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## PRELIMINARY JURISPRUDENTIAL OBSERVATIONS CONCERNING PROPERTY RIGHTS ON THE MOON AND OTHER CELESTIAL BODIES IN THE COMMERCIAL SPACE AGE

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### ABSTRACT

The activities of mankind in the early space age proceeded at a remarkable pace. Human and robotic explorers revealed a universe filled with wonder and the promise of unlimited opportunity. However, without the incentive of cold war competition, governments will not

continue to commit the resources necessary to be the predominant participants in developing the utilization of space. That role must be assumed by the private sector.

The use of satellites for telecommunications has become a multi-billion dollar market. Yet this application represents

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only a small fraction of the potential space-based economic activities of the next century. Lunar and asteroidal resources appear capable of providing significant economic incentives to enlarge the scope of space applications. However, private investment and development of these diverse space applications will depend upon establishing acceptable rules to encourage private enterprise, prevent conflicts, and resolve disputes in a peaceful manner.

This article explores the present legal status of property rights on the Moon and other celestial bodies *vis-a-vis* the commercial development of space. The existing space treaties are surveyed for specific provisions that either encourage or hinder private activities. Relevant issues are identified that will require timely resolution for the orderly, reliable and predictable recognition and protection of property rights in space into the next millennium.

## INTRODUCTION

The activities of mankind in space are at a crossroads. The era of governmental dominance is ending, as political and budgetary restraints act to prevent the commitment of national resources necessary to develop space for purposes other than national prestige and security. The private sector can fill this void, and open the vast reaches of space for commercial opportunities. However, the extant relevant treaties which will be applicable to space commerce were drafted when governments were the major participants in space activities. Thus, these international agreements did not have as their primary purpose the regulation of commercial activities and the relationships among private entities or between states and private entities. The *corpus juris spatialis* must be examined to determine whether it will have a helpful or a harmful effect on prospects for commercial operations in space, and modifications must be proposed where appropriate.

In relation to commercial ventures, the specific articles of existing space treaties may be neutral, favorable, unfavorable, or ambiguous. Most provisions might be considered ambiguous in the literal text, and have both positive as well

as negative implications on commercial development. The only certain conclusion is that the treaties reflect a broad spectrum of interests and policies. Nevertheless, the issues concerning the commercialization of space are becoming critical, as extraterrestrial resources are recognized as significant economic incentives for private development.

## SURVEY OF SPACE TREATY PROVISIONS WITH POTENTIAL APPLICATION TO COMMERCIAL VENTURES

The *corpus juris spatialis* contains numerous provisions which will be applicable to private development and commercialization of space. Virtually every article of the Outer Space Treaty<sup>1</sup> has relevance to commercial ventures in one context or another. For example:

- Private entities specifically are permitted to conduct activities in space, subject to the authorization and supervision of the appropriate state of nationality (article VI).
- The exploration and use of outer space, including the Moon and other celestial bodies, shall be the province of all mankind, and all states have a right of access to space on the basis of equality (article I).
- Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by use or occupation, or by any other means (article II).
- States retain jurisdiction over their personnel and objects, even when in outer space (article VIII).

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1. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, *opened for signature* January 27, 1967, 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205 [hereinafter referred to as the "Outer Space Treaty"].

- Astronauts are "envoys of mankind" and shall be given all due aid and assistance in case of emergency (article V).<sup>2</sup>

- Activities in space shall be conducted to prevent the harmful contamination of outer space and celestial bodies, and also to prevent adverse changes to the environment of the Earth through the introduction of extra-terrestrial matter; activities in space or on celestial bodies are to be conducted to prevent the harmful interference with the activities of other states parties (article X).

- The Secretary-General of the United Nations shall be informed, to the greatest extent feasible and practicable, of the nature, conduct, locations and results of activities in space, including the Moon and other celestial bodies, and information concerning these matters is to be made public (article XI).<sup>3</sup>

Article VII of the Outer Space Treaty provides that states which launch or procure the launch of an object into outer space are internationally liable for damage by such object on Earth, in the airspace, or in outer space. This provision has been supplemented and clarified by the Liability Convention,<sup>4</sup> which establishes

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2. See also Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched Into Outer Space, *opened for signature* April 22, 1968, 19 U.S.T. 7570, T.I.A.S. No. 6599, 672 U.N.T.S. 119.

