THE MOON AGREEMENT AND PRIVATE ENTERPRISE: LESSONS FROM INVESTMENT LAW

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I. INTRODUCTION

The year 2009 marked two events of interest to those with an interest in lunar exploration. First, there was the discovery by the National Aeronautics and Space Administration (NASA) of large quantities of water on the moon.1 Second, there was the release of Duncan Jones’ film

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1. “NASA scientists discovered that the moon contains water, a ‘significant amount,’ said Anthony Colaprete, who oversaw the Lunar Crater Observation and Sensing Satellite mission. He said NASA found enough water to fill a dozen two gallon buckets.” Ashley Jones, There’s Water on the
“Moon,” which imagines a future where large quantities of Helium-3 are harvested and sent back to earth to be used in clean nuclear fusion, solving the world’s energy and environmental problems—but requiring Sam Rockwell’s character, the solitary miner, to work under somewhat inequitable conditions imposed by his employer, Lunar Industries.

Science-fiction aside, if outer space resources are exploited in the future, it seems quite likely that private companies will be involved in the endeavor. This is not to suggest an unregulated “Wild West” of the kind encountered in films like “Outland” or a dystopian future of the kind shown in the film “Moon;” but the fact remains that, for the last few decades, private capital has driven most forms of technological innovation and large-scale investment, and, even after the 2008 financial crisis, continues to play a leading role in the world’s economic development. Suggested below are a few ideas on how the current legal instruments concerning lunar exploration can be improved to encourage private enterprise in this field.

II. THE RISE AND FALL OF THE MOON AGREEMENT

A. Genesis of the Moon Agreement


(1) Space exploration shall be carried out for the benefit of all mankind, in recognition that space is “the province of all mankind;”

(2) Outer space is not to be weaponized;

(3) Outer space cannot be the subject of sovereign claims;

(4) States shall have “responsibility” for their space activities (including the activities of non-governmental actors who are nationals of those states); and

(5) The moon and other celestial bodies shall be used exclusively for peaceful purposes.

Id.
the Moon itself, whose riches are vast enough, but to "other celestial bodies;" thus, potentially covering the planets and asteroids, whose mineral potential is almost infinite. Despite its ambitious spatial coverage, many of the provisions of the Moon Agreement do no more than restate the 1967 principles as being applicable to "the moon and other celestial bodies" or contain similarly anodyne statements about freedom of research and exploration or the absence of national sovereignty over outer space.

B. The Hostile Reception

One of the apparent driving factors for its rapid finalization and adoption in 1979 was the anxiety of Soviet Bloc states over the

4. Standing alone, the value of the water on the Moon is considerable as it might sustain a future human community there. "For future lunar colonists, this lunar water is more precious than gold." Kevin V. Cook, The Discovery of Lunar Water: An Opportunity to Develop a Workable Moon Treaty, 11 GEO. INT'L ENVT'L L. REV. 647, 651 (1999). The H-3 deposits are "potentially [even] more valuable," Id. at 652.

5. The Moon, planets and asteroids have been said to contain "aluminum, calcium, carbon, chromium, gold, hydrogen, iodium, iron, magnesium, manganese, nickel, nitrogen, oxygen, platinum, silicon, titanium and water." Heidi Keefe, Making the Final Frontier Feasible: A Critical Look at the Current Body of Outer Space Law, 11 SANTA CLARA COMPUTER & HIGH TECH L.J. 345, 362 (1995). One asteroid alone is said to contain approximately $1 trillion worth of iron, nickel, cobalt and platinum. See Cook, supra note 4, at 653. In terms of its sheer physical scope, therefore, the Moon Agreement could rightly be characterized as "the most far reaching international agreement ever written." Art Dula, Free Enterprise & The Proposed Moon Treaty, 2 HOUS. J. INT'L L. 3, 3 (1980).

6. For example, Article 2 of the Moon Agreement, providing that "[o]uter 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," simply reaffirms Article II of the Outer Space Treaty. The provisions guaranteeing against militarization of the Moon or celestial bodies likewise mirror Article IV of the Outer Space Treaty. See also Dula, supra note 5 at 6 n.14 (summarizing the provisions of the 1967 Treaty that mention the Moon).

7. Article 11(2) of the Moon Agreement, stating that "[t]he moon is not subject to national appropriation by any claim of sovereignty, by means of use or occupation, or by any other means," simply elaborates on the principle stated in the Outer Space Treaty that outer space cannot be the subject of national sovereign claims. Indeed, the non-sovereignty principle is broadly in line with the Law of the Sea Convention's principle that "[n]o State shall claim or exercise sovereignty or sovereign rights over any part of the [sea-bed]." United Nations Convention on the Law of the Sea, art. 137(1), Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter LOSC]. The non-sovereignty principle also lines up with the current "freeze" or exercise on territorial claims over the Antarctic. See Antarctic Treaty, art. 4(2), Dec. 1, 1959, 12 U.S.T. 794, 402 U.N.T.S. 71 (providing that the state parties shall not make any new claim to sovereignty over Antarctica). Article 11(3) of the Moon Agreement, providing that the landing of space vehicles or building of installations on the Moon shall not give rise to ownership rights "over the surface or the subsurface of the moon or any areas thereof," is reasonably consistent with the non-sovereignty principle—although it is perhaps disappointing that the Moon Agreement does not afford assurances that future owner/operator of those "buildings and installations" has the right to continuous use, occupation and enjoyment of those facilities.
militarization of space. Those anxieties were partially assuaged by the provisions of Article 3, which "reaffirmed the demilitarization of the moon and [celestial] bodies." When Western critics examined its text, however, it was not these provisions, but instead the economic provisions, that sparked controversy. Specifically, Article 11(1) of the Moon Agreement, stating that the natural resources of the Moon were the "common heritage of mankind," was seen as a road to the socialization of the Moon.

