share their wealth than do the documents discussed in Part II does not mean that NIEO concepts will not affect the sharing of benefits debate in space law. As evidenced by the resolutions seeking to implement the NIEO,\textsuperscript{128} achieving equity in international economic relations is central to the NIEO purpose. Consequently,

\begin{footnotesize}
\textsuperscript{122} Id. at 63, 65.
\textsuperscript{123} Id. at 67.
\textsuperscript{124} Id. at 76.
\textsuperscript{125} Id. at 197.
\textsuperscript{126} Id. at 74-75.
\textsuperscript{127} Id. at 91.
\textsuperscript{128} Resolution 3201, \textit{supra} note 108; Resolution 3202, \textit{supra} note 110.
\end{footnotesize}
discussions on implementing equitable economic relations will certainly color the sharing of benefits debate in space law, especially since a concern with equity in space law is increasing on the COPUOS agenda.\textsuperscript{129} Indeed, in 1988 delegates of developing States at COPUOS stressed that the COPUOS Legal Sub-Committee should develop a legal framework “aimed at securing the equitable access of all States to the benefits derived from the use and exploration of outer space . . . [to] eliminate inequalities among States.”\textsuperscript{130} Hence, views on equitable economic relationships relating to the stabilization of prices of natural resources extracted from developing countries might be considered along with views of the sharing of space benefits debate. States should be willing to bargain based on compromises between the two views as suggested above, or alternatively they might try to achieve a consistent policy view in both areas.

Elaboration of the NIEO might further affect space law even if its principles are not legally binding, if they nevertheless accomplish their function of mitigating inequality between the developed and developing world. Indeed, NIEO principles might fulfill information and coordination functions as mere political declarations of intent that would be observed de facto by States without any legal obligation.\textsuperscript{131} For example, sharing of technology in fields such as computer technology might provide a useful background for arguing that sharing of space technology should be furthered as well. Indeed, States might share both forms of technology as part of a general effort to share technology.

IV. REGIMES FOR SHARING THE BENEFITS OF OUTER SPACE EXPLORATION: EVALUATIONS AND A PROPOSAL

The examination of the NIEO in Part III pointed out the pressing needs of the developing world and the possibility of using the sharing of space benefits to help meet them. The analysis in Part II suggested that the international legal community agrees that there is some obligation to share benefits flowing from the exploration of outer space, but disagrees on how they must be shared. The discussion of the CHM in Part II showed that agreement on how to share space benefits might depend on consensus on the creation of a régime to govern the exploitation of the

\textsuperscript{129} See Danilenko, supra note 89, at 225.
\textsuperscript{130} Id.
\textsuperscript{131} See Wolfgang Benedek, Progressive Development of the Principles and Norms of International Law Relating to the NIEO, The UNITAR Exercise, 36 ÖSTERREICHISCHE ZEITSCHRIFT FÜR ÖFFENTLICHES RECHT UND VÖLKERRECHT 289, 293 (1986).
natural resources of the Moon. This section will complete the analysis of the sharing of benefits debate by examining and evaluating various régimes that have been considered for this purpose, and will propose a new régime that might be easy to implement and mindful of the interests of developed and developing nations alike.

A. A New International Organization

Article 11(5) of the Moon Agreement does not specify the type of régime necessary to govern the exploitation of selenological resources. Instead, it laconically prescribes the establishment of "an international régime, including appropriate procedures." Christol has argued that these procedures must be read to include an effective international intergovernmental organization as a primary instrumentality of governance. He argues that absent such an organization, the effectiveness of an international legal régime to generally manage and ensure the safe and orderly exploitation of the natural resources of the Moon and other celestial bodies would be in doubt, and that only through such a structure would it be possible to maintain open channels of communication with both public and private institutions seeking to achieve contact with it. Moreover, he argues that without such an organization, it would be impossible to attend to the views of both public organizations and private associations concerning the distribution of equitable shares in the benefits resulting from exploitation. The balance of this section will present alternatives to a large new organization, and consequently will show that there is no deterministic reason to create a new international intergovernmental organization to distribute benefits. Moreover, there are many independent reasons for not establishing a new organization.