3. See also Convention on Registration of Objects Launched Into Outer Space, *opened for signature* January 14, 1975, art. IV, 28 U.S.T. 695, T.I.A.S. No. 8480, 1023 U.N.T.S. 15, which obligates states to disclose specific but limited information concerning the location, function, and where applicable, basic orbital parameters, of objects launched into space.

4. Convention on International Liability for Damages Caused by Space Objects, *opened for signature* March 29, 1972, 24 U.S.T. 2389, T.I.A.S. No. 7762, 961 U.N.T.S. 187

procedures for the presentation and resolution of claims. Nevertheless, the Liability Convention does not alter the primary international liability of a launching state as expressed by the Outer Space Treaty.

The Moon Treaty reaffirms the non-appropriation doctrine<sup>5</sup> of the Outer Space Treaty. The Moon Treaty, however, goes much further, and expresses specific regulations concerning the use of lunar resources. In addition, the Moon Treaty subjects the exploitation of such resources to an international regime, which states parties have agreed to undertake to establish.<sup>6</sup>

The foregoing survey of the space treaties, while not intended to be exhaustive, is illustrative of the broad range of provisions which could have direct applicability to private commercial ventures in space. It is clear that space law will need to adapt to the change in emphasis from public to private space programs. The primary issues in need of resolution relate to the application of the non-appropriation doctrine, the international legal regime applicable to the use of extraterrestrial resources, and the respective liabilities of the launching state and the private entity conducting commercial space operations. As we look further into the future, the rights of

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[hereinafter referred to as the "Liability Convention"]. The Liability Convention distinguishes between damages on Earth or to aircraft in flight, for which strict liability principles are applied (article II), and damages to other space objects, which predicates liability on fault (article III).

5. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, *entered into force* July 11, 1984, art. 11.2, 1363 U.N.T.S. 3, *text reproduced in* Report, Committee on the Peaceful Uses of Outer Space, 34 U.N. GAOR Supp. (No. 20), U.N. Doc. A/AC.105/L.113 Add 4 (1979); UNITED NATIONS TREATIES ON OUTER SPACE 27 (1984); and 18 I.L.M. 1434 (1979)[hereinafter referred to as the "Moon Treaty"].

6. *Id.* at art. 11.5.

space settlers to autonomy in the governance of their daily life must also be considered.

### THE NON-APPROPRIATION DOCTRINE IN SPACE LAW

The non-appropriation principle of the Outer Space Treaty and the Moon Treaty is of primary importance. This doctrine prohibits national appropriation of outer space, including the Moon and other celestial bodies. By extension, states could not license private parties, particularly their own nationals, to appropriate privately that which cannot be appropriated publicly.<sup>7</sup> However, the inability to claim exclusive title to specific surface or subsurface areas on the Moon, or to orbits or other locations in space, could be viewed as a severe limitation inhibiting private development of space.

The question may be raised, therefore, whether the prohibition of national appropriation in space should continue to be a viable principle of international law in the commercial space age. The abrogation of the non-appropriation doctrine would enable states to claim sovereignty over various land masses, mineral deposits and other resources, asteroid bodies, orbits, or other "assets" of space, and thereafter to license, grant, permit, recognize, authorize and/or enforce rights of private ownership and development of such assets. Whether the abandonment of the non-appropriation doctrine would promote the commercial development of space, however, is yet to be demonstrated.

Abrogation of the non-appropriation doctrine cannot be justified merely to eliminate a potentially inhibiting circumstance to space commercialization. Rather, the basis on which the non-appropriation doctrine was adopted as a principle of space law must be considered. It is only where the original purposes of the doctrine cease to remain applicable that justification would exist for its removal as a principle from the *corpus juris spatialis*.

