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# JOURNAL OF SPACE LAW

UNIVERSITY OF MISSISSIPPI SCHOOL OF LAW  
A JOURNAL DEVOTED TO SPACE LAW AND THE LEGAL PROBLEMS  
ARISING OUT OF HUMAN ACTIVITIES IN OUTER SPACE.

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## FOREWORD

### SPACE LAW: CONTEMPORARY CONTRASTS AND COMPARISONS

*Joanne Irene Gabrynowicz\**

This issue of the JOURNAL OF SPACE LAW is a study in contrasts and comparisons. It contains papers on some of the oldest and newest space law issues as well as what some observers see as the growing interface between air and space law.

This issue also contains some of the most experienced and some of the more novice views on these subjects. For example, the question of the status of property rights in space has been long-debated in space law circles. Dr. Eilene Galloway, one of the acknowledged founders of both U.S. national and international space law, addresses the subject in this issue's commentary. Third year law student, Robert Kelly, also addresses it in this issue's case note. He analyzes *Nemitz v. U.S.*, which is the first case in which a U.S. Federal Court has been asked to adjudicate an asserted space property claim.

At the other end of the spectrum are articles that address entirely new issues for space and other lawyers. In his article, Prof. Paul Secunda identifies and analyzes the implications of the privacy protection requirements of the U.S. Health Insurance Portability and Accountability Act for health professionals who use remotely sensed data in their research, an increasingly growing trend.

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This issue of the JOURNAL OF SPACE LAW contains a new feature: publication of an article in French and Spanish as well as in English. The paper is the collaborative effort of the JOURNAL'S Editor-in-Chief and its Executive Editor, Dr. Jacqueline Etil Serrao. It is based on a presentation made by the Editor-in-Chief at the November 2003 United Nations/Republic of Korea Workshop on Space Law. The presentation was adapted by the editors for the Government of Colombia's Latin American Aerospace Experience: Agenda of Aerospace Activities for Colombia seminar, where it was presented in Spanish by Dr. Serrao. Dr. Virginia Rodríguez Serrano, an Associate Attorney with Clifford Chance in Madrid, Spain, worked with Dr. Serrao to provide the final published Spanish translation. Dr. Isabelle Bouvet, an attorney with the Centre National d'Etudes Spatiales, provided the French translation. Dr. Bouvet is also making her debut as an individual JOURNAL OF SPACE LAW author in this issue with her article on legal issues regarding the use of nuclear power sources in space.

Since the publication of the last issue of the JOURNAL OF SPACE LAW, Scaled Composites' *SpaceShipOne* designed by Mr. Burt Rutan won the Ansari X-Prize. It did so by successfully carrying the equivalent of three people on two sub-orbital flights to an altitude of 100km/62.5 miles within a two-week period. Many observers see this extraordinary accomplishment as an historical event which is a harbinger of an emerging commercial space tourism industry and a private human space program. The emergence of privately funded space launch vehicles is pertinent to Dr. Ruwantissa Abeyratne's article in this issue. He offers a comparison and contrast of air law and space law and addresses whether or not the International Civil Aviation Organization should be involved in the space law making process. Also reported in this issue's law update is the pending U.S. national legislation that was introduced to support the emergence of a private space tourism industry, illustrating once again the close relationship between technological and legal developments. The law update was compiled by third year student Laura Dyer. Finally, in contrast to a terrestrial based space industry and its legal evolution, Dr. Yun Zhao posits the inevi-

tability of space-based commercialization and offers his concept of an international governance authority for space commercialization.

In all, this issue of the JOURNAL OF SPACE LAW demonstrates that contemporary space law is alive with comparisons and contrasts that provide both intellectual and practical challenges as well as substantive material for on-going developments.

# ICAO'S INVOLVEMENT IN OUTER SPACE AFFAIRS – A NEED FOR CLOSER SCRUTINY?

*Ruwantissa Abeyratne\**

## I. INTRODUCTION

The question as to whether the International Civil Aviation Organization (ICAO) should be involved in the law making process pertaining to outer space affairs has already been addressed by scholars and professionals. Dr. Assad Kotaite, President of the ICAO Council, drew the inextricable link between space technology and civil aviation when he observed that space technology has made far reaching contributions to the betterment of the human condition, and civil aviation was one sector where such technological benefit was evident.<sup>1</sup> It is irrefragable that space science and technology will play a critical role in the future development of civil aviation. In the words of Dr. Kotaite:

Laid out on the drawing boards of aircraft manufacturers and futurists are spacecraft that one day will carry passengers into the upper airspace and eventually into outer space. When that day comes, and it may not be that far away, real issues will need to be addressed by government regulators.... The idea of adopting ICAO as a model, or expanding the mandate of ICAO to encompass outer space has merit.<sup>2</sup>

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\* DCL (McGill), Ph.D (Colombo) LL.M (Monash), FRAeS, FCILT. The author is a senior official at the International Civil Aviation Organization. He has written this article in his personal capacity. Views expressed herein should not necessarily be attributed to ICAO.

<sup>1</sup> Assad Kotaite, *Formal Regulatory Framework Needed to Govern Expanding Operations in Outer Space*, 55 ICAO J. 5 (2000). Dr. Kotaite observed that ICAO has been actively promoting the use of space technology in aviation since 1972 when the Future Air Navigation System (FANS), the precursor to the Communications, Navigation, Surveillance/Air Traffic Management System (CNS/ATM), was discussed at ICAO's 7<sup>th</sup> Air Navigation Conference. *Id.* See also generally, Ruwantissa I.R. Abeyratne, *Legal and Regulatory Issues in International Aviation*, in SPACE TECHNOLOGY AND AIR NAVIGATION, 260-269 (Transnational Publishers Inc., New York, 1996).

<sup>2</sup> Kotaite, *supra* note 1, at 5.



Wassenbergh made a similar observation in 1999 when he said that, in the context of launch vehicles, ICAO's mandate could well be expanded to include the drafting of "minimal traffic safety, security and environmental rules" for launch vehicles.<sup>3</sup> The inextricable link between the communications, navigation, surveillance/air traffic management (CNS/ATM) system and satellite technology brings to bear the compelling importance of the Aeronautics Telecommunications Network (ATN) for which ICAO has prolifically set standards in Annex 10 to the Convention on International Civil Aviation.<sup>4</sup> It is believed that ICAO's demonstrable competence in adopting 18 Annexes to the Chicago Convention, all of which contain Standards and Recommended Practices (SARPs) to regulate international civil aviation efficiently over the past 60 years, may well make it the global forum of nations which may be needed to achieve consensus in the management of outer space.<sup>5</sup> From a technical standpoint, ICAO's credibility is strengthened by the example set by the Organization in expertly migrating to the CNS/ATM system, thus achieving a seamless and global air traffic system.<sup>6</sup> A strong argument has already been made to separate the launching activity from outer space activity on the basis that space activities are essentially activities taking place in outer space and that the launching activity is a transportation activity occurring in the Earth's airspace.<sup>7</sup> Wassenbergh states:

I am of the opinion that there is reason for separating the international legal regimes applicable to these activities, espe-

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<sup>3</sup> Henri Wassenbergh, *Access of Private Entities to Airspace and Outer Space*, 24 ANNALS OF AIR & SPACE L. 311, 316 (1999).

<sup>4</sup> Convention on International Civil Aviation, Dec. 7, 1944, 15 UNTS 295, UKTS 8 [hereinafter Chicago Convention]. See ICAO Doc 7300/8 (8<sup>th</sup> ed., Sept. 2000), available at [http://www.icao.int/cgi/goto\\_m.pl?icao/en/download.htm#Docs](http://www.icao.int/cgi/goto_m.pl?icao/en/download.htm#Docs) (last viewed Oct. 9, 2004).

<sup>5</sup> Kotaite, *supra* note 1, at 5.

<sup>6</sup> Jack Howell, *Evolutionary Approach to Transition Now Focussed on Detailed Vision of How to Exploit Technologies*, 55 ICAO J. 6 (Sept. 2000).

<sup>7</sup> Henri A. Wassenbergh, *A Launch and a Space Transportation Law, Separate From Outer Space?*, 21 AIR AND SPACE L. 1, 28 (1996).

cially where it concerns activities deployed by non-governmental entities.<sup>8</sup>

He suggests that a clear distinction must be made between activities in outer space and transportation leading up to the journey in outer space. The latter would include the launch of the vehicle from the ground which would involve traversing airspace above the territory of a State or States. Wassenbergh's opinion cannot be ignored as it states an incontrovertible fact. However, the real issue lies in the determination of the common elements of air and space travel and the building of a common interoperable and international legislative structure that could encompass both the transitional process from air space to outer space and the application of the philosophy of each legal system to the other. Inextricably linked to this ultimate goal is the need to initially determine the synergies between air transport and space transport, both from technical and legal perspectives.

## II. ELEMENTS COMMON TO AIR LAW AND SPACE LAW

Air law came into being from a global regulatory perspective when 52 States signed the Chicago Convention on 7 December 1944.<sup>9</sup> Space law was launched in 1958 when the United Nations General Assembly adopted Resolution 1348.<sup>10</sup> The fundamental distinction between the legal systems is that air law is both more structured and all encompassing as its regulatory aspects stems from one international treaty. Space law on the other hand has no all encompassing regulatory document nor an international organization responsible for its regulation in the nature of a specialized agency of the United Nations system. Instead, several international treaties address different issues at space law.<sup>11</sup> However, both systems have certain fundamental

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<sup>8</sup> *Id.*

<sup>9</sup> Chicago Convention, *supra* note 4.

<sup>10</sup> Question of the Peaceful Use of Outer Space, U.N. ICAO, 792<sup>nd</sup> Plenary Meeting, U.N. Doc. A/RES/1348 (1958), available at [www.un.org](http://www.un.org).

<sup>11</sup> The basic space treaties are:

1. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan.

commonalities which are hard to ignore. For one, both the Chicago Convention and A/RES/1348 refer to the needs of the people of the world, where the former states that the development of the techniques of air navigation and principles of air transport have to meet the needs of the peoples of the world while the latter recognizes the common interest of humankind in outer space.<sup>12</sup> Article 1 of the Chicago Convention embodies the principle of sovereignty of nations while the second preambular clause of A/RES/1348 makes reference to Article 2 (1) of the Charter of the United Nations which states that the United Nations is based on the sovereign equality of all its Members. The Preamble to the Chicago Convention refers to the future development of civil aviation benefiting humankind and a similar provision is contained in the fourth preambular clause of A/RES/1348 which expresses the desire of the General Assembly to promote energetically the fullest exploration and exploitation of outer space for the benefit of humankind.

Although A/RES/1348 considered the importance of the contribution that could be made by an appropriate international body for cooperation in the study of outer space for peaceful purposes, and indeed established the United Nations Commit-

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27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 (entered into force on Oct. 10, 1967);

2. Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space, Apr. 22, 1968, 19 U.S.T. 7570, 672 U.N.T.S. 119;

3. Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187;

4. Convention on Registration of Objects Launched into Outer Space, Jan. 14 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15; and

5. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 18 1979, 1362 U.N.T.S. 3.

Other treaties explicitly apply in part to activities in space but are not limited to such activities, e.g. Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water, Aug. 5, 1963, U.S.-U.S.S.R., 14 U.S.T. 1313; and Treaty on the Limitation of Anti-Ballistic Missile Systems, May 26, 1972, U.S.-U.S.S.R., 23 U.S.T. 3435. The bilateral arms limitation agreements between the United States and the Soviet Union may also qualify as international space law to the extent that they prohibit interference with "national technical means of verification," including satellite reconnaissance.

<sup>12</sup> See Chicago Convention, *supra* note 4, at Preamble and art. 44 (d).

tee on the Peaceful Uses of Outer Space (UNCOPUOS),<sup>13</sup> such a measure does not match up to the signal initiative of the Chicago Convention. Article 44 of that Convention established ICAO. It is a specialized agency of the United Nations which comprehensively provides guidelines for international civil aviation through the 18 Annexes to the Convention as well as various other Assembly and Council resolutions and policy. UNCOPUOS has neither law making nor adjudicative powers<sup>14</sup> whereas the Chicago Convention contains several usable provisions that are enforceable<sup>15</sup> and offers the ICAO Council effective enforcement powers that could be used to remedy inadequacies in the global air navigation system.<sup>16</sup> It has been acknowledged that ICAO possesses genuine rule making powers and authority on matters of navigation over the high seas and other ocean areas where there is freedom of overflight.<sup>17</sup>

Another commonality between air law and space law is the heavy reliance placed by both systems on the sovereign right of nations to carry out functions in aviation and outer space activities. As mentioned earlier, the express mention of sovereignty in Article 1 of the Chicago Convention manifests itself in a practical sense regularly. One of the latest examples is the Global Declaration adopted at the 5<sup>th</sup> Worldwide Air Transport Conference of ICAO in March 2003 which recognized the sovereign right of each State to charter its own path of liberalization of air

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<sup>13</sup> Committee on the Peaceful Uses of Outer Space, U.N. Doc. A/RES/1472A (Dec. 12, 1959) [hereinafter COPUOS].

<sup>14</sup> Ralph G. Steinhardt, *Outer Space*, in 2 UNITED NATIONS LEGAL ORDER 753, 757 (Oscar Schachter & Christopher C. Joyner eds. Cambridge Univ. Press 1995).

<sup>15</sup> Chicago Convention, *supra* note 4, at arts. 54(j)-(k) (giving ICAO Council authority to monitor conduct of Contracting States).