Creating a new organization would be economically inefficient and politically improbable. A new organization would be extremely costly to initiate and maintain, and would engender a new variety of problems involving its control and operations. Moreover, the negotiation of an

132. Moreover, the drafters of the Moon Agreement gave little specific attention to what they envisaged in the régime they called for. See Christol, supra note 95, at 147. However, Christol argues that an international organization was implied in the calling for a régime. Id.
133. Moon Agreement, supra note 20, art. 5.
134. See Christol, supra note 95, at 147.
135. Id.
136. Id.
137. See Mateesco Matte, supra note 14, at 327.
acceptable structure and financing mechanism would be time consuming.\textsuperscript{138} A new organization would be difficult to fund because of the periodic financial problems in the United Nations and individual countries, including space-faring powers such as the United States and Russia.\textsuperscript{139} Its mere existence would not resolve the current tensions between industrialized and developing countries.\textsuperscript{140} Furthermore, the expense involved in creating a new organization would work against the developing countries by using funds which might be better expended in helping them directly.

Finally, the experience in negotiations of the Law of the Sea Convention confirms that attempts to solve problems through the establishment of complicated new international structures encounter considerable difficulty, and thus an appropriate régime to govern the exploitation of lunar resources should be found elsewhere.\textsuperscript{141}

B. An INTELSAT Model

While large institutional structures such as those envisaged for implementing the law of the sea have served as the main inspiration for creating a régime to govern lunar resources, less attention has been given to effective existing space administration agencies such as the International Telecommunications Satellite Organization (INTELSAT), the International Maritime Satellite Organization (INMARSAT), and others that could serve as useful models for a lunar régime.\textsuperscript{142} Indeed, INTELSAT's efficiency\textsuperscript{143} and its efforts to share space technology with developing countries appears to qualify it as a good model for a lunar regime.\textsuperscript{144} Mateesco Matte proposes a method for achieving

\begin{itemize}
  \item \textsuperscript{138} Id.
  \item \textsuperscript{139} See id.
  \item \textsuperscript{140} Id.
  \item \textsuperscript{141} See Danilenko, \textit{supra} note 79, at 261.
  \item \textsuperscript{142} See Eilene Galloway, \textit{Agreement Governing the Activities of States on the Moon and Other Celestial Bodies}, \textit{5 Annals AIR & Space L.} 481, 507 (1980).
  \item \textsuperscript{144} INTELSAT is the most important global telecommunication system, and aims at providing on a nondiscriminatory basis public telecommunications services to all countries. See Mateesco Matte, \textit{supra} note 14, at 329. It offers public telecommunications services via satellite to Member States and non-Member States alike at similar rates. \textit{Id.} Although INTELSAT is partly an intergovernmental organization, it is also something of an international public utility company, which is reflected in the investment in shares and ownership of assets by Member States and in the business-type management of the service as well as the returns paid to the Member States' shareholders. \textit{Id.} An example of INTELSAT's efforts to promote
a régime based on INTELSAT. Mateesco Matte recognizes that regardless of what non-space faring countries say, space nations continue to implement their own policies.\footnote{See Mateesco Matte, supra note 14, at 334.} He believes that space-faring countries could band together and have a better chance of identifying common interests than a group of all nations.\footnote{See id. at 334.} He hopes that developing countries will recognize this, and opt to join the group of space powers, presumably to benefit from the pooling of the group’s resources.\footnote{See id.} Mateesco Matte envisions that by first setting itself general goals such as promoting development, with an increasing membership such a group could mature into an INTELSAT-type of agency that could seek to administer specific space programs, which presumably would include lunar mining.\footnote{See id.}

While this program seems more pragmatic and realistic than proposals for instituting a large new international organization, its ambitious scope in terms of membership and jurisdiction make it susceptible to the same economic arguments advanced in Part IV(A), but to a lesser degree because the agency would be built in stages. It is doubtful, however, whether such a project would be an acceptable régime for the CHM, unless by default it presents itself as the only choice available. Because industrialized countries would make up its core, such an agency would not take into account significantly the interests of the developing countries, and it is improbable they would subscribe to it any more than they do to interpretations proposed by advocates of the industrialized nations’ view of the documents examined in Part II. Hence, the agency suggested above would not contribute to building a consensus on the proper way to exploit natural resources of the Moon.

the sharing of space benefits is its project “Satellites for Health and Rural Education” (SHARE), which has provided free satellite use for rural health and long-distance educational programs for selected projects. Aemro Araya, Recent Activities of Intelsat Benefiting the Developing Countries, 15 J. SPACE L. 64, 66 (1987).