There is an irony here. The formula "common heritage of all mankind" was not, as is commonly supposed, a creation of the Soviet Bloc; rather it was devised by Argentinian lawyers who believed, perhaps reasonably, that the prior formula "province of all mankind" was unduly vague and that a new formula was needed to reflect the concepts of "beneficial domain which includes enjoyment, profit and receipt of fruits." This formula then was embraced by the Nixon administration in 1972, over the strong opposition of the Soviet Bloc. Small wonder that the chief U.S. negotiator expressed bewilderment when the phrase came under attack.

8. BIN CHENG, STUDIES IN INTERNATIONAL SPACE LAW 362 (Clarendon Press 1997) (noting that, although "it can only be a matter for speculation what supplied the political will" for the "seemingly barren and frustrating labour of seven years [of Moon Agreement negotiations] suddenly to bloom and fruit all within the span of fifteen days," the "answer" may be found in the fact that the second Strategic Arms Limitation Treaty (SALT-II) was finalized at almost exactly the same time).

9. Article 11(1) provides that "[t]he 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." See Moon Agreement, supra note 2, art. 11(1).


12. "Until July of 1979, the Soviet Union maintained strong opposition to the common heritage concept, and it was essentially because of this opposition that the [Moon] Treaty was not concluded several years [before 1979]." Marian L. Nash, U.S. Practice, 74 AM. J. INT'L L. 418, 423 (1980) (quoting then Secretary Cyrus R. Vance). Instead, the Soviet Union preferred the view that space was "an international area for common use, 'a position that has been described as' just a watered down version of res nullius" that necessarily "rejected any limitation on their use of space resources." David Everett Marko, A Kind, Gentler Moon Treaty: A Critical Review of the Current Moon Treaty and a Proposed Alternative, 8 J. NAT. RES. & ENV'T L. 293, 312 (1992-93).

No matter, over time the notion that certain resources (such as the moon, or the deep sea-bed, or the Antarctic) are the "common heritage of mankind" was aggressively embraced by developing nations,\(^\text{14}\) and thus came to acquire socialist connotations.\(^\text{15}\) It did not matter that the phrase itself was relatively benign, if not meaningless; politics abhors a vacuum and it was soon given a meaning. Specifically, "[t]he developing nations interpret[ed the concept] to embody the principle that celestial body resources are the common property of all the nations, and to require international control of celestial body resources for the purpose of redistributing wealth and technology among nations."\(^\text{16}\) This was in diametrical opposition to the supposedly "laissez faire" interpretation that the United States had previously advanced.\(^\text{17}\)

\(\text{House Subcommittee Hearings.} \) "I don't think that [the 'common heritage of mankind'] is a defined term, and I think people are overly concerned with the definition." \(\text{See Nash, supra note 12, at 425}\) (quoting then Assistant Secretary of State for Congressional Relations J. Brian Atwood as stating that "neither the 'common heritage of mankind' concept as embodied in the Moon Treaty nor any other provision of the Treaty compels any specific form of international arrangement for the regulation of the exploitation of moon or other celestial body resources").

14. The movement to treat Antarctica as part of the “common heritage of mankind” began with a proposal by Malaysia in 1982, and gained traction during the 1980s among members of the so-called “non-aligned movement” and “Group of 77” developing nations. \(\text{See Moritaka Hayashi, The Antarctica Question in the United Nations, 19 CORNELL INT'L L.J. 275, 275–76 (1986).}\) Some of its proponents argued that the "common heritage" concept required a "sharing of benefits by all mankind" of resources extracted from Antarctica. \(\text{See id. at 287–88.}\) The “common heritage” question, insofar as Antarctica was concerned, receded greatly in 1991, when the Antarctic Treaty System members agreed on a long-term moratorium on mining in the Antarctic.

15. \(\text{See Marko, supra note 12, at 310 (The developing states "held the notion that the Moon is common property, res communis, and that taking property declared to be the common heritage of mankind is stealing.")}\) (footnotes omitted).

16. Alan Duane Webber, Note, Extraterritorial Law on the Final Frontier: A Regime to Govern the Development of Celestial Body Resources, 71 Geo. L.J. 1427, 1436–37 (1983) (footnote omitted); \text{see also id. at 1445 ("The Moon Treaty, like [Part XI of LOSC], will probably be interpreted as requiring developers to share their profits and technology with the lesser-developed countries.").}\); \(\text{House Subcommittee Hearings, supra note 13, at 134 (statement of Marmes A. Dubs, Chairman, American Mining Congress Committee on Undersea Mineral Resources) (The common heritage concept represents a system where there is “complete international control over access to, and the disposition of important natural resources so as to effect the transfer of wealth, technology and political control from the industrialized countries to the developing countries.”).}\)

17. Webber, supra note 16, at 1437. The United States position, of course, always presupposed a degree of regulation: as formulated by President Nixon during the sea-bed negotiations, it envisaged "that all resources in the deep seabed should be regarded as the common heritage of mankind, to be held in trust by the adjacent coastal state, with the revenues of the trusteeship to be apportioned between the trustee and an international seabed authority." \(\text{Grier C. Raclin, From Ice to Ether: The Adoption of a Regime to Govern Resource Exploitation in Outer Space, 7 NW. J. INT'L L. & BUS. 727, 738 (1986).}\)
To be sure, the Moon Treaty does not prohibit (and thus implicitly permits) private lunar exploration. Moreover, it does not expressly ban the use of lunar minerals for profit, and it allows private actors “to keep title to any private property which they might bring to the moon.” But this implicit acceptance of private lunar exploration was subject to a proposed, yet-to-be-established “international regime” to “govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible.” And, while some of the stated principles of the future regime (such as “orderly and safe development of the natural resources of the moon,” and the “rational management” of the moon and the “expansion” of exploitation) were unobjectionable, the last of the regime goals proved controversial. It stated that this regime would seek to bring about:

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.