<sup>16</sup> *Id.* at art. 69. Article 69 of the Convention provides that if the Council is of the opinion that the airports or other air navigation facilities, including radio and meteorological services, of a Contracting State are not reasonably adequate for the safe, regular, efficient and economical operation of international air services, present or contemplated, the Council shall consult with the State directly concerned, and other States affected, with a view to finding means by which the situation may be remedied, and may make recommendations for that purpose. *Id.* No Contracting State shall be guilty of an infraction of the Convention if it fails to carry out these recommendations. *Id.*

<sup>17</sup> Frederick L. Kirgis Jr., *Aviation*, 2 UNITED NATIONS LEGAL ORDER, 825, 854 (Oscar Schachter & Christopher C. Joyner eds. Cambridge Univ. Press 1995).

transport.<sup>18</sup> As for space law, the issue of unfettered freedom in regard to carrying out exploration and use of space is a pre-eminent concept which prompted one scholar to observe that ninety percent of work in space law is devoted to the problem of sovereignty.<sup>19</sup> The word "freedom", which occurs in both air law and space law, should not be confused with sovereignty. The former relates to freedom of outer space and the latter refers to the freedom of the air which are conferred by sovereign nations upon one another (except for the first and second freedoms which are considered the right to fly over a territory of a State and to land in the territory of one State for non-traffic purposes).<sup>20</sup> Jennings offered the most succinct explanation of freedom in air law when he said:

The truth of the matter seems to be that the principle of freedom alone is not sufficient to solve the problems of air law; like that of sovereignty, it can serve no more than as a point of departure for the development of an adequate and appropriately elaborate system of rules.<sup>21</sup>

This statement, made when the process of regulation of civil aviation on a global basis was incipient, carries the wisdom of time and is eminently applicable now. Although statements are made conceptually on state sovereignty or freedom of action as being entrenched (such as the one referred to above regarding the 5<sup>th</sup> ICAO Worldwide Air Transport Conference) in practicality State sovereignty often gives way to regional or community rules and, in some instances, exigencies of economic necessity and compulsion, only to be used as a potential privilege in departing from established rules constituting multilateral agreement. Sovereignty, both in terms of air law and space law, signifies a certain independence of action by a State with regard to

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<sup>18</sup> *Report of the Worldwide Air Transport Conference - Challenges and Opportunities of Liberalization*, U.N. ICAO ATConf/5, 2003, at 59-63, U.N. Doc. 9819 (2003).

<sup>19</sup> Y.A. Korovin, *Conquest of Outer Space and Some Problems of International Relations*, INTERNATIONAL AFFAIRS MOSCOW, 95 (1959) (statement of Eugene Pepin).

<sup>20</sup> *Manual on the Regulation of International Air Transport*, at 4.1.5 and 4.1.8 - 4.1.11, U.N. ICAO Doc 9626 (second ed., 2004).

<sup>21</sup> Robert Y. Jennings, *Some Aspects of the International Law of the Air*, 75 RECUEIL DES COURS 514, 585 (1949).

other States, to their exclusion. However, air law signifies control by a State exercised over its air space whereas no State can exercise sovereignty over any portion of outer space. This prohibition is based on the principle that any projection of territorial sovereignty into space beyond the atmosphere would be inconsistent with astronomical facts which bring to bear the peripatetic nature of the universe. The revolution of the Earth on its own axis, its rotation around the sun and the motion of the sun and planets through the galaxy would effectively preclude any presumptive declaration of territory by an individual state.<sup>22</sup>

The distinction between air space and outer space, particularly in the context of delimiting the two, was not an issue of urgency in 1959 when the United Nations General Assembly Resolution 1348 was adopted. The Ad Hoc Committee on the Peaceful Uses of Outer Space, stated in 1959 that the Committee believed that, in general, the determination of precise limits for airspace and outer space did not present a legal problem calling for priority consideration at that time.<sup>23</sup> Since then there has been a proposal that the upper limit of the "atmosphere" be considered as the extent to which air space would go vertically.<sup>24</sup> This has led to some controversy as the "atmosphere" comprises several layers such as the troposphere, stratosphere, ionosphere and exosphere, all of which have been considered as possible outer limits of airspace.<sup>25</sup> ICAO involvement does not arise if a space object traverses solely the airspace of the launch state. However, as Manfred Lachs points out:

...the law has traced no frontier between air space and outer space. Wherever that frontier may eventually be fixed, any object journeying from earth to outer space, or the reverse, must

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<sup>22</sup> C. Wilfred Jenks, *International Law and Activities in Space*, 5 INT'L & COMP. L. Q. 99, 103-04 (1956).

<sup>23</sup> Report to the United Nations General Assembly, *U.N. Ad Hoc Committee on the Peaceful Uses of Outer Space*, 14th Sess., U.N. Doc. A/4141 (1959).

<sup>24</sup> See E. Pepin, *Space Penetration*, *Proceedings*, 52 A.S.I.L. ANNUAL MEETING 229 (1958).

<sup>25</sup> Bin Cheng, *From Air to Space Law*, 13 CURRENT LEGAL PROBS. 228 (1960); see also, V.I. LISOVSKY, *INTERNATIONAL LAW* 196 (Moscow).

needs traverse airspace ... Such problems do arise, however, once the space object enters the airspace of other States.<sup>26</sup>

Dr. Kotaite refers to this possibility when he states that passenger flights will one day operate in an environment congested with space debris. He implies that the day is not in the far distant future when aircraft will take off from one State and traverse outer space before entering the Earth's atmosphere and landing in another State.<sup>27</sup>

### III. THE ICAO INVOLVEMENT

Any possible involvement by ICAO in future regulation of outer space activities would be inextricably linked to the nexus between air space and outer space and the blurring of distinction between aircraft *per se* and an aerospace plane.<sup>28</sup> Critical to this merger of activities would be issues involving security and safety, along with commercial and trading issues including market access and competition. ICAO is armed with an excellent model treaty — the Chicago Convention — which has stood the test of time and has already provided proven guidelines for every conceivable aspect of international civil aviation through its 18 Annexes. However, any involvement of ICAO in outer space affairs has to be cautiously considered with a view to finding the best possible manner in which ICAO could effectively contribute to the already existing structure including UNCOPUOS<sup>29</sup> and other international bodies involved in outer space affairs<sup>30</sup> which have so far done a commendable job of de-

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<sup>26</sup> MANFRED LACHS, *THE LAW OF OUTER SPACE: AN EXPERIENCE IN CONTEMPORARY LAW MAKING* 59 (Sijthoff: Leiden, 1972); *see also*, CARL Q. CHRISTOL, *THE INTERNATIONAL LAW AND OUTER SPACE*, *INTERNATIONAL LAW STUDIES* 171 (1962).

<sup>27</sup> Kotaite, *supra* note 1, at 5.

<sup>28</sup> Ruwantissa I. R. Abeyratne, *The Aerospace Plane and its Implications for Commercial Air Traffic Rights*, *THE AVIATION Q.* 186, 192 (January 1997).

<sup>29</sup> NANDASIRI JASENTULIYANA, *A SURVEY OF SPACE LAW AS DEVELOPED BY THE UNITED NATIONS, PERSPECTIVES ON INTERNATIONAL LAW* 350-83 (N. Jasentuliyana ed., Kluwer Law International 1995) (explaining and documenting UNCOPUOS and law-making process in outer space affairs); *see also* I.H. PH. DIEDERIKS - VERSCHOOR, *AN INTRODUCTION TO SPACE LAW* 6 (Kluwer Law International, 2d rev. ed. 1999).

<sup>30</sup> UNCOPUOS is not the only international forum in which legal issues relating to outer space affairs are addressed. The International Telecommunications Union (ITU) is also involved through its regulation of the utilization of the frequency/spectrum re-

veloping material, given the fact that it is a Committee with a technical and legal subcommittee each and lacks the law making power of ICAO.

A good starting point, and one which adds increasing credibility to a possible role to be played by ICAO in outer space affairs, is that there are some who believe that "aerospace law" should be one branch of the law singularly governing aerospace, and have defined "aerospace law" as follows:

The earth's envelope of air and space above it, the two considered as a single realm for activity in the flight of air vehicles and in the launching, guidance and control of ballistic missiles, earth satellites, dirigible space vehicles and the like.<sup>31</sup>

A pioneer in aerospace law, Dr. John Cobb Cooper, uses the above criteria to further define "aerospace law" "the body of legal principles and rules, from time to time effective, which govern and regulate" aerospace and flight. The space component includes outer space and "its relationship to land and water areas on the surface of the earth, the extent and character of the right of individuals and States to use and control such space, or parts thereof, or celestial bodies therein for flights or other purposes." The air space component includes flight and encompasses "instrumentalities with which flight is effected, including their nationality, ownership, use or control." Also included within the air component of aerospace are "surface facilities in connection with flights, such as airports, other launching or landing areas, navigation facilities and airways." Cooper also considered aerospace to involve the relationship "of every kind affecting or between individuals, communities or states arising from the existence or use of the area of flight (aerospace), or the

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source of the geo-stationary orbit. See *International Space Law in the Making*, in 1 F. FOR AIR AND SPACE L. 3-4 (Marietta Benko & Kai-Uwe Schrogl eds., Frontieres 1993). Additionally, The International Atomic Energy Agency (IAEA) addresses issues concerning environmental problems and the use of nuclear energy resources in outer space. *Id.* The United Nations Educational, Social and Cultural Organization (UNESCO) considers the effects of broadcasting by satellites from a legal, political, social and cultural perspective. *Id.*

<sup>31</sup> DIEDERIKS-VERSCHOOR, *supra* note 29, at 8; John Cobb Cooper, *Aerospace Law - The Subject Matter and Terminology*, 29 J. AIR L. & COM. 89, 89 (1963).



instrumentalities or facilities used in connection therewith or to make the flight effective.<sup>32</sup>

We have reached an age where satellites of various kinds, whether they be for communication, reconnaissance, observation or monitoring, – image remote corners of the Earth and invade the skies. In this sense, the very concept of state sovereignty has been marginalised and the integrity of States violated. Space stations and other space objects such as telescopes carry out numerous activities which may bear upon lower depths of the skies, thus affecting state sovereignty. It is therefore necessary to revisit the direction taken by technological developments in aerospace activities with a view to updating the legislative structure relating to aerospace.

The space shuttle, which was generally defined as a spacecraft, as it was a rocket propelled vehicle designed to move in Earth orbit and outer space, also had the capacity to take off in a manner similar to that of a conventional aircraft. This led to questions being asked regarding what were called “near Earth surface vehicles” which are rocket propelled hybrid space shuttles carrying distinct technical features of an aircraft and performing certain terrestrial functions which is usually carried out by aircraft.<sup>33</sup>

An ICAO-UNCOPUOS synergy which may be established through the ICAO Council and UNCOPUOS, and based on past ICAO work in CNS/ATM systems, warrants some study and cautious scrutiny. ICAO has, throughout the 1990s and through the current century so far, initiated an intense work programme in the technical field of CNS/ATM systems. This has involved sustained work on the development of SARPs for the air ground sub networks of the ATN.<sup>34</sup> In this sense, it would not be unreal-

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<sup>32</sup> Cooper, *supra* note 31, at 94. Dr. Cooper also made the suggestion that at any particular time, the territory of each state extends upward into space as far as the scientific progress of any state in the international community permits such state to control space above it. *Id.* Although this by no means attributes to Dr. Cooper the idea that individual states can claim sovereignty in outer space, this statement brings to bear the relevance of “control” exercised by a state in outer space. *Id.* See John Cobb Cooper, *High Attitude Flight and National Sovereignty*, 4 INT’L L. Q. 411 (1951).

<sup>33</sup> S. Mishra & T. Pavlasek, *On the Lack of Physical Bases for Defining a Boundary Between Space and Outer Space*, 7 ANNALS OF AIR & SPACE L. 399, 409 (1982).

<sup>34</sup> Howell, *supra* note 6.

istic to embark on a feasibility study of the development of an Annex to the Chicago Convention with full ICAO-UNCOPUOS involvement and cooperation, on the aerospacial impact on aeronautical activities relating to the safety and security of the aerospace industry and the integrity of the community of states.

The first step therefore would be for ICAO to study the impact of outer space activities of states and private entities on aeronautical activities regulated by ICAO. Such a study could give ICAO and UNCOPUOS an insight as to whether some cooperation between ICAO and other United Nations bodies involved in the regulation of outer space activities is warranted. Article 44 of the Chicago Convention, which sets out the "aims and objectives" of ICAO, identifies them as being, *inter alia*, to "[i]nsure the safe and orderly growth of international civil aviation throughout the world;" "[e]ncourage the arts of aircraft design and operation for peaceful purposes;" and "encourage the development of airways, airports, and air navigation facilities for international civil aviation".<sup>35</sup> These aims and objectives give ICAO ample scope to delve into technological advances made in the design and manufacture of "aerospacecraft" which may, in the future have aeronautical consequences and which may assist in the determination of ICAO's involvement in the regulation of aerospace activities.

Pursuant to Resolution A31-7 adopted by the 31st Session of the ICAO Assembly, in December 1995, the Council of ICAO established a Panel of Experts on the Establishment of a Legal Framework with Regard to Global Navigation Satellite Systems (LTEP). The LTEP was charged, *inter alia*, to develop a legal framework of conduct regarding the use of the Global Navigation Satellite Systems (GNSS). The framework developed by the LTEP took the form of a Charter containing various principles for the implementation and operation of GNSS, such as recognition of the paramount nature of safety in international civil aviation; non-discrimination and universal applicability and accessibility of GNSS; inviolability of States' sovereign rights; continuity, integrity, availability and reliability of ser-

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<sup>35</sup> Chicago Convention, *supra* note 4, at art. 44.

vices; and international cooperation. The Charter was recognized by the ICAO Council, at its 153<sup>rd</sup> Session in March 1998, as being worthy of submission to the 32<sup>nd</sup> Session of the Assembly, which in turn adopted the text of the Charter in a Resolution. Therefore, a legal regime already exists in the international arena relating to the provision of satellite communications for air navigation. At its 32<sup>nd</sup> Session, held in Montreal from 25 September to 5 October 2001, the ICAO Assembly adopted Resolution A32-19, the *Charter on the Rights and Obligations of States Relating to GNSS Services*.<sup>36</sup> The Assembly, while recognizing that Article 44 of the Chicago Convention mandates ICAO to develop the principles and techniques of international air navigation and to foster the planning and development of international air transport, observed in its second preambular clause that the concept of CNS/ATM systems utilizing satellite-based technology was endorsed by States and international organizations at the ICAO Tenth Air Navigation Conference, and was approved by the 29th Session of the Assembly as the ICAO CNS/ATM systems. The Assembly also recognized that the GNSS, was an important element of the CNS/ATM systems, and was intended to provide worldwide coverage and is to be used for aircraft navigation. It was concluded that GNSS would be compatible with international law, including the Chicago Convention, its Annexes and the relevant rules applicable to outer space activities. As such, the Assembly was of the view that it was appropriate, taking into account current State practice, to establish and affirm the fundamental legal principles governing GNSS which should be established in a Charter. The Assembly consequently adopted the principles in the Charter on the Rights and Obligations of States Relating to GNSS Services (GNSS Charter) and which shall apply in the implementation and operation of GNSS.<sup>37</sup>

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<sup>36</sup> *Assembly Resolutions in Force*, ICAO Doc 9790, at V-3 (as of Oct. 5, 2001).