The advent of the space age followed historical antecedents for exploration and discovery. Throughout the classical age of exploration, colonial powers claimed discovered lands by a variety of ceremonies, ranging from physical presence, to planting the flag, to other rituals. There were no particular international standards for recognizing which of these ceremonies was legally superior. Some claims were made on the basis of mere sighting, without any physical contact with the area claimed. In the end, these claims were enforced and recognized on the basis of military power.<sup>8</sup>

The launch of Sputnik I by the Soviet Union on October 4, 1957, demonstrated that the presence of satellites in Earth orbit had profound national security implications. The global community was faced with two choices: concede the historical right of the technologically superior nations to lay claim to vast portions of outer space, including the Moon and other celestial bodies, or prohibit the assertion of such claims in the first instance. Clearly, international peace and security would be served by the prevention of conflict over competing terran claims to portions of the cosmos. The resolution of this issue, therefore, was a universal prohibition of national appropriation in space.<sup>9</sup>

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8. See generally A. HALEY, *SPACE LAW AND GOVERNMENT* 118-23 (1963).

9. See International Co-operation in the Peaceful Uses of Outer Space, U.N.G.A. Res. 1721(XVI)A, December 20, 1961, U.N. Doc. No. A/4987, at 1(b), declaring that "outer space and celestial bodies . . . are not subject to national appropriation." Thus, general agreement on this issue was reached by the community of nations a mere four years after the launch of the first artificial satellite. See generally Haley, *supra* note 8, at 123-34. The non-appropriation doctrine achieved the status of binding international law when it was incorporated into article II of the Outer Space Treaty, *supra* note 1. The consideration of the non-appropriation doctrine also involved examination of other important but distinguishable issues by the global community, such as the right of access to and freedom of

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7. See C.W. JENKS, *SPACE LAW* 201 (1965).

Technology utilized in space activities continues to have national security implications. Such implications have become more profound and subtle as the technology has become increasingly sophisticated.<sup>10</sup> Although the collapse of the Soviet Union reduced international tensions in a variety of contexts, that historic event did not eliminate all possible hostile uses of space and space technology by all nations. Moreover, the historical antecedents of nationalism and colonialism, which resulted in countless wars of conquest and conflicts over competing claims, were developed prior to any ideological competition of the 20th century.

It is up to the international legal community to achieve the maximum exploration and use of outer space by both the public and private sectors while at the same time preventing the spread of armed conflict beyond this planet. At this time, the abandonment of the non-appropriation doctrine does not appear to serve that purpose. The reasons which justified the inclusion of the non-appropriation principle in the Outer Space Treaty and the Moon Treaty continue to apply today. The abrogation of the non-appropriation doctrine, moreover, may in fact be detrimental and antithetical to the interests of free enterprise in space.

Abrogation of the non-appropriation doctrine would permit, and indeed make inevitable, claims of national sovereignty in space by the technologically advanced nations, particularly the United States and Russia (as the successor in interest to the Soviet Union). These claims would include various orbits, the Moon, and other areas where the claimant had any basis for asserting that it had been first to "discover" the subject of the claim, whether by exploration, use, landing, imaging, mapping, or surveying. The Russians, under this state of affairs, would have the historic justification for claiming vast reaches of near-Earth space because they had the

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exploration and use of outer space. *See id.* at art. I.

10. *See* G.H. STINE, *CONFRONTATION IN SPACE* (1981).

undeniable firsts in the initial days of the space age. Other nations could be anticipated to lay claim to space "properties." The Bogota Declaration,<sup>11</sup> for example, expressing claims to the geostationary orbit, could be expected to be re-asserted with vigor.

The various claims likely would overlap and thereby give rise to international tensions and the potential for armed conflict. Wars of conquest also could result, and the assertion of claims ultimately would be based on successful application of military force. Such a circumstance would not be conducive to the activities of private commerce in space. Moreover, to the extent states would be able to claim sovereign rights over natural space resources, there would be nothing to prevent each of the states from imposing substantial taxes, royalties, duties, auction fees or other charges for the acquisition of rights by private entities to utilize such resources, even where the national claims thereto overlap. Clearly, the development of private enterprise in space would not be served by imposition of an economic tribute by various states. Finally, it should be noted that the non-appropriation doctrine is double-edged: While it prevents an entity from establishing a monopoly, it prevents the competition from establishing one, too.