Opponents predicted that this new authority would likely be a body in which developed countries would potentially be outnumbered and outvoted; and therefore, as a body predominantly controlled by developing countries, this new authority would insist on technology transfer and payment of international taxes as part of the new “regime” of lunar exploration.

Compounding this all was that the “regime” was only to emerge after it had been determined that exploitation of lunar resources was proven to be

18. Brian M. Hoffstadt, Moving the Heavens: Lunar Mining & the “Common Heritage of Mankind,” in the Moon Treaty, 42 UCLA L. REV. 575, 586 (1994). Mr. Hoffstadt also suggests that “the Treaty grants ownership to any natural resources on the moon’s surface that are no longer in place” and might therefore permit retention of profit from “minerals which are mined” there. Id. He stresses, however, that these features need to be read in conjunction with the rules regarding an international “regime,” which might have the ability to regulate and prohibit such mining activities through “ex post facto restrictions on mining and profit-keeping.” Id. at 590.

19. Moon Agreement, supra note 2, art. 11(5); see also id. art. 11(6) (“In order to facilitate the establishment of the international regime . . . 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.”); id. art. 18 (This article provides that, at any time after the fifth anniversary of the agreement coming into force, there shall be a “review conference” to “consider the question of the implementation” of the international regime.). The projected “review conference” apparently has not occurred.

20. Id. art. 11(7); see also id. art. 11(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.”).

21. See Cook, supra note 4, at 667.
This awkward timing meant that an international authority would impose its rules "in the middle of the figurative game," i.e., after potentially expensive feasibility studies had been conducted. Combined with the politically ambiguous nature of the "regime," this created the specter of a private actor, having spent millions (or billions) on research on exploration and prospecting, suffering "ex post facto" appropriation of their investments by a nebulous future international regime with power to tax or veto any future exploitation of the very resources the private actor had just located.

C. Comparisons with UNCLOS III's Sea-Bed Regime

Moon Agreement critics could point to the law of the sea for a concrete example of how a "regime" based on "common heritage" might work in practice. Throughout the 1970s, the United Nations Third Conference on the Law of the Sea (UNCLOS III) was drafting a new Law of the Sea Convention. A Sea-Bed Committee was responsible for drafting an entire chapter of the new treaty to regulate the exploitation of the deep sea-bed.

In 1978, a draft of the proposed Law of the Sea Convention was released, including a Part XI drafted by the Sea-Bed Committee. As proposed (and as later adopted by the final 1982 session of UNCLOS III), this text declared the sea-bed to be "the common heritage of mankind." By now, some delegates had definite views on what this meant. To quote Sri Lanka's delegate, "[i]f you touch the nodules at the bottom of the sea, you touch my property. If you take them away, you take away my property." And, as "operationally defined" by the originally-drafted UNCLOS Convention, "[common heritage of mankind] mean[t] that all nations [were] entitled to share in the profits derived from sea-bed exploration."
resources, regardless of their contribution of capital or technology to the extraction of those resources.\textsuperscript{28}

Part XI as proposed in 1978 provided for the establishment of an International Sea-Bed Authority (ISB Authority) to regulate and authorize exploitation of minerals on the international sea-bed, and to collect and distribute royalties from this activity. The ISB Authority had the power to license private operators to engage in sea-bed mining as long as:

(1) Private operators pay a series of application fees and royalties to the Authority;

(2) There be established an “Enterprise,” to operate as a wholly-owned organ of the public Authority, which would have equal access to the sea-bed and operate alongside private operators; and

(3) Any private operator would be subject to mandatory technology transfers, in that they would be forced to share their proprietary technical information with the Authority and the Enterprise.\textsuperscript{29}

The ISB Authority was required to provide for the “equitable sharing” of benefits from sea-bed mining and to show special consideration for the interests of developing states.\textsuperscript{30}

The 1978 draft text of the UNCLOS III attracted immediate opposition from critics within the United States. They objected not only to the economic structure of the Part XI regime (which they considered to be too bureaucratic and unfriendly to private capital), but also pointed out that, as drafted, the ISB Authority’s “one-nation-one-vote” rule would mean that “the developing countries and the Eastern Bloc” would have “control[led] licenses to exploit and use the deep sea-bed resources.”\textsuperscript{31} This, plus the “expensive” licensing fees, “cumbersome” licensing procedures, and ceilings on output, were said to “deter development of the oceans’ resources.”\textsuperscript{32}

Fears that the Moon Agreement’s regulatory “regime” might resemble the Part XI sea-bed regime fueled its opponents’ arguments.\textsuperscript{33} To quote then-Congressman John Breaux:

\textsuperscript{28}. Webber, supra note 16, at 1439.

\textsuperscript{29}. See LOSC, supra note 7, arts. 140(2), 144(1), 160(2)(f)(i).

\textsuperscript{30}. Id. art. 140(2).

\textsuperscript{31}. Raclin, supra note 17, at 744; Webber, supra note 16, at 1439.

\textsuperscript{32}. Marko, supra note 12, at 318.