<sup>37</sup> Charter on the Rights and Obligations of States Relating to GNSS Services, 32<sup>nd</sup> Assembly, ICAO Doc. A32-19 (1998) [hereinafter GNSS Charter].

1. States recognize that in the provision and use of GNSS services, the safety of international civil aviation shall be the paramount principle.

It is at this point that the problem arises, and legal discourse begins. The mere fact that the GNSS Charter is now an ICAO Assembly Resolution has prompted the comment:

Adopted in the form of an Assembly Resolution, the Charter cannot be accorded any legal force and therefore must be regarded as legally not binding. Some commentators, having expressed serious doubts as to the usefulness of the instrument, seem to be somewhat displeased with the nomenclature em-

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2. Every State and aircraft of all States shall have access, on a non-discriminatory basis under uniform conditions, to the use of GNSS services, including regional augmentation systems for aeronautical use within the area of coverage of such systems.
  3.
    - a) Every State preserves its authority and responsibility to control operations of aircraft and to enforce safety and other regulations within its sovereign airspace.
    - b) The implementation and operation of GNSS shall neither infringe nor impose restrictions upon States' sovereignty, authority or responsibility in the control of air navigation and the promulgation and enforcement of safety regulations. States' authority shall also be preserved in the coordination and control of communications and in the augmentation, as necessary, of satellite-based air navigation services.
  4. Every State providing GNSS services, including signals, or under whose jurisdiction such services are provided, shall ensure the continuity, availability, integrity, accuracy and reliability of such services, including effective arrangements to minimize the operational impact of system malfunctions or failure, and to achieve expeditious service recovery. Such State shall ensure that the services are in accordance with ICAO Standards. States shall provide in due time aeronautical information on any modification of the GNSS services that may affect the provision of the services.
  5. States shall cooperate to secure the highest practicable degree of uniformity in the provision and operation of GNSS services. States shall ensure that regional or subregional arrangements are compatible with the principles and rules set out in this Charter and with the global planning and implementation process for GNSS.
  6. States recognize that any charges for GNSS services shall be made in accordance with Article 15 of the Chicago Convention.
  7. With a view to facilitating global planning and implementation of GNSS, States shall be guided by the principle of cooperation and mutual assistance whether on a bilateral or multilateral basis.
  8. Every State shall conduct its GNSS activities with due regard for the interests of other States.
  9. Nothing in this Charter shall prevent two or more States from jointly providing GNSS services.

ployed which would be indicative of a legal instrument of fundamental importance.<sup>38</sup>

This is seemingly consistent with another view on the ICAO Assembly which states that:

[ICAO] Assembly recommendations ... are more than hortatory. They are designed to set global norms in a field where there is widespread acknowledgment of the need for ordered conduct. They are adopted by a plenary body, with the shared expectation that States will follow them to the extent that they are able to. They clearly are not binding, but they have a sufficient channelling effect to place them well above the low point on a continuum of normative instruments ranging from non law to true law.<sup>39</sup>

However, unlike the former view, this statement attributes more coercive force to ICAO Assembly Resolutions, thus making the GNSS Charter an instrument which sets out norms and demands States to follow them if possible and is therefore in between "non law" and "true law". What this means is that the GNSS Charter would not be totally destitute of effect in establishing certain obligations for States to perform. Therefore, it becomes a reckonable force in international relations, if not at international law, particularly since ICAO resolutions are highly persuasive and carry much political leverage. Above all, such an instrument could, while reaffirming existing legal principles, pave the way for an international convention that is binding on States' Parties.

The significance of the legal status regarding the current principles on the conduct of States in using space based applications in air traffic management lies in the compelling need to inquire as to whether rigid fragmentation of law and policy is really necessary, particularly in such an important area as aviation safety. Does one dismiss policy in this critical area purely on the inflexible notion that it is not enforceable? On the other hand, do States need to abandon rigid demarcations in in-

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<sup>38</sup> ALESSANDRA A.L. ANDRADE, *THE GLOBAL NAVIGATION SATELLITE SYSTEM: NAVIGATING INTO THE NEW MILLENNIUM* 89 (Ashgate 2001).

<sup>39</sup> Kirgis *supra* note 17, at 840.

stances such as these and agree to global adherence? These are some of the issues that have to be ironed out when the subject of cooperation between the aviation and space communities surfaces.

Also at the 32<sup>nd</sup> Session, the Assembly adopted Resolution A 32-20, Development and Elaboration of an Appropriate Long-term Legal Framework to Govern the Implementation of GNSS.<sup>40</sup> It was recognized that the GNSS was an important element of the ICAO CNS/ATM systems, is intended to provide safety-critical services for aircraft navigation with world-wide coverage, and that the complex legal aspects of the implementation of CNS/ATM, including GNSS, require further work by ICAO. Further work is necessary in order to develop and build mutual confidence among States regarding CNS/ATM systems and to support the implementation of CNS/ATM systems by Contracting States.

The Assembly recalled that the world-wide CNS/ATM systems implementation Conference in Rio de Janeiro in May 1998 recommended that a long-term legal framework for GNSS be elaborated, including the consideration of an international convention, while recognizing that regional developments may contribute to the development of such a legal framework and that the recommendations adopted by the Rio Conference as well as the recommendations formulated by the LTEP provide important guidance for the development and implementation of a global legal framework for CNS/ATM and in particular GNSS. Consequently, the Assembly, while recognizing the importance of regional initiatives regarding the development of the legal and institutional aspects of GNSS, and the urgent need for the elaboration, both at a regional and global level, of the basic legal principles that should govern the provision of GNSS, called for an appropriate long-term legal framework to govern the implementation of GNSS. Recalling an earlier decision of the Council taken on 10 June 1998 authorizing the Secretary General to establish a Study Group on Legal Aspects of CNS/ATM systems, the Assembly instructed the Council and the Secretary General,

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<sup>40</sup> *Id.* at V-4.

within their respective competencies, and beginning with a Secretariat Study Group, to ensure the expeditious follow-up of the recommendations of the world-wide CNS/ATM Systems Implementation Conference, as well as those formulated by the LTEP. Special consideration was to be given to those recommendations concerning institutional issues and questions of liability. Elaboration of an appropriate long-term legal framework to govern the operation of GNSS systems, including consideration of an international Convention for this purpose was also to be considered. Presentation of proposals for such a framework was to be made in time for consideration by the next ordinary Session of the Assembly.

#### IV. CONCLUSION

ICAO's involvement in outer space activities would hinge on the nature of technological advancements to come regarding the design and manufacture of spacecraft and their use of air space and outer space. The former is relevant since ICAO has an obligation to the international community, as mentioned above, under Article 44 of the Chicago Convention. The latter is important as the skies are becoming seamless and the single skies concept, particularly in Europe, is gaining on the aviation community. The use of the sky, from an air navigation service provider perspective, as well as from a territorial perspective, has become a serious consideration making it necessary for the legal ramifications of the issue of airspace to be given attention.

Should the consequences of future outer space activities have a serious effect on ICAO's aeronautical activities, they would have to be studied in depth and appropriate synergies between the aviation and outer space developed. What is immediately required is a vision both for the aviation community and outer space affairs community, for effective cooperation within their competencies, aims and objectives

It should not be forgotten that another positive feature of ICAO, which lends itself well to the Organization's possible involvement in outer space activities, is its proven competence in mediation during the settlement of disputes. A preeminent feature of the ICAO Council is its indomitable resolve to address its

deliberations to purely technical issues pertaining to any dispute, while stringently avoiding political issues and pitfalls. This is certainly true of all disputes brought before the Council, where the Council restricted its scope to technical issues as applicable to the principles embodied in the Chicago Convention.

Also to be remembered is that public international law is increasingly becoming different from what it was a few decades ago. We no longer think of this area of the law as a set of fixed rules, even if such rules have always been a snapshot of the law as it stands at a given moment. Fundamentally, and at its core, international law was considered in simple terms as the law binding upon States in their relations with one another.<sup>41</sup> The abovementioned principle was implicitly derived from the basic rule of law as it applies even today, that in the sustained evolution of humanity from troglodytes to computer wizards a central role has always been played by the idea of law – the idea that in every civilized society there must be order as against chaos and anarchy which were inimical to a just and stable society. Therefore law is the glue which binds the members of a community, whether national or international, together in their adherence to recognized values and standards. In international law,<sup>42</sup> the principal subjects are nation States, not individual citizens. Public international law applies to relations between and among States in all their numerous and complex forms, from war to satellites, and governs operational policy of many international institutions. Some of the new and emergent areas of international law govern: the use of radio frequencies; communications; the availability, exploration and exploitation of resources, whether in the sea bed or in outer space; multinational corporations; trade, investment and finance; pollution, in all its forms; international crime and multinational corporations.<sup>43</sup>

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<sup>41</sup> Robert Y. Jennings, *An International Lawyer Takes Stock*, 39 INT'L & COMP. L. Q. 513 (1990).

<sup>42</sup> International law itself is divided into private and public international law, the former being also referred to as "conflict of laws" and the latter just termed "international law". MALCOLM N. SHAW, *INTERNATIONAL LAW 1* (Cambridge Univ. Press: 5th ed., 2003).

<sup>43</sup> Jennings, *supra* note 41, at 521.



International law and politics overlap in instances where international disputes may emerge between or among nations. International law has no legislature. Although the General Assembly of the United Nations exists and functions as a regulator of international policy, being composed of delegates from all member States of the United Nations, its resolutions are generally not binding on member States,<sup>44</sup> except in certain circumstances. The United Nations system has no system of courts except for the International Court of Justice which can only hear cases between States if both sides to a dispute agree.<sup>45</sup> Even if the parties to a dispute agree to come before the Court, it has no jurisdiction to make sure that its decision is enforced or followed. In such an environment, an organization such as ICAO, with its strong mediatory history could prove to be invaluable.

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<sup>44</sup> See U.N. CHARTER arts. 10 and 11. (alluding to General Assembly making recommendations to member States); see also, D. H. N. Johnson, *The Effect of the Resolutions of the General Assembly of the United Nations*, 32 BRIT. Y. B. INT'L. L. 97 (1955).

<sup>45</sup> See The Statute of the International Court of Justice, June 26, 1945, art. 36 (2), 59 Stat. 1031 (entered into force Oct. 24, 1945) (calling for States Parties to Statute to declare consensually that they recognize jurisdiction of Court).

# USE OF NUCLEAR POWER SOURCES IN OUTER SPACE: KEY TECHNOLOGY LEGAL CHALLENGES

*Isabelle Bouvet\**

## I. INTRODUCTION

The Sun and chemical combustion are two sources currently used in space activities to produce thrust. Solar radiation may also be converted into electric energy by using solar cell panels, as long as they are exposed to solar radiation. When the distance from the sun is decreasing, light waves from the Sun become less powerful for space missions as the conversion into energy is progressively reaching its limit. Chemical thrust remains a significant source of energy, especially for launch purposes. However, these sources of energy are considered insufficient to allow deep space exploration; specialists call for the development of new technologies in this area.

The design and test of new vehicles and the need to find a reliable source of energy for long-term duration flights are among the important priorities needed to develop and enhance exploration missions. Potentially, nuclear sources could be used to serve space mission requirements that cannot be covered by current sources of energy.

The risks involved in the use of this source of energy for space missions, from the time of the launch, through the injection into orbit, and during the life of the spacecraft around the Earth, or during its trip into deep space, have generated a challenging legal debate culminating in the 1992 adoption of the Principles Relevant to the Use of Nuclear Power Sources in

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Outer Space (NPS Principles) under the form of an UN Resolution, a non-binding legal document.

The Twenty-first Century is starting with some very challenging exploration projects where technological breakthroughs will play a key role. In order to understand the technical issues behind the use of technology, it is helpful to review the types of nuclear power sources (Part 1). Analysis of the legal framework and implications that follow from the use of Nuclear Power Sources (NPS) will then be analyzed (Part 2).

## II. NUCLEAR POWER SOURCES, A KEY TECHNOLOGY FOR SPACE ACTIVITIES

### A. *Basic Mechanisms*

Two types of nuclear energy are commonly considered for space applications: radioisotopes (a source of heat and electricity consisting of hundreds of Watts) and nuclear generators (source of electricity and propulsion, depending on its use (hundreds of kW to MWs)). These sources of energy continue to be used for the operation of on-board instruments, but not for propulsion purposes.

These technologies, radioisotope heating units (RHUs) and radioisotope thermoelectric generators (RTGs) have been used to keep the thermal equilibrium of some of the on-board equipment, as well as to provide electricity. In the case of RTG, conversion processes are required to transform the heat into electricity. The RTG's electrical source is used for direct electricity needs or for ionic or plasma propellers. For those operations, the level of electricity is not very high, around only a few hundred Watts. However, radioisotope power sources have a low power density. On-board production of electricity is considered a satisfactory spacecraft technology, and because it is a static unit, is notably more attractive from the reliability point of view.<sup>1</sup>

Through the controlled fission of atomic nuclei, a nuclear generator can develop thermal energy. At the beginning of the

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<sup>1</sup> Nikolai Tolyarenko, *Power*, in KEYS TO SPACE: AN INTERDISCIPLINARY APPROACH TO SPACE STUDIES 8-9 (A. Houston & M. Rycroft, eds., 1999).