The abrogation and abandonment of the non-appropriation doctrine would not result in fostering the activities of private entities in space. Nevertheless, rules must be established regarding the manner in which rights in property may be acquired and maintained, and to apply those rules to all entities, whether they be individuals, corporations, states, or international organizations.<sup>12</sup> The Moon Treaty contains the

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11. Declaration of the First Meeting of Equatorial Countries, Bogota, Columbia, December 3, 1976, *text reproduced in* N. JASENTULIYANA & R.S.K. LEE, II *MANUAL ON SPACE LAW* 383 (1979).

12. *See generally* H.L. VAN TRAA-ENGELMAN, *COMMERCIAL UTILIZATION OF OUTER SPACE* (1993); Filho, *On Private, States and*

most detailed provisions in the extant *corpus juris spatialis* for the regulation of the use of natural resources. Specifically, the states party to the Moon Treaty have agreed to undertake to establish an international regime to govern the exploitation of lunar resources.

### THE MOON TREATY AND THE INTERNATIONAL REGIME

The Moon Treaty restates the non-appropriation language of the Outer Space Treaty and declares that the Moon and its resources are the common heritage of mankind.<sup>13</sup> Article 11.3 provides "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." Pursuant to this provision, neither land on the Moon, *i.e.*, the surface, nor mineral or other resources in place, may be owned by any public or private entity. The use of such resources is not prohibited, although such use may be subject to regulation by an international regime, which could be established in the future.

The specific purposes of the international regime are set forth in article 11.7 as:

- (a) The orderly and safe development of the natural resources of the Moon;

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*International Public Interests in Space Law*, in PROCEEDINGS OF THE 38TH COLLOQUIUM ON THE LAW OF OUTER SPACE 238 (1996); Doyle, *Legal and Policy Implications of Treating Natural Resources as the Common Heritage of Mankind*, in PROCEEDINGS OF THE 29TH COLLOQUIUM ON THE LAW OF OUTER SPACE 31 (1987); Haanappel, *Creating the Appropriate Regulatory Climate for Outer Space Activities Conducted by Private Enterprise*, in PROCEEDINGS OF THE 31ST COLLOQUIUM ON THE LAW OF OUTER SPACE 286 (1989).

13. Moon Treaty, *supra* note 5, at art. 11.1.

- (b) The rational management of those resources;

- (c) The expansion of opportunities in the use of those resources; [and]

- (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.

It must be noted that the Moon Treaty neither expressly requires the establishment of an international regime, nor does it impose a moratorium on the use of lunar resources pending the establishment of such regime.<sup>14</sup> However, it is clear that some form of jurisprudential framework will be necessary for the recognition and enforcement of rights in the use of extraterrestrial resources. Outer space is supranational in nature. When national security concerns are taken into consideration, it is apparent that all states, as sovereign entities, can be expected to demand some role in the regulation of space activities. In addition, the right to use and explore space should not be restricted to those who happen to have the technology today, to the exclusion of all others. States and other entities may have a legitimate right and expectation to be able to operate or participate in the operation of space activities in the future. Nevertheless, the jurisprudential framework which ultimately is developed does not necessarily need to constitute or include the international regime identified in the Moon Treaty.

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14. See Finch & Moore, *The 1979 Moon Treaty Encourages Space Development*, in PROCEEDINGS OF THE 23RD COLLOQUIUM ON THE LAW OF OUTER SPACE 13 (1981); *but see* Rosenfield, *A Moon Treaty? Yes, But Why Now?*, in PROCEEDINGS OF THE 23RD COLLOQUIUM ON THE LAW OF OUTER SPACE 69 (1981).