\textsuperscript{33}. See Kevin B. Walsh, Controversial Issues under Article XI of the Moon Treaty, 6 ANNALS AIR & SPACE L. 489, 496 (1981).
The long-term economic implications for the United States would be extremely adverse, if the United States were to repeat in the outer space context the mistakes committed with regard to the deep sea-bed. . . . I believe that for the United States to accept the kind of situation presaged by the draft Moon Treaty is to invite a serious erosion of our international community.34

Other critics were even more explicit, seeing the Moon Agreement as "socializing the moon."35

D. The Demise of the Moon Agreement

Defenders of the Moon Agreement argued that comparisons with the sea-bed regime were misplaced, and that it would not necessarily serve as a wealth-redistribution body. They stressed that the concept of "[e]quitable" division (as stated in Article 11) was "not the same as ‘equal,’” signifying that private operators might still be able to operate profitably within the future international regime.36 But the drafters of the Moon Agreement had done themselves no favors. The treaty text had "fail[ed] to clarify the vague requirements" of this future regime, thus allowing critics to interpret it uncharitably.37

Defenders of the treaty also took umbrage at suggestions that the treaty imposed a "moratorium" on lunar development. They were technically correct, in that the Moon Agreement does not expressly place a legal moratorium on exploitation of lunar resources. Nevertheless, as many commentators note, it contained so many "ambiguities, significant restrictions and future commitments,” and therefore created such


36. Williams, supra note 10, at 88.

37. Cook, supra note 4, at 667; see also Marko, supra note 12, at 315 (noting that, whatever the content of the treaty itself, "[f]he commercial and psychological beliefs of developed countries have doomed the treaty" by creating the expectation that it will be used for wealth-distribution).
uncertainty, that no rational private actor would invest in this legal climate.  

In sum, the treaty had been “hastily and hence poorly put together” and was easy prey for the new wave of free-enterprise critics who saw it as embodying the kind of 1970s ideology they were determined to sweep away.  

And it was these kinds of concerns, voiced during the Senate hearings on the Moon Agreement, that led the Carter Administration to consign it to inter-agency review, and for the Reagan Administration to abandon it. The Moon Agreement has since acquired only a handful of ratifications.

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38. Walsh, supra note 33, at 496; see also D. Goedhuis, supra note 24, at 232 (“[O]pponents of the present Moon regime . . . further submitted that free enterprise institutions simply cannot make significant investments in space where there is a threat of suit over treaty terms of ‘ex post facto’ appropriation of their investments by a nebulous future international regime.”); Webber, supra note 16, at 1445 (“Private enterprise would not be likely to make large investments in extraterrestrial resource development if it feared that once investments had made exploitation feasible an international regime would take control and distribute a portion of the profits among all nations.”); House Subcommittee Hearings, supra note 13, at 108 (statement of Leigh S. Ratiner, on behalf of the L-5 Society) (arguing that the Moon Treaty effectively imposed a “de facto moratorium on private enterprise use of [outer] space in connection with the development of natural resources”).

39. CHENG, supra note 8, at 357.

40. Dula, supra note 5, at 23 (“[T]he Moon Treaty is a dangerous and unnecessary abandonment of the basic legal rights free enterprise will need to work effectively in space. [I]t introduces substantial uncertainty and risk for private sector investment in space ventures that would exploit space resources for profit.”); House Subcommittee Hearings, supra note 13, at 107 (statement of Leigh S. Ratiner on behalf of the L-5 Society) (“The moon treaty is a give away of unprecedented proportions for which the U.S. obtains nothing in return.”).

41. Spectar, supra note 35, at 1033 (describing the process by which the Carter administration shelved the treaty).

42. The first Reagan Secretary of State, Alexander Haig, was among the more trenchant opponents of the Moon Treaty. In 1979, as President of United Technologies he testified before Congress that the common heritage concept was being used by developing countries to “gain control over critical materials and to gain access as a matter of right to the technology needed to exploit them” and that ratification therefore “would doom any private investment directed at space resource exploration.” House Subcommittee Hearings, supra note 13, at 219–20 (statement of Alexander Haig, President, United Technologies Corp., Inc.). As Secretary of State, Mr. Haig “presided . . . over the dismantling of American support for the Moon Treaty.” Marko, supra note 12, at 312 n.129.

43. As of today, only 13 States—Australia, Austria, Belgium, Chile, Kazakhstan, Lebanon, Mexico, Morocco, the Netherlands, Pakistan, the Philippines, Poland, and Uruguay—have ratified the Moon Agreement. U.N. Office for Outer Space Affairs, Status of Agreements Relating to Activities in Outer Space as at January 1, 2008, U.N. Doc. ST/SPACE/11/Re.2/Ad.1 (2008), available at http://www.unoosa.org/pdf/publications/ST_SPACE_11_Rev2_Add1E.pdf (last visited Feb. 24, 2011). In addition, France, Guatemala, India and Romania have signed it. Moreover, “[a]rguably, the agreement should be given little weight as evidence of developing customary law, since, in contrast to other ‘space law’ agreements that have achieved widespread ratification, the Moon Agreement has, over
Looking back, it is difficult to disagree with Professor Goedhuis' observation that the final text of the Moon Agreement should not have been "rushed through the United Nations in a great hurry before a consensus on the exact meaning and content of the concept of the moon and its natural resources being the common heritage of mankind had been achieved."44

III. THE NEED FOR A REVISED TREATY REGIME

Assuming, as a policy matter, that private capital needs to be better incentivized in the future of lunar resources development, what legal reforms might assist this?