Space Age in the 1960s, energy reactors began to be used for space propulsion tests on the ground. The initial technologies used were thermal nuclear propulsion and electrical nuclear propulsion. Power is generated in fuel by fission reactions. Fission is a nuclear reaction in which an atomic nucleus splits, or fissions, into fragments, usually two fragments of comparable mass, resulting in release of large amounts of energy in the form of heat and radiation. The process not only produces energy, but also additional neutrons that can be used to split other uranium nuclei, produce more neutrons, and start a chain reaction. The power is transferred to conversion systems to become electricity and then sent to the propulsion subsystem. The resulting electricity is converted into thrust by accelerating propellant-derived plasma.

The power level in case of nuclear generators is much higher than for RTGs (hundreds of kWatts) and is capable of overcoming the limitations of other power sources. Due to the high-performance of electric propulsion, specialists consider that nuclear fission has the potential for the greater capability necessary to explore our solar system. This more efficient technology shall both shorten interplanetary trip transfer times and support robotic and human lunar and Mars missions.

When looking at which different types of propulsion nuclear rockets shows the highest Isp, for example, the Isp is 450 seconds when the source of energy comes from a chemical reaction. It increases to 900 seconds<sup>2</sup> for direct fission. The nuclear generator may be designed with a gas core or a liquid core. Radioactivity requires working on a closed cycle in the first case, consequently decreasing the Isp in a significant way (7000 seconds with an open cycle and 1550 seconds for a closed cycle). Additionally, technical solutions for the reactor core will depend strongly on the fuel type.

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<sup>2</sup> GEORGE P. SUTTON & OSCAR BIBLARZ, *ROCKET PROPULSION ELEMENTS* 11 (John Wiley and Sons, eds., 7<sup>th</sup> ed. 2001).

### B. Programs in Different Countries

The first mission that launched a spacecraft powered by radioactive material into space was in 1961 by the U.S. Navy. Since then, more than fifty missions have taken place.

In Russia, a significant number of spacecraft powered by nuclear power plants (NPP) have been launched into near Earth orbit. Russia has also worked on a prototype nuclear rocket engine that was tested on the ground. In 1987-1988, the former Soviet Union developed *Topaz*. The electricity from the *Topaz* system was used to power an electric propulsion subsystem, based on thermionic energy conversion and providing 5kW of power. It was tested in flight. Between 1985 and 1994, *Topaz-2* was built (6kW thermionic NPP) and experimental studies took place in the United States within the Nuclear Electric Propulsion Space Test Program (NEPSTP).

In France, experiments on nuclear generators for electric and thermal propulsion purposes took place in the 1980s (ERATO and MAPS project). The ERATO<sup>3</sup> project's goal was to obtain a technological and design basis to enable comparisons with classical means of energy production. Studies on electronuclear reactors took place from 1982 to 1989. More recently, studies were conducted on nuclear thermal propulsion in the MAPS project, with CNES co-sponsorship.

In the United States, SNAP reactors were experimented with between the 1960s and the 1970s, and several tests were even conducted on the ground. In 1965, one reactor flew in Earth orbit. Although the nuclear generator operated in space, it was shutdown because of an electrical malfunction. All other U.S. missions with NPS were RTG based. In the 1997 *Cassini* mission, NASA sent an RTG on-board. In the U.S., NPS was used in numerous space missions<sup>4</sup> and each of the flown NPS

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<sup>3</sup> Pascal Pempie, *Association Aéronautique et Astronautique de France International Space University, Short Course on Nuclear Rocket Thermal Propulsion* (Centre National d'Etudes Spatiales, May 2002).

<sup>4</sup> Examples of U.S. space missions using NPS: *Nimbus* in 1968 (the vehicle was destroyed during the launch); *Apollo* in 1969-1972; *Pioneer 10* and *Pioneer 11* in 1972; *Viking 1* and *Viking 2* in 1975; *Voyager 1* and *Voyager 2* in 1977; *Galileo* in 1989; *Ulysses* in 1990; and *Cassini* in 1997.

systems respected a very detailed safety procedure. Depending on the mission, the energy needed may range from a few kW to thousands of kW in the distant future. In terms of missions for low Earth orbit and geostationary transfer orbit, chemical propulsion remains the best choice. For crewed planetary missions, high Isp is necessary to shorten the duration of the journey. Specifically, in these cases, nuclear thermal rockets are considered suitable technology, but are not required for automatic missions, where there are no constraints on the travel duration.<sup>5</sup> Nuclear electric power may be used in space to produce electricity on-board as well as for energy on the surface of a planet, e.g., on Mars. The major difficulty faced by engineers in the early stages of the space developments was to fly the newly-created technology. Although many projects were developed in the span of 40 years, none flew successfully, except for the U.S. SNAP-10A program. It is important to underline that alternative technology also has a promising future. The U.S. project, Variable Specific Impulse Magneto Plasmaic Rocket (VASIMR), uses plasma to create extremely high impulse thrust through a magnetic process.

The objective of NASA's new initiative in 2003, Nuclear Systems Initiative (NSI), was to enable significantly enhanced science-driven solar system exploration. The proposed NASA NSI contains two elements: Radioisotope Power Systems Development, and Nuclear Fission Electrical Power and Propulsion Research and Development.

On January 14, 2004, U.S. President Bush established a new vision for U.S. exploration.<sup>6</sup> The fundamental goal of this new exploration vision is to advance U.S. scientific, security and economic interests through a robust space exploration program. Among the policy goals are the development of innovative technologies, knowledge, and infrastructures both to explore and to support decisions about destinations for human exploration. A new Exploration Systems Enterprise was created to support the

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<sup>5</sup> See Pempie, *supra* note 3.

<sup>6</sup> See President George W. Bush, Renewed Spirit of Discovery, The President's Vision for U.S. Space Exploration, White House Press Release (Jan. 14, 2004) available at [http://www.whitehouse.gov/space/renewed\\_spirit.html](http://www.whitehouse.gov/space/renewed_spirit.html) (last visited Sept. 13, 2004).

development of new crew transport capabilities, namely the *Crew Exploration Vehicle*, as well as other exploration systems and technologies. It was planned that this enterprise would work in close liaison with the Space Science Enterprise<sup>7</sup> to use the Moon as a testing ground for solar system exploration vehicles and technologies.<sup>8</sup> To enable the success of this enterprise,<sup>9</sup> constraints of distance, energy and time must be overcome.

Within the definition of new priorities NASA reinforced the NSI that is now relayed by the *Prometheus* project.<sup>10</sup> *Prometheus* belongs to the Exploration Enterprise.<sup>11</sup> NASA's Project *Prometheus* is designed to develop the technologies needed to enable this vision for the future. There are two basic types of technologies under consideration for this program, radioisotope-based systems and nuclear fission-based systems. Radioisotope Power System (RPS) development would focus on two technologies, the Multi-Mission Radioisotope Thermoelectric Generator (MMRTG) and the Stirling Radioisotope Generator (SRG). The fission power and propulsion research would focus on developing the nuclear systems needed for revolutionary new capabilities in space exploration. Project *Prometheus* would include research on reactors, advanced heat-to-power conversion, and power management and distribution technologies to provide spacecraft flexibility, long-mission durations, and significantly more power for science instruments. The program has also identified a planetary science mission that will be uniquely enabled by nuclear fission electric power and propulsion: the *Jupiter Icy Moons Orbiter*. It would be an ambitious mission to orbit three planet-sized moons of Jupiter - Callisto, Ganymede and Europa

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<sup>7</sup> The Space Science Enterprise will include six themes: solar system exploration, Mars exploration, Lunar exploration, astronomical search for origins, structure and evolution of the universe and Sun-Earth connection.

<sup>8</sup> Since August 1, 2004, NASA has a new organization where the Exploration Systems Mission plays a major role.

<sup>9</sup> The Exploration Systems Enterprise has been allocated \$13.4 billion (U.S.D.) over the next five years.

<sup>10</sup> In Greek mythology, Prometheus was the wisest of the Titans who gave the gift of fire to humanity.

<sup>11</sup> In NASA Fiscal Year 2005, \$438 million (U.S.D.) are requested for Project *Prometheus* to develop advanced nuclear technologies for power and propulsion.

- which may harbor vast oceans beneath their icy surfaces. *Prometheus* constitutes a significant extension of the NSI.

### C. Risk and Safety Measures

Although living organisms are exposed to natural environmental radiation, a significant higher amount of radiation could constitute a serious risk, should this source of energy reach living organisms and humans. Since the discovery of X-Ray technology in 1885, these risks have been increasingly underlined. Established in 1955, the mandate of the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) is to assess and report levels and effects of exposure to ionizing radiation.<sup>12</sup> In its 1972 and 1977 reports, two categories of effects to radiation exposure were identified, somatic effects for an irradiated individual and genetic effects for their progeny.<sup>13</sup> In the 2001 report,<sup>14</sup> UNSCEAR reviewed the hereditary risks that follow parental exposure to radiation. Radiation causes damage to the cells as a result of radiation interactions and radiation exposure. Living organisms can tolerate the natural radiation environment, but this is no longer the case when the amount of radiation is too high. The associations between radiation exposure and the development of cancer are predominantly based on populations exposed to relatively high levels of ionizing radiation.

In space, a primary risk on board the satellite comes from the material that composes the different forms of NPS: basically plutonium and uranium.<sup>15</sup> These sources of energy contain a large amount of radioactive material and require the adherence to stringent safety requirements. These requirements will depend on the source of energy used and the purpose for which it is used, such as heating processes, on-board electricity power, or

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<sup>12</sup> Regular reports are published by the U.N. Scientific Committee on the Effects of Atomic Radiation, available at: <http://www.unscear.org/> (last visited Sept. 13, 2004).

<sup>13</sup> MARIETTA BENKŐ, WILLEM DE GRAAF & GJJSBERTHA C.M. REIJNEN, *SPACE LAW IN THE UNITED NATIONS*, 64-68 (Martinus Nijhoff Publishers 1985).

<sup>14</sup> *Hereditary Effects*, United Nations Scientific Committee on the Effects of Atomic Radiation, UNSCEAR 2001 Report to the General Assembly (Oct. 2001).

<sup>15</sup> The recent U.S. *Cassini* mission contained over seventy-two (72) pounds of plutonium.



propulsions purposes. Moreover, each sequence of a space mission (launch, placement into orbit, life, end of life, reentry) will require specific safety measures. In 1964 in the U.S., an RTG, SNAP-9A, burned into the atmosphere and the dispersion and dilution of the material in the atmosphere successfully prevented dense radioactivity from falling on the ground. In 1968, a second U.S. RTG, SNAP-19, was recovered in the ocean. In this situation, the NPS had been put in containment to avoid the dispersion of the radioactivity. In 1968, the *Nimbus B-1* satellite was destroyed, along with the rocket. A different method used for SNAP-10 consists of putting the satellite in a very far-distant orbit, largely reducing any long-term reentry risk.

In Russia, a significant number of satellites using nuclear generators have been utilized. In the famous 1978 case of *Cosmos 954*, a Soviet satellite which re-entered in Canadian territory, the impact did not occur near human presence. In a second accident involving the Soviet craft *Cosmos 1402*, radioactivity was dispersed in the high atmosphere over the ocean.

Each of the above-mentioned cases demonstrated an inherent amount of risk. Scenarios can be imagined where the dilution and dispersion would not be sufficient if the size of the radioactive particles remained too big, or a radioactive cloud could expose humans to the effects of radiation. Additionally, when RTGs are contained in a specific material or cased, considering the long life duration of that radioactive energy, an accident could still happen, such as an explosion or high impact collisions and provoke RTG leakage. These are worst-case scenarios and fortunately have never been experienced. However, the goal is to show that despite successful past experiences, risks should never be underestimated. RTG risk exists at both the launching and re-entry phases. In the case of nuclear generators, as long as the reactor has not been activated at the time of the launch, the re-entry phase may represent the only period of radiation risks.

For obvious reasons, safety requirements are of highest importance in space missions. RTGs are fuelled with radioactive material and emit ionizing radiation. The energy produced progressively decreases until the spacecraft system no longer has power. Safety measures include such necessities as placing the

RTG in a specific containment system to immobilize the radioactive material. Using the necessary technology can prevent accidents on Earth in case of a re-entry failure.

A nuclear generator is not considered dangerous as long as it has not been activated and the fission process has not started. However, radioactive material may have negative effects for an extremely long time. Furthermore, compared to RTGs, the range of radiation is much broader. Consequently, any crash on Earth must be avoided.<sup>16</sup> The first necessary safety measure is to ensure the reactor is not activated until the spacecraft has reached its planned orbit. One of the interesting properties of these nuclear generators is that they are capable of lasting for hundreds of years. If a satellite is put in an orbit below 2000 km, risk is incurred at the end of the satellite lifetime and reentry before a sufficient radioactivity decrease has occurred. One of the techniques the Soviets used to mitigate this problem after the *Cosmos 954* accident was to separate the radioactive part of the spacecraft and put it in a distant orbit. Back-up procedures would also ensure that, should this process fail, the fuel would be dispersed at a very high altitude. As already stressed by authors,<sup>17</sup> this process involves risk since the radioactivity would not be entirely spread out that it can be either placed in an orbit distant from the Earth, or dispersed in the Earth atmosphere at a high altitude. No clear evidence has been given on the radioactive danger represented by the second option and the ground effects of this radioactive energy.

Safety measures need to be clearly defined at the national level. In the United States, safety measure reviews include close collaboration between the U.S. Department of Defense, the Department of Energy (DoE) and NASA. A preliminary Safety Analysis Report (SAR) is prepared after an initial design is selected for the mission. The SAR is regularly published during the developmental phase of the mission design. In addition to internal agency reviews, a safety review panel, called the Inter-agency Nuclear Safety Review Panel, is set up and supported by experts from government, industry and academia. Chaired by

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<sup>16</sup> See Benkö, *SPACE LAW IN THE UNITED NATIONS*, *supra* note 13.