The range and depth of the issues to be considered in the acquisition and enforcement of rights in extraterrestrial resources show the need for adequate representation of all concerned entities in any body attempting to determine these matters. At a minimum, any regulatory body must assure the recognition, respect and enforcement of rights to utilize extraterrestrial resources which are granted to the constituent entities. Appropriate safeguards must be devised to protect the natural environments of celestial bodies, and to prevent interference by one entity with the activities of another. Furthermore, a mechanism must be developed for the resolution of disputes which will arise between parties involved or otherwise interested in the utilization of extraterrestrial resources.<sup>15</sup>

The level of regulatory detail that may be imposed by a future legal regime is impossible to predict. As summarized by Jenks,

Distinctions may well be necessary between use which is by its nature exclusive and use which can be shared simultaneously, use which involves the resource used being consumed and use which leaves it available for further use, use which involves some transformation or deterioration and use which has no such effect. It is difficult to elaborate on the matter in any precise detail until it is known what can be used and how.<sup>16</sup>

### LIABILITY

The Outer Space Treaty provides that states are internationally responsible for national activities in space, whether conducted by governmental agencies or non-governmental entities.<sup>17</sup> In addition, the Outer Space Treaty and

the Liability Convention provide that the launching state internationally is liable for damages caused by space objects on the surface of the Earth, to aircraft in flight, or to other space objects. The Liability Convention does not impose liability on the launching state for damages caused to its nationals or other entities involved in the activity giving rise to the damages.<sup>18</sup> Nor does the Liability Convention apply to situations where the damage is caused other than by a "space object" or its component parts. Thus, the liability imposed by the Liability Convention is primary and unlimited, however, it does not apply in all circumstances.

The imposition of unlimited liability is a significant departure from maritime and aviation standards. International aviation traffic has operated since 1952 under the terms of the Rome Convention, which provides for limitations on the liability of the organization to whom the aircraft is registered for damage caused by the operation of the aircraft.<sup>19</sup> Similarly, liability under

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18. DeSaussure, *Do We Need a Strict Limited Liability Regime in Outer Space*, in PROCEEDINGS OF THE 22ND COLLOQUIUM ON THE LAW OF OUTER SPACE 117, 119 (1980).

19. Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface, *opened for signature* October 7, 1952, art. 11, 310 U.N.T.S. 181 [hereinafter referred to as the "Rome Convention"]. The Rome Convention establishes a five tiered structure of liability limitations, based on the weight of the aircraft. The Montreal Protocol to Amend the Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface, *opened for signature* September 23, 1978, ICAO Doc. 9257, reduced the number of categories to four. The maximum liability provided by the Montreal Protocol is approximately \$29,300,000. The Rome Convention did not receive widespread approval. Although it entered into force, the treaty has not been accepted by many industrialized nations, including the United States, Canada, the United Kingdom, or Germany. Among the reasons for the lack of support is the criticism that the liability limitations are too low. Of course, the

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15. See G.H. STINE, SPACE POWER (1981).

16. Jenks, *supra* note 7, at 275.

17. Outer Space Treaty, *supra* note 1, at art. VI.

maritime law has been limited as a matter of both domestic and international law.<sup>20</sup> Liability for damage within the expressed limitations generally is absolute. Thus, commercial airline and ship operators, as well as private individuals, must arrange for their own insurance coverage to manage the risks inherent in their operations. This philosophy appears to have worked well by placing the risk of loss on aircraft and ship owners who must maintain and operate their craft in accordance with the national and international regulations and standards. The question therefore can be raised whether or not a limited liability regime should be applied to the realm of space activities.<sup>21</sup>

The activities of non-governmental entities in space are subject to the authorization and continuing supervision of the appropriate state of nationality.<sup>22</sup> The domestic law of the United States requires that private ventures obtain a license to conduct a launch of a payload into

space.<sup>23</sup> A necessary component of a launch license application is that the applicant demonstrate financial responsibility, which can be established by obtaining insurance.<sup>24</sup> The amount of insurance is determined by the government based upon a risk analysis of the maximum probable loss which may be caused by a particular launch.<sup>25</sup>

By statute, the amount of insurance is limited to a maximum of the greater of \$500,000,000 or the largest amount available at reasonable cost in the global marketplace for third party liability claims, and \$100,000,000 for property damage claims in favor of the U.S. government.<sup>26</sup> In addition, the licensing statutes require that all parties to a licensed launch activity execute a reciprocal waiver of claims on behalf of themselves, their contractors, sub-contractors, customers, and the contractors and sub-contractors of the customer, pursuant to which each entity agrees to be responsible for property damage and personal injuries it sustains resulting from an activity carried out under the license.<sup>27</sup> The waiver by the U.S. government,

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limitations of liability do not apply in cases of intentional damage. See generally I.H.PH. DIEDERIKS-VERSCHOOR, AN INTRODUCTION TO AIR LAW 125-36 (1993).