Some might advocate a totally unregulated environment where operators take what they find. This has superficial attraction for those concerned with the disincentives and "free riders" associated with the common heritage concept.45 But, one critic has warned:

[T]his total lack of lunar law would likely heighten the comparison to the Wild West — with no regulation; states would have an incentive to militarize the Moon and to engage in prolonged conflicts with other would-be users to gain monopolies and exclusive uses over valuable lunar resources. While a scheme rejecting all lunar regulation might lead to an era of free and open use of the Moon, it also may lead to World War III.46

In fact, the principal criticism of the Moon Agreement is not that it proposes regulation, but that it proposes the wrong sort of regulation: the

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44. Goedhuis, supra note 24, at 233; see also Nicolas Mateesco Matte, Limited Aerospace Natural Resources and Their Regulation, 7 ANNALS AIR & SPACE L. 379, 395 (1982) ("The space powers should stop offering agreements or treaties which are lacking in substance fata morgana in a vacuum juris before effective exploitation of limited resources becomes realistic."); Lynn M. Fountain, Creating Momentum in Space: Ending the Paralysis Produced by the "Common Heritage of Mankind" Doctrine, 35 CONN. L. REV. 1753 (2003) (noting that the Moon Agreement "deeps the quandary" over resource ownership because it "defers the resolution of the property rights issue until after an international governing regime has been established, which is not to be established until exploitation of the resources becomes feasible. Yet, the ambiguous nature of the governing regime, as well as the uncertainty of the property rights, discourages such exploitation."); IAN BROWNlie, PRINCIPLES OF PUBLIC INTERNATIONAL LAW 258 (7th ed., 2008) ("[T]he [Moon Agreement's] provisions concerning the appropriation of resources of the moon have certain obscurities.").


46. Id.
kind that discourages a sufficiently stable and predictable framework which, in turn, discourages private investment.  

Proper regulation would also ensure that there is adequate provision against any one company acquiring a monopoly position in the world minerals market, as well as addressing issues of collective security. No one would deny, for example, that if a huge cache of plutonium were discovered somewhere outside the Earth, there would be a legitimate regulatory interest in controlling (or curbing) its use and extraction. To quote one writer:

A free-market approach bolstered by the legal certainty inherent in a system that provides defined property rights would do much to energize the stalled development of the space industry. Involvement of private companies can provide the focus, money and research necessary for successful growth. But such growth must take place under an international regulatory regime. If the space powers each create and pursue their own legal systems for the commercialization of outer space, the result will be chaotic and prone to international conflict.

Proof of the need for some kind of regulation lies in two pieces of U.S. legislation. The first is the U.S. International Traffic in Arms Regulations (ITAR), “a special U.S. regulatory regime aimed at controlling the export and transfer of U.S. technology, including satellite technology, to foreign persons.” The ITAR is not just an explicit recognition of U.S. national security interests in controlling the transfer of aerospace technology, it is

47. “[P]rivate enterprise . . . is not likely to invest without a stable legal environment. . . . If political instability threaten[s] financial returns, private enterprise would not make the initial investment. Without a legal framework to govern extraterrestrial resource development, resources simply would not be developed. Thus, such a framework is in the interests of mankind.” Webber, supra note 16, at 1342; see also Keefe, supra note 5, at 370 (“Space Law currently . . . lacks a sufficiently well-defined regime to adequately inform investors of how resources extracted from celestial bodies will be regulated and divided.”); Jeremy L. Zell, Putting a Mine on the Moon: Creating an International Authority to Regulate Mining Rights in Outer Space, 15 MINN. J. INT’L L. 489, 515 (2006) (“It is nearly impossible for a firm or nation to calculate potential returns on investment for mining outer space if the legal status of its claim is unknown. Currently, the debate over the Common Heritage Concept leaves many debating whether it is possible to make claims on materials in space and who receives the benefits of the extracted material and in what proportions.”).

48. Fountain, supra note 44, at 1775.

also an explicit recognition that the international community has a legitimate interest in ensuring that sophisticated (and potentially dangerous) technology does not fall into the wrong hands.

The second is the initial U.S. legislative response to Part XI of the Law of the Sea Convention (LOSC). Following its rejection of Part XI, the United States enacted legislation to license and authorize deep sea-bed mining by U.S. companies. Soon thereafter, however, the United States decided that it could not proceed in a totally unilateral manner and negotiated separate agreements with its major trading partners “to resolve overlapping claims with respect to mining areas for polymetallic nodules of the deep sea-bed.” Thus, international cooperation and recognition was ultimately judged necessary for the resource-exploitation regime to be viable. Likewise, some form of treaty-based system for technology control and international exploitation of outer space resources appears desirable.

IV. PRACTICAL PRECEDENTS FOR A FUTURE TREATY SYSTEM

A. The Revised Sea-Bed Regime as Contained in the 1994 Agreement on Part XI

Since 1979, international law has witnessed four developments that, together, provide guidance for a reformed Moon Agreement. The most obvious of these is the sea-bed regime, as now reformulated.

In 1994, shortly prior to the LOSC coming into force, the United States and other Western countries successfully negotiated a new “Agreement on Implementation” of Part XI. The 1994 Agreement, adopted by the UN General Assembly in 1994, creates a more market-friendly regime for the sea-bed. It reduces the license application fee, abolished


52. The Law of the Sea Convention came into force on November 16, 1994, one year after its sixtieth ratification.

the requirement that private ventures fund the activities of the so-called "Enterprise," and abolished mandatory technology transfer requirements and mandatory production ceilings. It further provided that voting on the Sea-Bed Authority would be done in groups, with the United States virtually guaranteed a seat on such groups, and each group able to block decisions on substantive matters. The 1994 Agreement also established a Finance Committee that would originate the financial decisions of the ISB Authority, to which the largest donors would automatically be members and in which decisions would be made by consensus.


In 1988, a Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA) was signed by the various members of the Antarctic Treaty System. CRAMRA is aimed to permit and regulate mining activities in Antarctica. Environmental pressures, however, led to a shelving of CRAMRA in favor of a long-term moratorium on mineral activities in the Antarctic, now formalized in the 1991 Madrid Protocol banning Antarctic mining for fifty years.