<sup>17</sup> *Id.*

the three coordinators appointed by the Secretary of the Department of Defense, the administrator of NASA and the Secretary of the Department of Energy, the review panel provides an independent risk evaluation assessment. It is important to underline the level of depth with which this work is assessed; all potential risks are carefully reviewed for each phase of the mission.<sup>18</sup> Based upon agency and DoE recommendations, NASA may request nuclear safety launch approval to the White House Office of Science and Technology Policy (OSTP). The decision to approve the launch belongs to the OSTP Director. Clearly, this process has proven to be very efficient. Failures were handled in such a way that no accident occurred that was detrimental to human life.

Although mechanisms are extremely well defined to ensure the highest level of safety, there may be some cases where the RTG shield is broken, producing leaks. For 40 years, NPS technology has constituted a major achievement for space activities, notably for exploration purposes. Despite few accidents, nuclear power sources have been used with the strict and full respect of safety requirements in existence. However, as with any human action, risk exists. When studying high-risk technology, analysis is often made of the benefits this technology brings, and statistics are used to evaluate whether foreseeable risks are acceptable in light of the ultimate result reached. Localized risks are circumscribed to a specific territory. In the case of outer space activities, one should keep in mind that the radioactive material are above the oceans, territories and airspace of numerous countries, which, as a consequence, are incurring risks without having been informed.

The study of nuclear technology and space activities at the beginning of the Twenty-first Century is of particular importance. Despite already strong experience in the field, until now NPS was used mainly for on-board equipment in space exploration projects. Now, with only a few years before the realization

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<sup>18</sup> See Don Williamson, Jr., *Process to Launch Nuclear Power Sources into Space, An Overview of the Process Necessary to Choose and Launch Nuclear Power Sources into Space*, 10 (May 2000), available at <http://fti.neep.wisc.edu/neep602/SPRING00/TERMPAPERS/williamson.pdf> (last visited Sept. 13, 2004).

of the International Space Station core completion, major space faring nations, starting with the United States, are looking at the next step: space activities beyond near Earth orbit. In the preparation for these new challenges as detailed above, nuclear power sources have been identified as a key technology and significant budget allocations are planned to be made towards their development. However, legal requirements at both the international and national levels will not be neglected and will have an increasing role to play. At the same time, although this energy was identified, it is still necessary to further explore alternative power sources.

### III. LEGAL PRINCIPLES GOVERNING NUCLEAR POWER SOURCES

#### A. *International Law*

Immediately after the *Cosmos 954* accident in 1978, a working group was established within the Scientific and Technical Subcommittee of UNCOPUOS (STSC). The group issued its report in 1981.<sup>19</sup> In the 1980s, the issue was discussed in different fora in order to identify the legal measures needed. Two conventions were adopted on September 26, 1986: the Convention on Early Notification of a Nuclear Accident (Notification Convention)<sup>20</sup> and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention).<sup>21</sup>

Under the Notification Convention, in the event of a nuclear accident, States' Parties shall notify, directly or through

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<sup>19</sup> In 1979, in accordance with G.A. Res. 33/16 (Nov. 10, 1978), the Scientific and Technical Subcommittee established a Working Group of experts to consider the technical aspects and safety measures relating to the use of NPS in outer space. See Vladimir Kopal, *The Use of Nuclear Power Sources in Outer Space: A New Set of United Nations Principles?*, 19 J. SPACE L. 103, 104 (1991).

<sup>20</sup> Convention on Early Notification of a Nuclear Accident, Sept. 26, 1986, art. 2, IAEA Doc. INFCIRC/335, available at <http://www.iaea.org/Publications/Documents/Infircs/Others/inf335.shtml> (last visited Sept. 13, 2004) [hereinafter Notification Convention].

<sup>21</sup> Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, Sept. 26, 1986, IAEA Doc. INFCIRC/336, available at <http://www.iaea.org/Publications/Documents/Infircs/Others/inf336.shtml> (last visited Sept. 13, 2004) [hereinafter Assistance Convention].

the International Atomic Energy Agency (IAEA) those States which are, or may be, physically affected.<sup>22</sup> They must provide information about the nuclear accident, its nature, the time of its occurrence and its location.<sup>23</sup> The objective is to provide relevant information about nuclear accidents as early as possible in order that transboundary radiological consequences may be minimized. The use of radioisotopes for power generation in space objects is expressly mentioned in the scope of the Convention.<sup>24</sup> The objective of the Assistance Convention is to facilitate prompt assistance in the event of a nuclear accident or radiological emergency; to minimize its consequences; and to protect life, property and the environment from the effects of radioactive releases.<sup>25</sup> The goal of this Convention is to minimize the consequences of the accident, protect life, property and the environment from the effects of radioactive releases. Furthermore, this Convention provides that a State Party needing assistance in the event of a nuclear accident or radiological emergency may call for such assistance from any other State Party, directly or through the IAEA.<sup>26</sup> The Convention provides a set of rules on assistance that will be applicable to accidents caused by NPS use in outer space.<sup>27</sup>

### *B. International Space Law*

Space law treaties provide a set of rules to ensure the peaceful use of outer space. Broadly defined, many articles are applicable to the use of NPS in outer space and a few are presented here.

According to the terms of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty), States bear international responsibility for national activities in outer space, the Moon and other celestial

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<sup>22</sup> Notification Convention, *supra* note 20, at art. 2.

<sup>23</sup> *Id.* at art. 2 (a).

<sup>24</sup> *Id.* at art. 1.

<sup>25</sup> Assistance Convention, *supra* note 21, at art. 1.1.

<sup>26</sup> *Id.* at art. 2.1.

<sup>27</sup> *Id.* at arts. 2-19.

bodies.<sup>28</sup> Article IX provides that States shall be guided by the principle of cooperation and mutual assistance and shall conduct all their activities with due regard to the corresponding interests of all other States. States shall conduct exploration so as to avoid harmful contamination or adverse changes in the Earth's environment. In Article XI, State Parties conducting space activities shall inform the Secretary-General of the UN of the nature, conduct, locations and results of such activities. This issue is linked to the question of advanced notification of the use of NPS in outer space. Such a specific provision addressing this issue was not included in the NPS Principles, nor is it mentioned in the Convention on the Registration of Objects Launched into Outer Space.<sup>29</sup> Apart from the specific information the State needs to furnish,<sup>30</sup> the "general function of the space object" is mentioned but the nuclear power source is not specified. This gap is regrettable because the Convention has a stronger legal value than the NPS Principles. Finally, the Outer Space Treaty prohibits the use of nuclear weapons.<sup>31</sup>

The Convention on International Liability for Damage Caused by Space Objects (Liability Convention),<sup>32</sup> provides that a launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the Earth or to aircraft in flight.<sup>33</sup> The term "damage" means loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organisations.<sup>34</sup> Clearly, if an accident occurs because of the use of NPS in outer space, this provision will apply. The Liability Convention recog-

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<sup>28</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, art. VI, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

<sup>29</sup> Convention on Registration of Objects Launched into Outer Space, adopted on Nov. 12, 1974, GAOR, 1023 U.N.T.S. 15.

<sup>30</sup> Such as the name of the launching State, date and location of launch, and the basic orbital parameter.

<sup>31</sup> Outer Space Treaty, *supra* note 28, at art. IV.

<sup>32</sup> Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, T.I.A.S. No. 7762 [hereinafter Liability Convention].

<sup>33</sup> *Id.* at art. II.

<sup>34</sup> *Id.* at art. I (a).

nizes the need to ensure the prompt payment of a full and equitable measure of compensation to victims of such damage.<sup>35</sup>

Harmful contamination through the introduction of extra-environmental matter on the Moon and other celestial bodies could introduce adverse environmental changes. The Agreement Governing the Activities of the States on the Moon and other Celestial Bodies (Moon Agreement) states that States' Parties shall take measures to prevent the disruption of the existing environmental balance.<sup>36</sup>

*C. The United Nations Committee on the Peaceful Uses of Outer Space and the 1992 Principles Relevant to the Use of Nuclear Power Sources in Outer Space*

1. The NPS Principles

Discussed since 1978 by delegates at the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (LSC) the use of nuclear power sources in outer space became a specific item of the agenda in 1980.<sup>37</sup> In 1990, the Committee on the Peaceful Uses of Outer Space (COPUOS) started to define some provisions for an NPS legal regime, notably Principle 3, guidelines and criteria for safe use.<sup>38</sup> On December 14, 1992 the UN General Assembly unanimously adopted the Principles Relevant to the Use of Nuclear Power Sources in Outer Space.<sup>39</sup> It is interesting to note that these Principles and the Outer Space Treaty were adopted before the activities themselves occurred. Although NPS was used by the main space-faring nations and, at times even governed by provisions at national levels, no specific legal document at the international

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<sup>35</sup> *Id.* at Preamble.

<sup>36</sup> Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 5, 1979, Art 7.1, U.N. GAOR, Doc. A/RES/34/68 [hereinafter Moon Treaty].

<sup>37</sup> See Eilene Galloway, *United Nations Consideration of Nuclear Power for Satellites*, in PROCEEDINGS OF THE TWENTY-SECOND COLLOQUIUM ON THE LAW OF OUTER SPACE 131 (1979).

<sup>38</sup> See Nandasiri Jasentuliyana, *The Legal Sub-Committee of COPUOS Achieves Progress in the Legal Dimension in Outer Space Activities*, 18 J. SPACE L. 35 (1990).

<sup>39</sup> Principles Relevant to the Use of Nuclear Power Sources in Outer Space, Dec. 14, 1992, U.N. Doc. A/Res/47/68 [hereinafter NPS Principles].

level existed. Resolutions do not have a binding force; however, the recognition at the international level of the utility of NPS is a major milestone in the development of international space law.

As previously discussed, nuclear power sources involve different types of energy, and when dealing with outer space, the main types of energy are RTG and nuclear generators. One of the major drawbacks of the NPS Principles is the lack of textual mention of all the NPS used in outer space. The text limits its application to generation of electric power on board space objects, without referring to nuclear propulsion. Consequently, the Principles only partly cover NPS use in outer space.

To minimize the quantity of radioactive material in space and the risks involved, the use of nuclear power sources is restricted to space missions that cannot be reasonably operated by non-nuclear energy sources.<sup>40</sup> The provisions call for very careful utilization of the radioactive material without providing specific technical constraints. Recognizing the need to protect the biosphere against radiological hazards, the provisions accept the existence of hazards in "foreseeable operational or accidental circumstances" as long as those hazards are "kept below acceptable levels". Radioactive material shall not cause a "significant contamination of outer space".<sup>41</sup> "[G]enerally accepted" relevant international radiological protection guidelines "shall" be taken into account. The valuable recommendations made by the International Commission on Radiological Protection will serve as the baseline scenario.<sup>42</sup>

The design for the nuclear power source systems restricts radiation exposure to a "limited geographical region" and to individuals to the principal limit of "1 mSv in a year".<sup>43</sup> This level, used for terrestrial application of NPS, is very low for safety reasons, and is considered to be the maximum permissible radiation dose tolerable by humans. Another important mechanism is the in-depth defense. According to Principle 3.1 (d),

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<sup>40</sup> *Id.* at Principle 3.

<sup>41</sup> *Id.* at Principle 3.1 (a).

<sup>42</sup> *Id.* at Principle 3.1 (b).

<sup>43</sup> *Id.* at Principle 3.1 (c).



foreseeable safety-related failures or malfunctions "must be capable of being corrected or counteracted by an action or a procedure, possibly automatic".

Principle 3.2 recognizes the usefulness of nuclear generator operations in interplanetary missions, in low-Earth orbits if they are stored in sufficiently high orbits after the operational part of their mission, and in "sufficiently high orbit in which the orbital lifetime is long enough to allow for a sufficient decay of the fission products[...]".<sup>44</sup> Also, it must be of "minimum" danger to "existing and future outer space missions" and pose a "minimum" risk of collision with other space objects.<sup>45</sup> When measuring this orbit, decay time needed before re-entering in the atmosphere is taken into account.<sup>46</sup> Nuclear generators "shall use only highly enriched uranium 235 as fuel."<sup>47</sup> Clearly, the intention is the prevention of the use of other nuclear fuels in outer space for safety reasons. Furthermore, nuclear power sources "shall not be made critical before they have reached their operating orbit or interplanetary trajectory."<sup>48</sup> These two requirements are significant steps in the elaboration of NPS Principles.

The design and construction of the nuclear generators meet important safety criteria by ensuring that nuclear generators are not critical before reaching the operating orbit "during all possible events, including rocket explosion, re-entry, impact on ground or water, submersion in water or intrusion of water into the core".<sup>49</sup>

Limits are defined as 1 mSv in a year of enriched 235 uranium, but there are no detailed specifications. The provisions are such that the designer and operator have the responsibility to build the reactor according to these limitations. Those provisions highlight the enormous burden of responsibility placed on States intending to launch.<sup>50</sup>

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<sup>44</sup> NPS Principles, *supra* note 39, at Principle 3.2 (b).

<sup>45</sup> *Id.*

<sup>46</sup> *Id.*

<sup>47</sup> *Id.* at Principle 3.2 (c).

<sup>48</sup> *Id.* at Principle 3.2 (d).

<sup>49</sup> *Id.* at Principle 2 (e).

<sup>50</sup> Marietta Benkö, Gerhard Gruber & Kai-Uwe Schrogl, *The UN COPUOS: Adoption of Principles Relevant to the Use of Nuclear Power Sources in Outer Space*,

Utilization of radioisotope generators is permitted for interplanetary missions and in Earth orbit, provided that they are stored in a high orbit at the conclusion of the operational part of their mission. As a response to an existing practice, radioisotope generators "shall be protected" by a containment system capable of withstanding the "heat and aerodynamic forces of re-entry in the upper atmosphere under foreseeable orbital conditions".<sup>51</sup> "[T]he containment system and the physical form of the isotope shall ensure that no radioactive material is scattered into the environment so that the impact area can be completely cleared of radioactivity by a recovery operation."<sup>52</sup> Although these provisions are of significant importance, a zero risk scenario cannot exist.