20. See DeSaussure, *supra* note 18, at 120-21.

21. See generally *id.*; see also G.H. STINE, *HALFWAY TO ANYWHERE* (1996); Hurwitz, *An International Compensation Fund for Damage Caused by Space Objects*, in PROCEEDINGS OF THE 34TH COLLOQUIUM ON THE LAW OF OUTER SPACE 201 (1992); Cocca, *Full Compensation to Total Responsibility*, in PROCEEDINGS OF THE 26TH COLLOQUIUM ON THE LAW OF OUTER SPACE 157 (1984); Dula, *Management of Inter and Third Party Liability for Routine Space Shuttle Operations*, in PROCEEDINGS OF THE 20TH COLLOQUIUM ON THE LAW OF OUTER SPACE 201 (1978).

22. Outer Space Treaty, *supra* note 1, at art. VI.

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23. See Commercial Space Launch Act, 49 U.S.C. §§ 70101, *et seq.*; see also 14 C.F.R. §§ 400 *et seq.* For a discussion of domestic legislation in other states, see von der Dunk, *Two New National Space Laws: Russia and South Africa* in PROCEEDINGS OF THE 38TH COLLOQUIUM ON THE LAW OF OUTER SPACE 251 (1996).

24. 49 U.S.C. § 70112(a).

25. 49 U.S.C. § 70112(c).

26. 49 U.S.C. § 70112(a)(3).

27. 49 U.S.C. § 70112(b)(1). For a discussion concerning the application of the reciprocal waivers, see *Martin Marietta Corporation v. Intelsat*, 978 F.2d 140 (4th Cir. 1992), *as amended* 991 F.2d 94 (1993); see also Bostwick, *Liability of Aerospace Manufacturers: McPherson v. Buick Sputters into the Space Age*, 22 J. SPACE L. 75 (1994); Meredith, *Spacecraft*



however, is limited to the amount of a claim in excess of the required insurance coverage.<sup>28</sup> A procedure has been established by which the U.S. government will provide for the payment of successful claims against a licensee in excess of the amount of required insurance, subject to a maximum of \$1,500,000,000.<sup>29</sup>

A Proposed Notice of Rulemaking concerning Financial Responsibility for Licensed Launch Activities recently was issued.<sup>30</sup> Included among the proposed regulations is a form for the reciprocal waiver of claims. This form of waiver provides that where a licensed launch activity involves either the U.S. government, its contractors, or a federal launch facility, the government is not entitled to indemnification from the license holder.<sup>31</sup> Thus, although the regulations generally relate to tort claims between entities involved in a launch activity, the form of reciprocal waiver indicates that the license holder will be relieved of liability to indemnify the government for claims of third parties in excess of the required insurance.

The above described regulatory framework creates a *de facto* limited liability regime for launch license holders. This limitation would be effective as between the licensee and the U.S. government, especially if the cross waiver

provision is judicially enforceable.<sup>32</sup> That is, the government has international responsibility, and in certain instances liability, for claims which are in excess of or otherwise not covered by the requisite insurance. Whether or not the self-imposed limitation of \$1,500,000,000 over and above the insurance would be sufficient to cover these claims, it is doubtful that this limitation will carry any significance in either diplomatic negotiations or before a properly constituted Claims Commission under the Liability Convention.<sup>33</sup> Thus, it can be expected that claims in excess of this self-imposed limitation will be allowed where appropriate under international law. Nevertheless, the licensee will be able to rely upon the reciprocal waiver to avoid responsibility to indemnify the government for such excess claims.