Although CRAMRA had some limited promises of good treatment for investors willing to mine in the Antarctic, its focus was on administrative structure. Although it indicated that exploration or development permits would not be "cancelled" by the council except under certain circumstances, it nevertheless appeared to contemplate that a permit can be cancelled for any reason with the consent of the investor's "sponsoring

54. 1994 Part XI Agreement, supra note 53, § 2 (abolishing obligations on operators to fund the Enterprise).
55. Id. Annex § 5 (changing rules regarding technology transfer).
56. Id. Annex § 75 (changing rules regarding production policies, including abolition of original LOSC rules on production ceilings).
57. Id. Annex § 3.
58. Id. Annex § 9 ("The Finance Committee").
61. CRAMRA, supra note 59, art. 50(1) ("No Management Scheme shall be suspended or modified and no Management Scheme, exploration or development permit shall be cancelled without the consent of the Sponsoring State except pursuant to Article 51 [permitting cancellation where development goes beyond "acceptable" environmental impact or where operator fails to comply with Convention], or Article 54 or the Management Scheme itself.")
State." CRAMRA also failed to include specific dispute resolution procedures or arbitral rights for the investor. A Canadian commentator remarked that:

Ironically, although the United States feared that the international regime for sea-bed mining would be used as a model for a new regime in Antarctica, the Antarctic Minerals Convention of 1988, approved by the United States, is in many ways more stringent in its regulations and more complex in its bureaucratic structure.63

C. The ITU System for Regulating Geostationary Orbital Slots

The geostationary orbit “is essentially a doughnut-shaped volume of space in which geostationary satellites are placed;” and “located approximately 35,786 kilometers above the Earth’s equator.”64 Because such satellites orbit the earth at the same rate as the earth’s own rotation, they “appear motionless when viewed from earth” and thus “can communicate with approximately one third of the planet, an entire country or, if in conjunction with a satellite network, the entire globe.”65 The orbital area is a finite space, not only because it is above the equator, but also because satellites parked too close to each other will interfere with each others’ transmissions.66 Consequently, in order to avoid overcrowding, a regulatory allocation system is necessary. This exists in the form of the International Telecommunications Union system (ITU).

An international organization, the ITU “can trace its official existence” back to 1865.67 Through a 1973 convention, it has power to “effect allocation of the radio frequency spectrum and registration of radio

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62. Id.
65. Thompson, supra note 64, at 283; see also Roberts, supra note 64, at 1101–05; Kosmo, supra note 64, at 1058–59.
66. Thompson, supra note 64, at 285.
67. Roberts, supra note 64, at 1105–06 (discussing history).
frequency assignments in order to avoid harmful interference between radio
stations of different countries,\(^\text{68}\) and can “coordinate efforts to eliminate
harmful interference between radio stations of different countries and to
improve the use made of the radio frequency spectrum.”\(^\text{69}\) The ITU
Convention further provides that “radio frequencies and the geostationary
satellite orbit are limited natural resources,” which “must be used
efficiently and economically so that countries or groups of countries may
have equitable access to both.”\(^\text{70}\)

Acting under this authority, the ITU maintains a master register of
permitted frequencies within which satellites may broadcast,\(^\text{71}\) thus, acting
as an allocator of geostationary orbit slots. Under its current policy, orbital
positions are “assigned” to states that apply for them.\(^\text{72}\) However, states
may “preempt another nation’s use of an orbital location” by registering its
intended use of such slots with the ITU.\(^\text{73}\) Slots thus operate on a “first
come, first served” basis, giving “preferential treatment to early
registrants.”\(^\text{74}\) The United States and other developed countries have
“consistently opposed any comprehensive plan to share slots and
frequencies, as it is feared that these plans would be inflexible, restrictive,
and result in diminished technical advances.”\(^\text{75}\)

Although states may submit disputes over slot allocation to binding
arbitration,\(^\text{76}\) collective diplomacy has played a larger role in resolving
controversies. In 1991, for example, Tonga attempted to amass six “slots,”
with the apparent intention of “renting and auctioning” them to other
users.\(^\text{77}\) Under pressure from INTELSAT and satellite operators, Tonga


\(^{69}\) Id. art. 4(2)(b).

\(^{70}\) Id. art. 33(27). Article 33 was adopted in 1973 following a similarly worded 1971
resolution by the World Administrative Radio Conference for Space Communications. Susan Cahill,
*Give Me My Space: Implications for Permitting National Appropriation of the Geostationary Orbit*, 19
Wis. Int’l L.J. 231, 240 (2001). It was amended in 1982 to require the ITU to “take into account” the
needs of “developing countries.”

\(^{71}\) Roberts, *supra* note 64, at 1111–12; Thompson, *supra* note 64, at 288–90.

\(^{72}\) Cahill, *supra* note 70, at 233.

\(^{73}\) Id. at 243.

\(^{74}\) Roberts, *supra* note 64, at 1112–13.

\(^{75}\) Kosmo, *supra* note 64, at 1062.

\(^{76}\) See Optional Protocol on the Compulsory Settlement of Disputes Relating to the
Constitution of the International Telecommunication Union, to the Convention of the International
104-34.

\(^{77}\) Cahill, *supra* note 70, at 244.
Nelson

relinquished some of its claims, and ITU regulations were subsequently amended to require "that a majority of slots applied for be used directly by the requesting country." 78

Although the "common heritage" principle is not an explicit part of the ITU's regime, the system does work on the assumption that the geostationary orbit lies outside national sovereignty. This has generated some controversy in the past. In 1976, a group of equatorial states issued a declaration (known as the "Bogotá Declaration") asserting that "segments" of the geostationary orbit were "part of the territory over which the Equatorial States exercise their national sovereignty," and objected to the ITU system of allocation. 79 Most space-using nations and scholars have, however, rejected this claim, on both scientific and legal grounds. 80 Legal scholars have pointed out that a claim of sovereignty over the geostationary orbit would be incompatible with the Outer Space Treaty's declaration that outer space "is not subject to national appropriation by claim of sovereignty." 81

Yet despite this controversy, and despite the absence of a centralized enforcement system (or sanctions system), 82 states tend to comply with the allocation decisions. 83 The ITU system has enabled states (and corporations) to expend the large amount of resources necessary to build, launch, and maintain satellites. In that sense, the ITU system can be judged to be successful.