As far as safety assessment is concerned, the "launching State", defined by the NPS Principles as a, "State which exercises jurisdiction and control over a space object with nuclear power sources on board at a given point in time relevant to the principle concerned."<sup>53</sup> Launching States shall ensure prior to the launch through cooperative arrangements, that a "thorough and comprehensive safety assessment is conducted".<sup>54</sup> These arrangements will be signed between the State, as well as any parties who have "designed, constructed or manufactured the nuclear power sources, or who will operate the space object, or from whose territory or facility such an object will be launched."<sup>55</sup> The Principles reflect the high degree of complexity of those operations, yet, leave open the issue of what constitutes a "procuring state".

In line with Article XI of the Outer Space Treaty, "the results of this safety assessment, together with, to the extent feasible, an indication of the approximate intended time-frame of the launch, shall be made publicly available prior to each

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PROCEEDINGS OF THE THIRTY-SIXTH COLLOQUIUM ON THE LAW OF OUTER SPACE 235 (1993) [hereinafter *Adoption of Principles*].

<sup>51</sup> NPS Principles, *supra* note 39, at Principle 3.3 (b).

<sup>52</sup> *Id.*

<sup>53</sup> *Id.* at Principle 2.1.

<sup>54</sup> *Id.* at Principle 4.1

<sup>55</sup> *Id.*

launch."<sup>56</sup> Additionally, the Secretary-General of the UN shall be informed how States may obtain safety assessment results "as soon as possible prior to each launch."<sup>57</sup>

Should a re-entry of radioactive material occur as a result of a malfunctioning of the space object, the launching State<sup>58</sup> "shall in a timely fashion", inform the States concerned.<sup>59</sup> With the same frequency, the launching State "shall" provide and update the international community and the Secretary-General of the United Nations on the anticipated time of re-entry.<sup>60</sup> In this case, "as far as reasonably practicable," this State "shall...respond promptly to requests for further information or consultations sought by other States."<sup>61</sup>

A specific provision on the notification of re-entry is a major step. However, progress would be assured by an amendment to this provision providing a systematic information notification prior to the launch of any planned use of NPS in outer space.

If notified of an expected re-entry of a space object containing a nuclear power source on board, all States "possessing space monitoring and tracking facilities, in the spirit of international cooperation, shall communicate the relevant information

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<sup>56</sup> *Id.* at Principle 4.3.

<sup>57</sup> *Id.*

<sup>58</sup> *Id.* at Principle 2. For State launching, the same definition as for launching State is used.

<sup>59</sup> *Id.* at Principle 5. The information shall be in accordance with the following format:

(a) *System parameters:*

- (i) Name of launching State or States, including the address of the authority which may be contacted for additional information or assistance in case of accident;
- (ii) International designation;
- (iii) Date and territory or location of launch;
- (iv) Information required for best prediction of orbit lifetime, trajectory and impact region;
- (v) General function of spacecraft;

(b) *Information on the radiological risk of nuclear power source(s):*

- (i) Type of nuclear power source: radioisotopic/reactor;
- (ii) The probable physical form, amount and general radiological characteristics of the fuel and contaminated and/or activated components likely to reach the ground. The term "fuel" refers to the nuclear material used as the source of heat or power.

<sup>60</sup> *Id.*

<sup>61</sup> *Id.* at Principle 6.

that they may have available" to the Secretary-General of the United Nations and the State concerned "as promptly as possible."<sup>62</sup> Such rapid communication would allow States that might be affected to assess the situation and take any precautionary measures deemed necessary.<sup>63</sup> Traditional space law principles of international responsibility for national activities involving the use of nuclear space power are covered by Principle 8, and are in accordance with Article VI of the Outer Space Treaty.

The liability principle follows the space law definition of a launching State.<sup>64</sup> The launching State shall bear international liability for "damage caused by such space objects or their component parts".<sup>65</sup> This Principle fully applies to the case of such a space object carrying a nuclear power source on board<sup>66</sup> and constitutes an important complement to the existing mechanisms established by the Outer Space Treaty and the Liability Convention. It is important to note the existence of such provisions, as they usually belong to international conventions and are not part of UN resolutions.<sup>67</sup> Their adoption by the States show the importance accorded to these Principles.

If a dispute occurs, it "shall be resolved through negotiations or other established procedures for the peaceful settlement of disputes", in accordance with the Charter of the United Nations and the Liability Convention for signatories.<sup>68</sup>

Lastly, and of great importance, is the final provision, which stated that the NPS Principles shall be reopened for revision by the Committee on the Peaceful Uses of Outer Space "no later than two years after their adoption".<sup>69</sup> This important provision stresses the need to take into account new applications of NPS, and the possible need to review the work of the LSC. Al-

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<sup>62</sup> *Id.* at Principle 7.

<sup>63</sup> *Id.* at Principle 7.

<sup>64</sup> Liability Convention, *supra* note 32. According to Article 1 (c), a launching state is a State which launches or procures the launching of a space object and a State from whose territory or facility a space object is launched.

<sup>65</sup> NPS Principles, *supra* note 39, at Principle 9.

<sup>66</sup> *Id.*

<sup>67</sup> *Adoption of Principles*, *supra* note 50, at 238.

<sup>68</sup> NPS Principles, *supra* note 39, at Principle 10.

<sup>69</sup> *Id.* at Principle 11.

though this issue has been on the agendas of both Subcommittees since 1992, their revision has still not occurred.

## 2. Latest Developments in the COPUOS

In 1998, the LSC recommended that the Working Group on the Use of NPS in Outer Space suspend its consideration of this agenda item pending receiving the results of the work of the STSC. In 2000, the LSC agreed without prejudice to the possibility of reconvening the Working Group. The group would be reconvened if, in the opinion of the LSC, sufficient progress had been made in the STSC to warrant such an action.

The STSC adopted a multi-year work plan in 1998. During its first year, terrestrial processes and technical standards that might be relevant to NPS were identified. It included factors such as distinguishing nuclear power sources in outer space from those used in terrestrial nuclear applications. The work of the IAEA in this area, its conventions and documents were also relevant to the STSC work plan.<sup>70</sup> In the second year, the work plan reviewed national and international processes, proposals, standards and national working papers relevant to the launch and peaceful use of NPS in outer space. At the STSC session in 2002, the Subcommittee's Working Group on the Use of NPS in Outer Space finalized its report titled, "A Review of International Documents and National Processes Potentially Relevant to the Peaceful Use of NPS in Outer Space."<sup>71</sup>

Following the 2002 STSC, the LSC agreed that opening a discussion on the revision of the NPS Principles was not warranted.<sup>72</sup> In 2003, the STSC agreed to follow another multi-year work plan for the period 2003-2006 to establish the objectives, scope and attributes for an internationally based framework of goals and recommendations for the safety of planned and currently foreseeable application of NPS. It is foreseeable that the STSC could work in coordination with the International Atomic

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<sup>70</sup> *Report of the Legal Subcommittee on its Thirty-Ninth Session*, U.N.G.A. COPUOS, 39<sup>th</sup> Sess., U.N. Doc. A/AC.105/738 (2000).

<sup>71</sup> *Report of the Legal Subcommittee on its Forty-First Session*, U.N.G.A. COPUOS, 41<sup>st</sup> Sess., at 11, U.N. Doc. A/AC.105/787 (2002).

<sup>72</sup> *Id.*

Energy Agency because of the significant experience of the IAEA in this field.

### 3. Evaluation of the NPS Principles

The NPS Principles are important because they contain a set of rules applying to NPS electricity for on-board use. They also provide for a detailed safety assessment, a re-entry notification process, responsibility and liability mechanisms and assistance to States. Even before the adoption of the NPS Principles, countries conducting this type of space activity were already ensuring the safest utilization of this source of energy for their space activities. Parts of the NPS Principles are even based on this previous experience.

The NPS Principles provide a specific consensual language, using very general and sometimes vague terms, such as, "reasonably practicable," "possible harmful effects," "in a reasonable way," "does not cause a significant contamination,"<sup>73</sup> "with a high degree of confidence,"<sup>74</sup> "the hazards kept below acceptable levels," "as far as reasonably practicable"<sup>75</sup>. The wording chosen is also used in many other international space law texts,<sup>76</sup> and it is one of the conditions that made it possible for COPUOS to reach consensus on topics which would not have been adopted otherwise. However, considering the risky activity involved, it is unfortunate that some of the provisions are not more specific. One observer considers using so many qualifying terms weakens the impact of highly important safety criteria.<sup>77</sup> In contrast, the terminology used for technical regulations governing any terrestrial activity requiring strong safety provisions is precise. Failure to respect these rules will result in enforcement of the regulation. In the case of international space law, not only are the terms vague, but the enforcement provisions are also unclear.

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<sup>73</sup> NPS Principles, *supra* note 39, at Principle 3.

<sup>74</sup> *Id.* at Principle 3.1.

<sup>75</sup> *Id.* at Principle 6.

<sup>76</sup> "States parties to the Treaty shall... render... all possible assistance..." to astronauts in the event of an accident. Outer Space Treaty, *supra* note 28, at art. V.

<sup>77</sup> Carl Q. Christol, *Nuclear Power Sources for space Objects: A New Challenge for International Law*, PROCEEDINGS OF THE THIRTY-SIXTH COLLOQUIUM ON THE LAW OF OUTER SPACE (1993).

As mentioned above, the NPS Principles do not address nuclear propulsion. Experiments on nuclear propulsion have been conducted for many years, and the risks involved are known. Keeping the NPS Principles without extending their application to nuclear generators may weaken the scope of the Principles.

It is also necessary to clarify the applicability of the Outer Space Treaty. From the text of the Outer Space Treaty, its applicability seems to be limited to outer space. Considering the legal issues inherent to the Moon Agreement,<sup>78</sup> the addition of a special provision on the applicability of the NPS to the Moon and other celestial bodies would be an important clarification.

During exploration missions, astronauts face several types of radiation, such as solar and cosmic. During a flight with NPS on board, the proximity between astronauts and nuclear power sources will be considered in the development of spacecraft security and safety measures. For many years, NASA studies on this issue have been conducted through biological and physical research programs.<sup>79</sup> Specific provisions on the protection of astronauts during space missions utilizing NPS on board will need to be developed in the appropriate fora.

The lack of binding force of the NPS Principles is a subject of great attention because the commitment is not same as that of an international convention. Transforming them into an international convention may not necessarily be the best solution for several reasons because such a transformation would freeze the text, avoiding the possibility for further adaptations and create the risk that some countries would refuse ratification. When adopting principles, the decisions that may be reached by consensus are different from what countries will accept as drafts for future international conventions. The ultimate result

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<sup>78</sup> The main space faring nations, namely the former U.S.S.R. and the U.S., did not ratify this agreement, object of a great controversy. Several issues were at stake, mainly the exploitation of the Moon's resources and the level of information to provide by States about their activities.

<sup>79</sup> NASA and DoE decided to build a NASA Space Radiation Laboratory to study sun and space radiation in order to ensure the safety of the spacecraft crew. The Laboratory became operational in 2003. See Brookhaven National Laboratory, Laboratory News, *NASA and DOE Dedicate New NASA Facility at Brookhaven Lab* (Oct. 14, 2003), available at <http://www.bnl.gov/bnlweb/pubaf/pr/2003/bnlpr101403.htm> (last visited Sept. 17, 2004).

may be fewer provisions in the binding text than are currently covered in the NPS Principles. Obviously, none of these are really satisfactory solutions.

#### IV. CONCLUSION

Work on technical standards will probably begin at the conclusion of the STSC 2002-2006 multi-year work plan. Consequently, it seems difficult to foresee any deep revision of the NPS Principles before the end of the STSC. Should such a review take place, its success will be possible mainly if at least one delegation or a group of delegations strongly supports the changes. If the Principles are reopened in the near future for review, their revision could take years before reaching a new consensus. However, some provisions could be adopted to strengthen the framework and extend its scope. On very specific issues, circumscribed applicable mechanisms could be put into place to avoid gaps between the Principles and technology developments.

COPUOS, its STSC, LSC, and other fora such as the International Commission on Radiological Protection, have an important role to play in the development of relevant standards. In addition, appropriate provisions need to be implemented at the national level by all countries using NPS for their space activities.

Finding a balance between the development of high technology with respect to technical standards and the need for protective legal mechanisms concerning the use of NPS in outer space is not easy to find. Considering the inherent risks involved in the use of these types of technologies, it will be important to keep in mind that the use of nuclear power sources should be restricted to space missions that cannot be reasonably operated by non-nuclear energy sources. For this reason, alternative technology development is to be encouraged.

In view of the fact that Russia has been working on NPS technology for years and the U.S. has recently decided to focus on this technology to accomplish the objectives defined in its new space exploration vision, the pertinent question is how will other countries react? Some countries may be interested in pur-



chasing this technology for scientific or military purposes. Whether these countries build their own systems or purchase them, this development will open the door to technology transfer issues.

The use of nuclear power sources in outer space is a challenging issue of great importance, and future developments in this area, both technical and legal, should be examined with the greatest care and responsibility to avoid all possible risks.

# AN INTRODUCTION TO SPACE LAW FOR DECISION MAKERS

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This presentation provides an introduction to space law for decision makers, and was delivered by Dr. Jacqueline Etil Serrao in Spanish at the *Latin American Aerospace Experience: Agenda of Aerospace Activities for Colombia* seminar held in Medellín, Colombia on June 25, 2004. The seminar was organized by the Civil Aviation Authority of the Government of Colombia in coordination with the United Nations Office of Outer Space Affairs, the European Space Agency, the Colombian Chancellery, and the Colombian Agency for International Cooperation. The presentation is based on one delivered by Prof. Joanne Irene Gabrynowicz at the November 2003 United Nations/Republic of Korea Workshop on Space Law. The adapted presentation is published here in English, Spanish and French.