The existing regulatory framework generally is concerned with activities relating to the launch of payloads, primarily satellites, and not to the operations of objects while in orbit. This focus on launch activities is exemplified in the Proposed Notice of Rulemaking. In the discussion concerning proposed regulation 440.11, regarding the duration of insurance coverage, it is noted that the licensee will be required to maintain the insurance until completion of the

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*Failure-Related Litigation in the United States: Many Failures, but Few Suits*, in PROCEEDINGS OF THE 38TH COLLOQUIUM ON THE LAW OF OUTER SPACE 22 (1996).

28. 49 U.S.C. § 70112(b)(2).

29. 49 U.S.C. § 70113(a)(1) (expressed in 1989 dollars).

30. See 61 Federal Register 38991-39021 (July 25, 1996), proposing the establishment of a new Part 440 to 14 C.F.R. §§ 400, *et seq.*, which will implement the statutes discussed in the text.

31. *Id.* at 39021, Appendix II, § 6.

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32. There is some question as to whether the reciprocal waiver will be applicable to damages arising from gross negligence. The proposed regulations state that claims for gross negligence are not excluded from the reciprocal waiver. However, waivers of claims for gross negligence may not necessarily be permitted as a matter of state law. See *Martin Marietta v. Intelsat*, 991 F.2d at 100 (finding that liability for gross negligence cannot be waived pursuant to Maryland law). This issue may be subject to conflicting decisions by the state courts. The lack of uniformity in interpretation of the applicable regulations could be a significant negative factor in space commercialization, and at a minimum will place increased emphasis on choice of law provisions in contract negotiations.

33. See Liability Convention, *supra* note 4, at arts. XIV *et seq.*

licensed activities or until the risk of liability is sufficiently small that financial responsibility is no longer necessary. It further is noted that such period generally will be thirty days or less from successful orbital insertion of the payload.<sup>34</sup> Thus, the regulatory framework is unclear and imprecise in relation to the operations of payloads or other commercial activities conducted in outer space.

### AUTONOMY

Autonomy is the core of self-determination. The ability to achieve it is perhaps the strongest motivation for developing human settlements in space. In the past, the exploitation of natural resources has often been confused with self-determination for the purpose of building a system of social relationships. While numerous examples can be devised which will involve both, they are separate and distinct. The right of self-determination is not necessarily intertwined with the right to use resources for profit.

To the extent that a commercial operation involves the permanent relocation of individuals from Earth (or other settlements) to a facility in space or on another celestial body, questions of the right of the settlers to exercise self-government necessarily will arise. The concept of autonomy and self-government as a preferred modality for permanent space settlements increasingly has been gaining support.<sup>35</sup> In space,

the habitat and entire social structure can be devised together with the community design, in order to promote justice and harmony in the interrelationships between the settlement inhabitants and the entities interested in the establishment and operation of the facility. In this way, the lessons of history can prevent mistakes of the future, as mankind has an opportunity literally to design an entire way of life.

The application of terrestrial law to a permanent space community is derived from the perspective that an external legal structure will be superimposed upon the facility. However, extant jurisprudential philosophies will prove to be inadequate in the context of a settlement in space, as national and/or international instrumentalities cannot accommodate all the probable situations which likely will arise and require immediate resolution.<sup>36</sup> Furthermore, the passage of time involved in the process of terran resolution of conflicts would delay unnecessarily the administration of justice within the settlement.<sup>37</sup> It is unrealistic to assume that settlers will accept a situation wherein they do not share in the decision-making mechanisms for the internal functioning of the community. Manifestly, the determination of applicable law must consider the

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34. 61 Federal Register at 39008.