78. Id.

79. Declaration of the First Meeting of Equatorial Countries, Dec. 3, 1976 (signed by Brazil, Colombia, Congo, Ecuador, Indonesia, Kenya, Uganda, and Zaire), reprinted in 2 SPACE LAW: BASIC LEGAL DOCUMENTS (Prof. Dr. Karl-Heinz Bockstiegel, Dr. Mariette Benko & Prof. Dr. Stephan Hobe eds., 2005).

80. See Thompson, supra note 64, at 308 (noting that the Bogotá Declaration was "overwhelming[ly] reject[ed]"). From a scientific perspective, scholars commented that: (1) from a functional perspective, the geostationary orbit is part of outer space; and (2) the geostationary orbit is not, as the Bogotá Declaration states asserted, created by the gravitational pull of the earth beneath it. Kosmo, supra note 64, at 1061.

81. Outer Space Treaty, supra note 3, art. II.

82. It has been said that, if the ITU "can be comparable to a traffic officer, it is an officer unable to adequately measure the traffic, whose 'tickets' for violations are often ignored and who lacks not only a jail but also a court for offenders." Thompson, supra note 64, at 290 (quoting David M. Leive, International Telecommunications and International Law: The Regulation of the Radio Spectrum, AM. SOC'Y INT'L L., at 22 n.8 (1970)).

83. Thompson, supra note 64, at 290.
1. The Space Station Agreement

Under the Intergovernmental Agreement on the International Space Station (IGA), participating states can contribute towards the building and establishment of the International Space Station (ISS). The ISS has been described as a “hub and spoke structure” with NASA, the operator of the ISS, at the “hub.” Once operational, “modules” of the ISS are treated as being subject to the sovereignty and control of a given participating state. Thus, research and development activities being conducted within, say, a Russian module can be treated as being subject to Russian law (including, where applicable, Russian patent and intellectual property law). The participating state (and/or those operating within its module), therefore, has legal security over any developments or discoveries they may make while using the ISS.

2. Investment Protection Treaties and Free Trade Agreements

The third, and perhaps most significant, trend of international law since the 1980s has been the emergence of modern “bilateral investment treaties” (BITs) and similar multilateral treaties, which typically contain both substantive and procedural protections for an investment. These treaties guarantee that an investment will not be “expropriated” (i.e., confiscated) without payment of prompt, adequate, and effective compensation. They also provide a variety of further protections,
including that investors will receive "fair and equitable treatment," which has been described as embodying principles of "transparency, stability and the investor's legitimate expectations, compliance with contractual obligations, procedural propriety and due process, action in good faith and freedom from coercion and harassment." BITs often provide that investors shall not be discriminated against on the grounds of nationality and/or will receive "most favored nation" treatment, i.e., the same level of treatment as the most favorable investment treaties entered into by the host state. BITs also typically provide for arbitration before the International Centre for Settlement of Investment Disputes (ICSID) or under the arbitration rules of the United Nations Commission on International Trade Law (UNCITRAL).
The guiding principles behind investor protection were aptly summarized in the 2003 award of the Tecmed tribunal:

The foreign investor expects the State to act in a consistent manner, free from ambiguity and totally transparently in its relations with the foreign investor, so that it may know beforehand any and all rules and regulations that will govern its investment, as well as the goals of the relevant policies and administrative practices or directives, to be able to plan its investment and comply with such regulations. The foreign investor also expects the host State to act consistently, i.e., without arbitrarily revoking any preexisting decisions or permits issued by the State that were relied upon by the investor to assume its commitment as well as to plan and launch its commercial and business activities. The investor also expects the State to use the legal instruments that govern the actions of the investor or the investment in conformity with the function usually assigned to such instruments, and not to deprive the investor of its investment without the required compensation.

Another form of investment protection is a “concession” agreement between the host state and the investor. Such agreements have sometimes been expressed (or construed) as being subject to the general principle of pacta sunt servanda, meaning that the obligations arising thereunder must be performed in good faith and cannot be abrogated by later state action. These protections are usually enforceable in a neutral arbitral forum pursuant to the rules of a neutral legal system; “the investor priority will be the choice of a legal order that provides a stable and predictable legal

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92. Técnicas Medioambientales Tecmed, S.A. v. Mexico, No. ARB (AF)/00/2, Award, ¶ 154 (ICSID May 29, 2003).

93. See generally RUDOLF DOLZER & CHRISTOPH SCHREUER, PRINCIPLES OF INTERNATIONAL INVESTMENT LAW 72–79 (2008) (chapter on investment contracts). Concession agreements sometimes include a “stabilization clause,” in which the host state promises not to alter or vary the regulatory or taxation environment in a manner that would alter the investment climate. See id. at 75.

environment and of a forum for dispute resolution that will preclude bias or political influence against the investor."95

**V. POSSIBLE INVESTMENT PRINCIPLES FOR A NEW MOON AGREEMENT**

With those examples in mind, here are some basic provisions that should be included in any future regime governing extraterrestrial development:

1. **Ability to Prospect/Explore:** LOSC and CRAMRA both give operators the ability to prospect or explore a particular area for resources as a preliminary to engaging full mining activity in that area.96 This is a basic prerequisite for private mining.