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Good morning. I am Dr. Jacqueline Etil Serrao, the Associate Director of the National Remote Sensing and Space Law Center at the University of Mississippi School of Law. Today I will be talking about "Space Law: Advances and Perspectives". Most of this presentation was originally written and presented by the Center's Director, Professor Joanne Irene Gabrynowicz, at the 2003 United Nations - Republic of Korea Capacity Building Workshop on Space Law. The workshop was organized by the U.N. Office of Outer Space Affairs. The participants were

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the policy and decision makers from space faring, newly-active space faring and developing nations. Some of the material here also appears in a recent Suffolk University Law Review article written by Prof. Gabrynowicz.

The body of international space law consists of treaty law and customary law. The four core treaties are:

1. Treaty on Principles Governing the Activities of Status in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty)
2. Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Rescue Agreement)
3. Convention on the International Liability for Damage Caused by Space Objects (Liability Convention)
4. Convention on the Registration of Objects Launched into Outer Space (Registration Convention)

These four treaties are widely accepted by a large number of States. However, the following fifth treaty is not:

5. Agreement Governing the Activities of States on the Moon and other Celestial Bodies (Moon Treaty)

Additionally, there is a series of principles that were adopted by the United Nations General Assembly. Each set of principles has varying weight at international law. International space law also consists of custom and practice. The Outer Space Treaty specifically references international law and the Charter of the United Nations. It also means that nations have international responsibility for all public and private space activities. Taken together these all constitute the body of international space law.

Let's talk about the principles of space law. As a whole, international space law consists of a number of important fundamental principles. First, the Outer Space Treaty functions like a constitution. For example, it sets out the general principles that are the basis for all of space law. These principles include the concept that space shall be the "province of all mankind". This

means that all nations have the nonexclusive right to use and explore space. The "province of all mankind" is not the same thing as the "common heritage of mankind" which is contained in the Moon Treaty. This will be discussed later. Other important, fundamental principles are the non-appropriation principle; the "peaceful purposes" principle; liability; and the principle that nation-states are responsible for the space activities of their nationals.

The "common heritage" principle refers to the potential extraction of resources, and resource allocation. The "province of mankind" principle addresses exploration and use. Under the "province of all mankind" principle, all nations have the non-exclusive right to use and explore space. In order to understand the difference between the two principles, I offer an analogy. On the high seas, all nations have the right to have their ships travel across the oceans. They also have the right to extract fish from the oceans. Once the fish are on the ship's deck, those fish are the ship's resources. In space, by analogy, Nations have the right to have their spacecraft move in space ("province of mankind"), but agreement has not been reached as to whether nations can extract resources ("common heritage").

These two principles are not interchangeable although some observers argue that they are. The "province of all mankind" is based on the *res communis* principle: the thing belongs to all. This means all nations have the right to use and explore. It is an inclusive principle, not an exclusive one. Space may be used in parts, but it cannot be acquired.

All nations have free access to all areas of space and the celestial bodies on the basis of equality. All nations have the right to use and explore space. Examples of use include Earth observations and communications. Exploration includes the *Apollo* missions, robotic missions of near-Earth space, and exploration of other bodies like Mars.

Article II of the Outer Space Treaty provides 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." When Christopher Columbus came to North America, he claimed it for Spain. The law at the time recognized that if a State claimed land and

could control it, it became that Nation's territory. Neil Armstrong also placed a national flag on the Moon, but unlike Columbus, it was not an exercise of sovereignty and not a claim of the Moon. The law had changed. The flag placed by Columbus signified a sovereign claim by Spain of new territory. The flag placed by Armstrong signified a national achievement, not the acquisition of territory.

"Peaceful purposes" is a term of art and has a long history in space law. It goes back to the first resolutions in the United Nations regarding space. The early debate focused on what does "peaceful purposes" mean? Two definitions were in competition. The first was that "peaceful purposes" means "non-aggressive". The second was that "peaceful purposes" meant "non-military". The "non-aggressive" definition has been accepted for two reasons:

First, both the Soviets and the United States had a military presence in space from the beginning. To say that "peaceful purposes" meant "non-military" contradicted the facts. Second, during the Cold War, important military activities created stability. For example, both the Soviets and the United States had reconnaissance and surveillance satellites that enabled them to know what each other was doing to some degree. This decreased the need to take first strikes and helped stabilize the geopolitical environment.

"Peaceful purposes" also means the prohibition of specific weapons in open space. These include nuclear weapons and weapons of mass destruction in open space. "Weapons of mass destruction" include atomic, biological and chemical weapons. Outer space and celestial bodies are two different things. Celestial bodies are exclusively peaceful which implies even further restrictions than what is in place for open space.

There are some military activities which are legal. There are also some activities which are prohibited. Legal activities include scientific research, peaceful purposes and using equipment and facilities that are necessary to carry out scientific and peaceful activities. Prohibited activities include military bases, installations, fortifications, weapons testing, and maneuvers.

While it may seem obvious to say that there is a liability regime for space, that wasn't always so. In the early days of

space activities, it was not clear that nations could be held responsible for their actions in space without a specific system that held them responsible. Therefore, the Liability Convention was put in place. It provides for a dual liability regime. Absolute liability applies to damages that occur on Earth and to aircraft in flight. Absolute liability means that it is not relevant whether or not the potential defendant was at fault. It is still responsible. If the damage occurs in space, then negligence applies. The space liability regime includes a number of mechanisms to allow for the allocation of liability among joint actors. They include joint and several liability, indemnification, and apportionment. Finally, the treaty regime provides a claims process which includes the establishment of a claims commission and specific rules for compensation.

International space law provides that nations have international responsibility for all public and private space activities. For example, United States commercial remote sensing companies are licensed by the United States Government so they can be supervised as required by international space law. Space law recognizes international intergovernmental organizations. One example is the European Space Agency (ESA) which is a highly successful regional space organization. It was established by a treaty, the ESA Convention, in 1975.

Finally, the Secretary General of the United Nations has a designated role in a variety of circumstances. For example, under the Liability Convention claims may be presented through the Secretary-General. Under the Registration Convention, a signatory nation may request information through the Secretary-General about a space object that has caused damage. Under the Rescue and Return Agreement signatories must inform the Secretary-General of accidents and emergencies including ones that involve the global commons (i.e., an ocean, Antarctica).

Despite the fact that there are five treaties, customary law, and United Nations principles, there are many questions which have yet to be answered. The following are some questions that are open because there is no consensus in the international community.

- Although there is no sovereignty over territory, it is unclear if there is no sovereignty over resources: does prohibition of territorial appropriation include resources?
- Is resource taking a "use" of space?
- Is sovereignty necessary to establish property rights?
- Does the prohibition of national appropriation prohibit property claims by an individual, an intergovernmental organization, or a corporation?

The most controversial example of unresolved issues is the issue of the use of resources in space. To develop consensus there will have to be the political will to develop a consensus that Nations accept.

Another controversial issue is whether the treaty regime should remain as it currently is. Both the established and newly-active space faring nations agree that a new stage of space law development has begun. However, there are differing opinions as to the best approach to be taken to direct the development process.

Some countries, including Russia, think these provisions are inadequate because they do not address all possible situations. Nations that believe the regime is lacking and beyond development through strengthening and amending the existing instruments have suggested that a new, comprehensive treaty should be negotiated.

They see this as the logical way to successfully meet the changing needs of space activities. They argue that nations are choosing not to participate in the existing treaties due to the uncertain and changing interpretations of their terms.

Other countries say that the system answers these questions by allowing the amendment or expansion of the current treaties. Other nations see the existing legal regime, including the treaties, as both adequate and as providing the foundation for further legal development. They are of the view that encouraging adherence to the existing treaties is the more practical way to achieve development. Nations holding this view also raise related procedural issues including the argument that consideration of a comprehensive treaty is beyond the compe-

tency of the United Nations Committee on the Peaceful Uses of Outer Space and its Legal Subcommittee. Finally, they argue that since nations continue to join to the existing treaties, the current regime is a viable one.

An evolving list of nations on each side of the debate shows that, with the exception of Russia, the more established space nations are against a new, comprehensive treaty. The list includes India, Japan, and the United States. On the other side are nations with no, few, or recent, space capabilities. They include Bulgaria, China, Iran, and Greece.

Some nations with mature ground segments for remote sensing, Earth observations and other space activities, but without indigenous launch capability, hold a center position. Morocco and Australia, for example, have some concern regarding the uncertainty in some of the treaties but would only go so far as supporting a review and clarification of the treaties themselves.

All of the groups acknowledge that there is a need to elaborate common legal rules or standards. They also agree on the reasons why further development is necessary. These include technological changes and the increased commercialization of space.

The debate on a new comprehensive treaty requires careful consideration of what can be lost or what can be gained. Whatever limitations, challenges, or difficulties exist in space law, the real problem is not just the law itself. The real challenge is forming the political will to address the law.

Thank you all for being so patient with my Spanish. If you have any questions, please email the Center's Director, Professor Joanne Gabrynowicz or myself at [jgabryno@olemiss.edu](mailto:jgabryno@olemiss.edu) or [jserrao@olemiss.edu](mailto:jserrao@olemiss.edu). Thank you for your time.



# INTRODUCTION AU DROIT DE L'ESPACE POUR LES DÉCIDEURS

*Traduit de l'anglais en français par Isabelle Bouvet\**

Bonjour. Mon nom est Dr. Jacqueline Etil Serrao, Directrice Adjointe du centre national de droit spatial et de télédétection (*National Remote Sensing and Space Law Center*) à la faculté de droit de l'Université du Mississippi. Le sujet que je souhaite aborder aujourd'hui s'intitule: "droit de l'espace : avancées et perspectives". La plus grande partie de cette présentation a été écrite à l'origine et présentée par le Directrice du Centre, le professeur Joanne Irene Gabrynowicz en 2003, au cours de l'atelier organisé par le bureau des affaires spatiales des Nations Unies et intitulé "Atelier organisé par la République de Corée sur le droit de l'espace". Les participants étaient des analystes et décideurs des puissances spatiales, des nouvelles puissances spatiales de même que des pays en voie de développement. Certains éléments ci-dessous figurent également dans un article récent du *Suffolk University Law Review* écrit par le Prof. Gabrynowicz.

Le corps du droit international de l'espace comprend le droit des traités et le droit coutumier. Les quatre traités principaux sont:

1. Le Traité sur les principes régissant les activités des États en matière d'exploration et d'utilisation de l'espace extra-atmosphérique, y compris la Lune et les autres corps célestes (Traité sur l'espace)
2. L'Accord sur le sauvetage des astronautes, le retour des astronautes et la restitution des objets lancés dans l'espace extra-atmosphérique (l'Accord de sauvetage)

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3. La Convention sur la responsabilité internationale pour les dommages causés par des objets spatiaux (la convention sur la responsabilité)
4. La Convention sur l'immatriculation des objets lancés dans l'espace extra-atmosphérique (la convention sur l'immatriculation)

Ces quatre traités sont largement acceptés par un grand nombre d'Etats. Cependant, le cinquième ne l'est pas:

5. l'Accord régissant les activités des États sur la Lune et les autres corps célestes (l'accord sur la Lune)

De plus, il existe une série de principes qui ont été adoptés par l'Assemblée Générale des Nations Unies. Chaque ensemble de principes a une valeur juridique variable en droit international. Le droit de l'espace comprend la coutume et la pratique. Le traité sur l'espace se réfère spécifiquement au droit international et à la charte des Nations Unies. Cela signifie également que les pays sont responsables au plan international pour toutes les activités spatiales privées et publiques. Pris dans leur ensemble, ils constituent le corps du droit international de l'espace.

Permettez-moi maintenant d'aborder les principes du droit de l'espace. Considéré dans son ensemble, le droit international de l'espace comporte un nombre important de principes fondamentaux. En premier lieu, le traité sur l'espace constitue en quelque sorte la constitution. Il énonce des principes généraux qui forment la base de tout le droit de l'espace. Ces principes incluent des concepts tels que "l'apanage de l'humanité tout entière" ("the province of all mankind") qui signifie que tous les pays ont un droit non exclusif d'utiliser et d'explorer l'espace. Il diffère du "patrimoine commun de l'humanité" ("common heritage of mankind") mentionné dans l'accord sur la Lune. Nous l'examinerons ultérieurement. Les autres principes fondamentaux sont le principe de non-appropriation; l'utilisation à des fins pacifiques, et le principe selon lequel les Etats sont responsables des activités spatiales menées par leurs nationaux.

Le principe du "patrimoine commun de l'humanité" se réfère à l'extraction potentielle des ressources et l'allocation des

ressources. Celui de "l'apanage de l'humanité toute entière" concerne l'exploration et l'utilisation. Selon le principe de "l'apanage de l'humanité tout entière", tous les pays ont un droit non-exclusif d'utiliser et d'explorer l'espace. Afin de comprendre la différence entre ces deux principes, je vous propose d'illustrer ce propos au moyen d'une analogie. En haute mer, tous les pays ont le droit de traverser les océans avec leurs bateaux. Ils ont également le droit de pêcher des poissons dans les océans. Dès que ces poissons sont sur le pont du bateau, ils sont en quelque sorte appropriés. Par analogie, les pays ont le droit d'avoir leurs engins, spatiaux se déplacer dans l'espace ("province of mankind") mais aucun accord n'a été conclu au niveau international selon lequel les pays pourraient extraire des ressources ("common heritage").

Alors que certains observateurs défendent ce point de vue, les deux principes ne sont pas interchangeables. Le principe de "l'apanage de l'humanité tout entière" est basé sur celui de *res communis*: le bien appartient à tous. Cela signifie que tous les pays ont le droit d'utiliser et d'explorer. C'est un principe global, il n'est pas exclusif. Il est possible d'utiliser des parties de l'espace, pas de se l'approprier.