\footnote{See id.}

\footnote{See Mateesco Matte, supra note 14, at 334.}

\footnote{See id. at 334.}

\footnote{See id. Mateesco Matte does not detail how the organization would resemble INTELSAT or explain why INTELSAT’s success in administering satellite use would necessarily be reproducible in administering lunar exploitation. One advantage of the INTELSAT formula would be that Member States could receive dividends on their investment in the venture. See also Christopher C. Joyner & Harrison H. Schmitt, Extraterrestrial Law and Lunar Bases: General Legal Principles and a Particular Régime Proposal (INTERLUNE), in LUNAR BASES AND SPACE ACTIVITIES OF THE 21ST CENTURY (W. W. Mendell ed., 1985) (detailing a possible organizational structure for an INTELSTAT-type régime).}
C. An Antarctic Régime

Another source of inspiration for a lunar mining régime is the actual and proposed conduct of mineral extractions from Antarctica. One commentator has suggested that an appropriate régime for commercial activities in space could parallel the régime to regulate mineral development activities in Antarctica proposed in 1983 by Christopher Beeby, the U.N. delegate from New Zealand.¹⁴⁹

Under the Antarctic Treaty,¹⁵⁰ activities are governed by the Consultative Parties, which include only parties undertaking substantial scientific research activities in Antarctica.¹⁵¹ Under the Beeby proposal, any State interested in having a State-owned or private enterprise carry on mineral exploitation activities would be invited to become a party to the régime without having to become a Consultative Party to the Antarctic Treaty.¹⁵² All parties to the régime could extract resources from the continent, and the extraction would be overseen by a commission consisting of the Consultative Parties and States either engaged in Antarctic resource activity or whose nationals are engaged in such activity.¹⁵³ Under the Beeby proposal, however, many important issues, such as the roles of parties to the régime that are not Consultative Parties and the decision-


¹⁵¹. Raclin, supra note 149, at 240.

¹⁵². Id. The Beeby proposal and its evolution throughout the 1980s inspired the Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA), which allowed some mining activity and was opened for signature in November, 1988. See Christopher C. Joyner, The 1991 Madrid Environmental Protocol: Rethinking the World Park Status for Antarctica, 1 REV. EUR. COM. & INT'L ENV. L. 328, 329 (1992); Christopher C. Joyner, The Antarctic Minerals Negotiating Process, 81 AM. J. INT'L L. 888–905 (1987). However, by the summer of 1989 environmental concerns led Australia and France to announce they would not ratify CRAMRA, and consequently CRAMRA’s entry into force became impossible. See Joyner, The 1991 Madrid Environmental Protocol at 330. To replace CRAMRA, the Consultative Parties proposed the Protocol to the Antarctic Treaty on Environmental Protection in 1991. Id. at 330–31. This Protocol places a moratorium on Antarctic mining, and because of the Protocol’s language it is unlikely that the moratorium will be lifted for at least fifty years after the Protocol enters into force. Id. at 331. However, the Protocol is not yet operative, and because it bans mining, prospective contracting States may be unwilling to ratify it if they wish to keep open their mining options. See S.K.N. Blay, New Trends in the Protection of the Antarctic Environment: The 1991 Madrid Protocol, 86 AM. J. INT'L L. 377, 399 (1992). Hence, the ideas contained in the Beeby proposal may influence the shaping of a régime to control the mining of Antarctic resources should one be sought as an alternative to or a modification of ideas contained in the Protocol.

¹⁵³. Raclin, supra note 149, at 240.
making process to be followed by the overseeing commission, remain unresolved.¹⁵⁴

The above suggests the Beeby proposal thus probably would resemble a system whereby States were granted spheres of influence to mine resources.¹⁵⁵ Yet Marcoff sees a danger in applying Antarctic law to celestial bodies. He finds it improvident to import norms elaborated before the notion of using space for the benefit of all humanity became institutionalized into space law, especially norms where "fixed" claims to certain areas, as is the case in Antarctica, are entertained.¹⁵⁶

But the Beeby proposal also seems unacceptable to fashion an appropriate régime for governing the mining of lunar resources for a more practical reason. While it might not be very difficult to allow developing countries to mine Antarctica, in the case of the Moon a similar right would be useless unless the problem of high technological entry barriers were adequately addressed.