2. **Ability to Mine:** Once prospected, an operator should then have the ability to mine as per an approved plan, subject to compliance with environmental and safety requirements. This too is a feature of both LOSC and CRAMRA.97

3. **Property Rights in Extracted Materials:** The rules should make clear, from the outset, that the operator has good title to the minerals it extracts, just as LOSC states that "title to minerals shall pass upon recovery in accordance with this Convention."98

4. **Length of Tenure:** Mining is a long-term investment. LOSC provides, for example, that an operator will have a fifteen year contract.99

5. **Transparency:** Where an investor is subject to a regulated regime, it ideally is entitled to full transparency in the form of advance knowledge of any and all applicable rules, practices, and policies of the regulator. This is now reflected in the new transparency provisions of the 2004 U.S. Model BIT.100

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95. *Id.* at 174.
97. See LOSC, *supra* note 7, Annex III art. 6 ("Approval of plans of work"); CRAMRA *supra* note 59, art. 48 (providing that a regulatory committee has power to grant operators the "exclusive rights" to "explore" and "develop the mineral resource or resources which are the subject of the Management Scheme exclusively in accordance with the terms and conditions of the Management Scheme").
98. LOSC, *supra* note 7, Annex III § 1.
99. *Id*. Annex I § 1(1).
100. U.S. Model BIT, *supra* note 87, art. 11 (requiring transparency in, *inter alia*, regulatory measures and administrative proceedings).
6. Security of Tenure: As the late Professor Thomas Wälde stated, an investor “should be protected against unexpected and detrimental changes of policy if the investor has carried out significant investment with a reasonable, public-authority initiated assurance in the stability of such policy.”101 Concession agreements, thus, sometimes include “stability clauses” which protect against ex post facto changes to the regulatory framework, and guarantee *pacta sunt servanda*. Many BITs require that a state shall observe any express commitments it has made with respect to an investment (*e.g.*, in the form of a prior contract).102 At present, the ITU system likewise provides effective security of tenure once an orbital slot is allocated, but a mining regime would probably require more explicit guarantees.

7. Right to Repatriation of Capital and/or Dividends: Most BITs contain some kind of guarantee that the investor will be able to realize its investment by repatriating its capital and dividends.103

8. Control over Management: Many BITs provide investors with a measure of freedom in selecting senior management.104

9. Intellectual Property: It can be expected that technological discoveries and innovations will be developed not just in the home state’s laboratory, but on-site. Using the model from the IGA for the ISS, operators should be permitted to


102. *See, e.g.*, Netherlands Model BIT, *supra* note 87, art. 3(4) (“Each Contracting Party shall observe any obligation it may have entered into with respect to investments of nationals of the other Contracting Party.”); UK-Argentina BIT, *supra* note 87, art. 2(2) (same); Energy Charter Treaty, *supra* note 87, art. 10(1) (similar).

103. *See, e.g.*, Netherlands Model BIT, *supra* note 87, art. 5 (“The Contracting Parties shall guarantee that payments relating to an investment [including profits, loan repayments, earnings, and the proceeds of sale or liquidation of the investment] may be transferred.”); UK-Argentina BIT, *supra* note 87, art. 6(1) (providing for repatriation of “investments and return”); Energy Charter Treaty, *supra* note 87, art. 14 (providing for protection of certain “transfers” relating to investments); U.S. Model BIT, *supra* note 87, art. 7 (protection of certain “transfers”).

104. *See, e.g.*, Energy Charter Treaty, *supra* note 87, art. 11(2) (“A Contracting Party shall permit Investors of another Contracting Party which have Investments in its Area, and Investments of such Investors, to employ any key person of the Investor’s or the Investment’s choice regardless of nationality and citizenship provided that such key person has been permitted to enter, stay and work in the Area of the former Contracting Party and that the employment concerned conforms to the terms, conditions and time limits of the permission granted to such key person.”); U.S. Model BIT, *supra* note 87, art. 9 (Host states may not insist that “senior management” of an enterprise possess a “particular nationality.”).
claim intellectual property rights arising from such discoveries.

10. Full Protection and Security: BITs typically provide that an investor will receive a certain minimum level of protection from the host government.\textsuperscript{105} Although this does not translate directly into the space context, the future regime might require that member states operating in proximity to the investor shall not infringe upon the operator's physical security.

11. Neutral Forum: An adequately functioning regime must provide for neutral dispute resolution in a forum in which all parties have confidence, pursuant to a neutral system of law. Although the ITU system and the LOSC sea-bed arrangements have attempted to create such an arrangement, the BIT arbitration system, operating under the ICSID or the UNCITRAL rules, offers the best known model for resolving disputes between a private actor and a public host state/regulator. Arbitration is also established as a "preferred method of resolving industry disputes" within the commercial aerospace community.\textsuperscript{106}

VI. CONCLUSION

Although it may take some time for exploration of the Moon or other celestial bodies to resume in earnest, and still more time to develop means of exploiting their natural resources, the policy issues presented by the Moon Agreement still warrant close study. This is particularly true for the companies whose technology might one day play a role in that process.

If and when the technology to develop the Moon is eventually developed, the shortcomings of the Moon Agreement will have to be addressed. If, as now seems likely, the Moon Agreement proves to be an unworkable model for regulation, it will either wither on the vine due to lack of signatures, or else undergo a major revision. When that occurs, the

\textsuperscript{105} See, e.g., Netherlands Model BIT, supra note 87, art. 3(1) ("Each contracting party shall accord to [foreign] investments full physical security and protection."); UK-Argentina BIT, supra note 87, art. 2(2) (similar provision); Energy Charter Treaty, supra note 87, art. 10(1) (similar); U.S. Model BIT, supra note 87, arts. 5(1)-(2) (similar; clarifying that the "full protection and security" standard requires host states "to provide the level of police protection required under customary international law").

\textsuperscript{106} BENDER, supra note 49, § 39.01 at 39.2; see also id. § 39.04[1] at 39.19 (explaining that arbitration is preferred because of its "significant advantages," including its perceived fairness, that it allows for the appointment skilled arbitrators with technical knowledge and industry experience, and that it can protect technical and confidential business data).
lessons of other areas of international law, including investment law, are sure to be instructive.