35. See generally Esquivel de Cocca, *Human Society on Mars: New Legal Needs for a Different Mankind*, in PROCEEDINGS OF THE 35TH COLLOQUIUM ON THE LAW OF OUTER SPACE 335 (1993); DeSaussure & Ulrich, *Transition of Control and Jurisdiction Over Space Settlements*, in PROCEEDINGS OF THE 34TH COLLOQUIUM ON THE LAW OF OUTER SPACE 55 (1992); Fasan, *Human Settlements on Planets: New Stations or New Nations*, 22 J. SPACE L. 47 (1994); G.N. PATTERSON, *PRIORITIES IN GEOLUNAR SPACE* (1989); G.S. ROBINSON, *LIVING IN OUTER SPACE* (1975); G.S. ROBINSON & H. WHITE, JR., *ENVOYS OF MANKIND* (1986); Sterns & Tennen, *The "Art*

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*of Living in Space: A Preliminary Study*, in PROCEEDINGS OF THE 21ST COLLOQUIUM ON THE LAW OF OUTER SPACE 245 (1979); Tamm, *Outer Space Colonization: A Planned Unit Development*, in PROCEEDINGS OF THE 22ND COLLOQUIUM ON THE LAW OF OUTER SPACE 217 (1980). See also Sterns & Tennen, *International Law and 'The Art of Living in Space: The Recognition of Settlement Autonomy*, 9 SPACE POLICY 213 (1993).

36. See Shurley, Natani & Sengel, *Ecoprochiatric Aspects of a First Human Space Colony*, in SPACE MANUFACTURING FACILITIES (SPACE COLONIES) 259 (J. Grey ed. 1977).

37. Cf., Chen, *Pending Issues Before the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space*, 5 J. SPACE L. 29 (1978).

alternative that a permanent space settlement will have the need for new law, unique unto itself.

The primary goal of continuity of settlement existence will be maintained by considering the settlement like unto another state, with the power to determine its own internal course. In this way, the space entity will be able to embark upon a rational and reasoned existence, and develop its own jurisprudential philosophy, derived from the collective experiences, needs, desires and goals of the inhabitants, rather than have determinations forced upon it in reaction to terrestrial events. Therefore, the space community should have separate and distinct control over those traditionally local areas of concern which will affect directly the proper functioning of the settlement on a daily basis, and the power to exercise limited home rule in an application of the concept of functional jurisdiction.<sup>38</sup>

The establishment of a settlement in space is an activity of unprecedented proportions, and necessarily will require a close, cooperative relationship between the founding terrestrial entity and the settlement. The emergence of settlement competence also will require consideration of the relationships between the settlement, the founding entity, and any nation or other entity desiring to conduct relations with the settlement. These goals may be accomplished by an international agreement of recognition and capacity, which will grant the settlement exclusive juridical competence for its internal and external functioning. Upon the receipt of recognition of its capacity as a legal regime, capable of conducting its own internal administration and external relations, the settlement will evolve from a mere habitable structure to an *exinde civitas politicae*, a political city-state in space. Such autonomy will enhance the ability of mankind to utilize extraterrestrial resources and promote the commercial development of space.

## CONCLUSION

The present law of outer space is neither expressly "pro" nor "anti" free enterprise because it was not drafted to be a comprehensive regulation of private uses of space resources. As the commercial space age develops, some modifications and clarifications of existing space law clearly will be necessary. Elements of maritime and aviation law may provide meaningful analogies and examples of the manner in which the development of applicable laws, and the activities of governments, can either promote or stifle commercial ventures in space.

It is unlikely that the international community will abandon the non-appropriation doctrine that stands at the foundation of the *corpus juris spatialis*, and which continues to promote international peace and security. However, the future legal regime which will govern the use of extraterrestrial resources must include adequate provision for the representation and participation of all interested parties, whether public, private, national, international or transnational. The domestic laws of states also will have an important role to play in promoting and creating incentives for private investment in space. A robust space economy ultimately will lead to the establishment of permanent settlements on celestial bodies and other locations, and issues concerning the right of the settlers to autonomy and self-government necessarily will arise. The extant *corpus juris spatialis* provides a firm basis on which the issues presented in the emerging age of commercial space can be considered and resolved.

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38. See I.A. CSABAFI, THE CONCEPT OF STATE JURISDICTION IN INTERNATIONAL SPACE LAW 64 (1971); cf. AZ. CONST., Art. XIII, § 2 (authorizing home rule).