D. A Proposed Régime

The main flaws in the régimes outlined above are that they are too expensive to implement, fail to resolve the conflict between the views of the developing and space-faring nations, and do not take into account the technological access problem of lunar mining. This section suggests a new régime designed to avoid these flaws by proposing the establishment of lunar mining credits.

The inspiration for this new régime is the Montreal Protocol on Substances that Deplete the Ozone Layer (the Protocol).¹⁵⁷ The beginning of the Protocol states that its Parties are aware of the deleterious effect of certain substances on the ozone layer, are determined to protect it by taking precautionary measures to control equitably total global emissions of depleting substances, and acknowledge the need for special provisions to meet the needs of developing countries.¹⁵⁸ Article 2 of the Protocol proposes a scheme to gradually decrease the emission of harmful

¹⁵⁴. Id.
¹⁵⁵. The idea of granting spheres of influence in celestial bodies without concomitant claims of sovereignty was suggested as early as 1964. See Welf H. Prince of Hanover, Comments on "Draft Resolution of the International Institute of Space Law Concerning the Legal Status of Celestial Bodies," in PROCEEDINGS OF THE SEVENTH COLLOQUIUM ON THE LAW OF OUTER SPACE 356, 357 (1964).
¹⁵⁶. See MARCOFF, supra note 31, at 679–81.
¹⁵⁸. Id. at 1550-51.
substances over a period of years. The interesting feature of the Protocol is that while Parties are allowed a certain amount of emissions per time period (the allowances are more generous for developing countries), they are permitted to either transfer or receive emission allowances from any other Party so long as the combined emission levels of the transferor and transferee Parties do not exceed the sum of their individual allowed emission levels. This means that a Party that wants to emit more substances than it is allowed can purchase the right to do so from a Party that emits less substances than authorized. The Protocol thus assures a stable level of emissions while allowing efficient mechanisms to adjust who may emit how much.

The basic idea of the Protocol may be adapted to create a régime to govern the exploitation of lunar resources. In this régime, each country would be allocated a certain amount of lunar mining credits, which would allow the holder of the credits to engage in mining certain tonnage of natural resources on the Moon for a given period. An equitable distribution of credits could be obtained if the amount of credits allocated to a country were determined in proportion to its population, with perhaps an allowance for increasing allocations to especially needy countries. Countries with the technological ability to mine the Moon would be allowed to do so in amounts commensurate with their credit allotment. If they wanted to mine more than they were allowed, they could purchase credits from countries not wanting or not able to mine, or alternatively associate these countries in their mining activities.

This régime offers many advantages, and conforms to the main purposes for a régime governing lunar resources set out in Article 11(7) of the Moon Agreement.

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159. Id. at 1552-54.
160. Id. at 1553. The Protocol gives more detail on how emission levels are to be determined and combined.
161. The régime outlined here goes beyond proposed licensing and patenting schemes. See Nandasiri Jasentuliyana, Balancing the Conflicting Demands in Legislating Common Property Resources of the Oceans and Space, in PROCEEDINGS OF THE TWENTY-EIGHTH COLLOQUIUM ON THE LAW OF OUTER SPACE 149, 150 (1985) (proposal to balance the demands of different countries and maintain equal opportunity in access to resources by creating an international licensing system for individual entities to explore common resources); Raclin, supra note 149, at 241 (proposal to adopt a system similar to the U.S. patent system whereby States undertaking commercial activities in space would be granted exclusive rights to their returns for a given time). It is beyond the scope of this Note to speculate on how long lunar mining credits should be valid, what amount of mining resources they would allow, or what mining methods they would allow. Any lunar régime would have to address these issues, however, because of the requirements in Article 11(7)(a)&(b) of the Moon Agreement that the régime should have among its purposes the orderly and safe development of lunar resources, and the rational management of those resources.
The régime would be inexpensive. The infrastructure necessary for this credit system régime would be less costly than the implementation of new organizations required by other régimes. Only an agreement at the U.N. level setting forth the steps outlined above, and a recording system to track who owns, transfers and receives what amount of credits would be necessary. Moreover, because the system would depend largely on individual contracting between countries to allocate credits, little international organizational involvement would be required. The régime would thus further the purpose of rational management of lunar resources mandated by Article 11(7)(b).

The régime would be politically acceptable to developed and developing States. Because the system would not discriminate except to provide an added layer of economic wealth to needy countries, no country could reasonably claim it was unfair. In this way, the régime would promote the Article 11(7)(d) goal of equitable sharing by all States in the benefits derived from lunar resources.

The régime would mitigate technological access problems. Developing countries could use their credits to purchase access to space technology by joining space ventures in which they would contribute rights to additional mining, which would give space miners incentives beyond philanthropy to share technology.

Significantly, the régime would provide an effective means for sharing the benefits of space exploration with developing countries while simultaneously leaving space-faring States free to mine in a legally certain environment. Even if developing countries did not become space powers or receive selenological resources in kind, they could still reap financial rewards from space exploration by selling their credits. Thus, the régime would further the Article 11(7)(c) goal of expanding opportunities in the use of lunar resources.

However, one might still ask whether introducing a credit system would make lunar mining commercially impossible or less attractive than the exploitation of other resources that could be more cheaply harvested and shared.

A system of credits would probably not make lunar mining commercially unprofitable. Another environmental law analogy supports this contention. Under a plan similar in intent to the Protocol, the U.S. Environmental Protection Agency issues rights to emit sulfur dioxide as part of a plan to reduce levels of acid rain. The Chicago Board of Trade

voted in 1991 to create a private market in these rights, a move which many believe will make it cheaper and easier for utilities purchasing the rights to reduce acid rain. A free market in lunar mining credits would provide an efficient means for trading these credits and the prices for these credits, guided by supply and demand principles, would ensure that they are priced so as to keep lunar mining commercially viable.

Moreover, even though viable lunar mining might still be inefficient in its incipient stages, it would probably not remain so. When it became necessary for a lunar miner to exceed its credit allotment, it would incur a cost that would be absent if it were simply free to mine as much as it wished. The cost introduced by credits would also make lunar resources more scarce, and possibly the increased cost to miners who needed extra credits would exceed the benefits received by sellers of credits, producing an inefficient result. An inefficient result would reduce the total benefits available for redistribution, and it might thus be preferable to share the benefits from more efficient activities. For example, if it were more efficient to mine the seabed than the Moon, then more could be redistributed for the good of benefitting developing countries by mining the sea and abandoning lunar mining. However, because of the need for much technological development before lunar mining becomes a reality, it is as yet impossible to compare the efficiencies of mining the Moon and the seabed, or other common areas or activities. Moreover, even if initial lunar mining proved inefficient, it is possible that because of probable technological advances, and the anticipation of great harvests of lunar resources combined with the continual depletion of Earth’s resources, lunar mining could become a more and more efficient activity over time.

CONCLUSION

A central concept in space law is a desire to share the benefits of outer space exploration for the benefit of all humanity. Debates on lunar mining have focused this broad goal. The near-universally recognized Outer Space Treaty and the more-limited Moon Agreement are the principal space law sources relevant to this debate. An analysis of these documents reveals that there is an obligation on space-faring nations to share the benefits of

163. Id.
165. See id. at 598, 604.
167. See Böckstiegel, supra note 38, at 2-8.
their actual and anticipated lunar ventures with developing countries, although this obligation remains vague and imposes no definite qualitative or quantitative binding obligations on space-faring nations beyond those they wish to assume themselves. However, an examination of the principle of the New International Economic Order, especially as it relates to the Common Heritage of Mankind concept, emphasizes the needs of the developing countries and reveals that lunar mining can help meet these needs, and consequently that régimes to use lunar mining to benefit developing countries merit investigation. However, unless such régimes adequately take the interests of space-faring nations into account, they will have little chance of succeeding. Different régimes have been proposed, but they are problematic in the expense of their implementation, their political infeasibility or undesirability, or their presupposition of technological ability to mine the Moon by all parties to the régime. A new régime granting transferable credits allowing Moon mining for finite periods could avoid the problems of other régimes and offer a viable way to use outer space for the benefit of all peoples, whether they belong to advanced space-faring countries or struggling developing ones.