Tous les pays ont un libre accès à tous les domaines de l'espace et les corps célestes sur la base de l'égalité. Tous les pays ont le droit d'utiliser et d'explorer l'espace. L'utilisation concerne par exemple l'observation de la Terre et les communications. L'exploration inclut les missions *Apollo*, les missions robotiques proches de la Terre et l'exploration de Mars par exemple.

Selon l'article II du traité sur l'espace, "l'espace, y compris la Lune et les autres corps célestes, ne peut faire l'objet d'appropriation nationale par proclamation de souveraineté, ni par voie d'utilisation ou d'occupation, ni par aucun autre moyen." Lorsque Christophe Colomb arriva en Amérique du Nord, il revendiqua la terre au nom de l'Espagne. Le droit de l'époque reconnaissait que si un Etat revendiquait une terre et pouvait la contrôler, cela devenait le territoire de cette nation. Le droit a changé. Le drapeau placé par Christophe Colomb signifiait une revendication de souveraineté par l'Espagne d'un nouveau terri-

toire. Le drapeau placé par Neil Armstrong sur la Lune signifiait une réalisation nationale, non l'acquisition de territoire.

L'expression "peaceful purposes" est un terme qui a une longue histoire en droit de l'espace. Il faut revenir à la première résolution des Nations Unies sur l'espace. Le débat originel se concentrait sur la signification de cette expression. Deux définitions étaient alors en compétition: selon la première, "peaceful purposes" signifiait "non agressif", selon la seconde "non militaire". La première définition a été retenue pour deux raisons:

En premier lieu, les Soviétiques et les Américains étaient présents militairement dans l'espace depuis le début. Par conséquent, énoncer que "peaceful purposes" signifiait "non militaire" contredisait les faits. De plus, au cours de la guerre froide, d'importantes activités militaires ont entraîné un équilibre forcé. Par exemple, les Soviétiques et les Américains avaient des satellites de reconnaissance et de surveillance qui leur permettaient de connaître les activités respectives de chacun. Cela a contribué à une stabilisation de l'environnement géopolitique.

"Peaceful purposes" signifie également l'interdiction des armes dans l'espace extra-planétaire. Cela concerne les armes nucléaires et les armes de destruction massive dans l'espace. Les armes de destruction massive incluent l'arme atomique, biologique et chimique. L'espace extra atmosphérique et les corps célestes sont deux choses différentes. Les corps célestes sont exclusivement pacifiques ce qui signifie des restrictions encore plus importantes que pour ce qui concerne l'espace extra-planétaire.

Par ailleurs, certaines activités militaires sont légales. Il y a également des activités militaires qui sont interdites. Celles qui sont permises sont les activités de recherche scientifique et d'utilisation des équipements et installations qui sont nécessaires pour mettre en œuvre les activités scientifiques et pacifiques. Les activités interdites incluent des bases militaires, des installations, des fortifications, le test d'armes et les manœuvres.

Alors qu'il pourrait paraître évident de dire qu'il existe un mécanisme de responsabilité pour l'espace, cela n'a pas toujours été le cas. Lors de l'élaboration du droit de l'espace, il n'était pas établi que les pays seraient rendus responsables de leurs activi-

tés dans l'espace sans qu'un régime spécifique les rende responsables. Par conséquence, la convention sur la responsabilité a été établie, prévoyant un régime double: la responsabilité absolue s'applique aux dommages qui ont lieu sur la Terre et aux avions en vol. La responsabilité absolue signifie que la faute est indépendante de la responsabilité, la responsabilité est établie. Si le dommage se déroule dans l'espace, alors la négligence s'applique. Le régime de la responsabilité dans l'espace comprend un mécanisme de responsabilités qui permet l'allocation de la responsabilité conjointe entre les acteurs. Enfin, le traité prévoit un processus de revendication qui comprend l'établissement d'une commission des réclamations et des règles spécifiques sur la compensation.

Le droit international de l'espace énonce que les pays encourrent la responsabilité internationale pour toutes les activités spatiales qu'elles soient privées ou publiques. Par exemple, les activités commerciales de télédétection des sociétés sont sous licence du gouvernement américain afin qu'elles soient sous sa supervision tel que le prévoit le droit international. Le droit de l'espace reconnaît les organisations internationales intergouvernementales. Un exemple: l'Agence spatiale européenne est une organisation régionale très efficace. Elle a été constituée par un traité, la convention de l'ESA, en 1975.

Enfin, le Secrétaire Général des Nations Unies s'est vu attribuer un rôle particulier dans différentes circonstances. Par exemple, selon la convention sur la responsabilité, des réclamations peuvent être présentées par l'intermédiaire du Secrétaire Général. Selon la convention sur l'immatriculation, un Etat signataire peut demander une information par l'intermédiaire du Secrétaire Général concernant un projet spatial qui a causé un dommage. Selon l'Accord sur le Sauvetage, les signataires doivent informer le Secrétaire Général des accidents et urgences y compris celles qui impliquent des intérêts globaux (ex: un océan, l'Antarctique).

Malgré le fait qu'il y ait cinq traités, du droit coutumier et les principes des Nations Unies, de nombreuses questions demeurent sans réponse. Les questions suivantes restent ouvertes, elles n'ont pas obtenu de consensus au sein de la communauté internationale.

- Bien qu'il n'y ait pas de souveraineté sur le territoire, la question de la souveraineté sur les ressources demeure: la non appropriation des territoires entraîne-t-elle la non-appropriation des ressources ?
- Le fait d'extraire des ressources s'apparente-t-il à une utilisation de l'espace?
- La souveraineté est-elle nécessaire pour établir les droits de propriété ?
- L'interdiction de l'appropriation nationale empêche-t-elle la revendication de la propriété par un individu, une organisation intergouvernementale ou une société ?

L'exemple le plus controversé d'une question qui demeure irrésolue est la question de l'utilisation des ressources dans l'espace. Il sera nécessaire d'avoir une volonté politique forte pour développer un consensus qui serait accepté par les pays.

Une autre question controversée consiste à déterminer si le régime des traités existant doit demeurer tel qu'il est. Les nations spatiales traditionnelles et les nouvelles puissances spatiales s'accordent à dire qu'une nouvelle phase du développement du droit de l'espace a débuté. Cependant, il existe des différences d'opinion sur la meilleure approche à adopter.

Quelques pays, y compris la Russie, estiment que ces dispositions sont inadéquates parce qu'elles n'adressent pas toutes les situations possibles. Les nations qui considèrent que le régime est insuffisant ont proposé qu'au delà d'un renforcement ou de l'amendement des instruments existants, un nouveau traité soit négocié.

Ceci est selon eux le moyen évident de prendre en compte les changements nécessaires. Ils considèrent que certaines nations choisissent de ne pas participer aux traités existants en raison des incertitudes et changements d'interprétation des termes.

D'autres pays estiment que le système répond à ces questions en amendant ou étendant les traités existants. D'autres nations estiment que le régime juridique existant, y compris les traités, est adéquat et fournit la base des développements futurs. Selon elles, encourager l'adhésion aux traités existants est

le meilleur moyen pour accomplir des développements. Les nations soutenant cette position ont également soulevé des questions de procédure, y compris des arguments selon lesquels un traité unique serait au-delà des compétences du comité des Nations Unies sur l'utilisation pacifique de l'espace et de son sous-comité juridique. Enfin, ils estiment que dans la mesure où les nations continuent de rejoindre les traités existants, le régime actuel est viable.

Un nombre important de pays, notamment les principales puissances spatiales à l'exception de la Russie, s'opposent à la mise en place d'un nouveau traité global. Cette liste inclut l'Inde, le Japon et les Etats-Unis. Les pays soutenant l'autre position sont ceux ayant récemment développé des capacités spatiales ou n'en ayant pas, notamment: la Bulgarie, la Chine, l'Iran et la Grèce.

Certaines nations ayant un segment sol pour les activités de télédétection, mais dépourvus de capacité de lancement, ont une position intermédiaire. Le Maroc et l'Australie par exemple ont des objections concernant l'incertitude liée à certains traités, mais n'iraient pas jusqu'au point de demander une révision ou une clarification des traités.

Tous les groupes sont d'accord sur le fait qu'il existe un besoin d'élaborer des règles juridiques communes ou des standards. Ils sont également d'accord sur les raisons qui motivent ces développements: des changements technologiques et un accroissement de la commercialisation de l'espace.

Le débat relatif à la mise en place d'un nouveau traité mérite un examen attentif sur ce que cela pourrait nous apporter ou nous faire perdre. Quelles que soient les limitations, les challenges ou les difficultés qui existent en droit de l'espace, le vrai problème n'est pas le droit lui-même. La vraie question est d'obtenir une volonté politique pour aborder le droit.

Merci de votre patience pour mon espagnol. Si vous avez des questions, merci de communiquer un e-mail à la Directrice du Centre, le Professeur Joanne Gabrynowicz ou moi-même à l'adresse : [jgabryno@olemiss.edu](mailto:jgabryno@olemiss.edu) ou [jserrao@olemiss.edu](mailto:jserrao@olemiss.edu). Merci de votre participation.

# INTRODUCCIÓN AL DERECHO DEL ESPACIO PARA LOS RESPONSABLES DE LA TOMA DE DECISIONES

*Traducido del inglés al español por  
Virginia Rodríguez Serrano\**

Buenos días. Soy la Dra. Jacqueline Etil Serrao, Directora Asociada del Centro de teledetección nacional y del derecho del espacio ultraterrestre (*National Remote Sensing and Space Law Center*) de la Facultad de Derecho de la Universidad de Mississippi. Mi conferencia de hoy versa sobre la "Legislación espacial: Avances y perspectivas". Esta conferencia fue en su mayor parte preparada y presentada por la Directora del Centro anteriormente mencionado, la profesora Joanne Irene Gabrynowicz, en el Grupo de Trabajo organizado por Naciones Unidas en 2003 en relación con la "Capacidad de construcción de la República de Corea en materia de Derecho del espacio ultraterrestre". Este Grupo de Trabajo fue organizado por la Oficina para Asuntos relacionados con el Espacio Exterior de Naciones Unidas. Los participantes de dicho Grupo de trabajo fueron los responsables políticos y de toma de decisiones de Estados con capacidad para llevar a cabo actividades de exploración espacial, Estados que recientemente han iniciado ciertas actividades de exploración espacial y países en vías de desarrollo. Algunas de las consideraciones aquí expuestas también aparecen en un reciente artículo publicado en la Revista de Derecho de la Universidad Suffolk por la prof. Gabrynowicz.

El Derecho internacional del espacio ultraterrestre está integrado por tratados internacionales y Derecho consuetudinario general. Los cuatro tratados internacionales básicos son los siguientes:

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1. Tratado sobre los principios que deben regir las actividades de los Estados en la exploración y utilización del espacio ultraterrestre, incluso la Luna y otros cuerpos celestes (*Tratado del Espacio Ultraterrestre*).
2. Acuerdo sobre el salvamento y la devolución de astronautas y la restitución de objetos lanzados al espacio ultraterrestre (*Acuerdo sobre salvamento*).
3. Convenio sobre la responsabilidad internacional por daños causados por objetos espaciales (*Convenio sobre responsabilidad*).
4. Convenio sobre el registro de objetos lanzados al espacio ultraterrestre (*Convenio sobre registro*).

Estos cuatro tratados son ampliamente aceptados por un gran número de Estados. Sin embargo, el quinto tratado adoptado en esta materia, citado a continuación, no lo es:

5. Acuerdo que debe regir las actividades de los Estados en la Luna y otros cuerpos celestes (*Acuerdo sobre la Luna*).

Adicionalmente, la Asamblea General de las Naciones Unidas ha adoptado, a lo largo de estos años, un conjunto de principios. Cada grupo de principios tiene un peso distinto y relativo en el Derecho internacional. El Derecho internacional del espacio ultraterrestre está integrado asimismo por el Derecho consuetudinario y la práctica de los Estados. El Tratado del Espacio Ultraterrestre se remite específicamente al Derecho internacional y a la Carta de la Organización de las Naciones Unidas. Señala asimismo que los Estados tienen responsabilidad internacional por todas sus actividades espaciales, de carácter público y privado. En definitiva, de forma conjunta, todos los instrumentos mencionados anteriormente, tratados y costumbre internacional, forman el cuerpo del Derecho internacional del espacio ultraterrestre.

Hablemos de los principios inspiradores del Derecho del espacio ultraterrestre. Con carácter general, el Derecho internacional del espacio ultraterrestre está integrado por una serie de principios básicos de gran relevancia. En primer lugar, el Tratado del Espacio Ultraterrestre opera de forma similar a una

constitución. Así, dicho Tratado establece los principios generales que integran el núcleo normativo básico del Derecho del espacio ultraterrestre. Entre estos principios se encuentra el concepto de que la exploración y utilización del espacio ultraterrestre "incumben a toda la humanidad". Dicho principio implica que todos los países tienen un derecho no exclusivo de utilizar y explorar el espacio ultraterrestre. El concepto de que "la exploración y utilización del espacio ultraterrestre incumben a toda la humanidad" no coincide exactamente con la noción de "patrimonio común de la Humanidad," contenida en el Tratado sobre la Luna. Este aspecto será tratado más adelante. Otros principios básicos relevantes son el principio de no apropiación del espacio, el principio de utilización del espacio ultraterrestre con fines pacíficos, el principio de responsabilidad y el principio de que los Estados son responsables de las actividades llevadas a cabo en el espacio por sus nacionales.

La noción de "patrimonio común" está centrada en las cuestiones de extracción potencial de recursos y aprovechamiento o destino de los mismos. El concepto de "provecho e interés de la humanidad" está relacionado con la exploración y utilización del espacio ultraterrestre. Por virtud del principio de que la exploración y utilización del espacio incumben a toda la humanidad, todos los Estados tienen un derecho no exclusivo a la utilización y exploración del espacio ultraterrestre. Al objeto de entender la diferencia entre ambos conceptos, téngase en consideración el siguiente supuesto. En el alta mar, todos los países tienen derecho a utilizar el área del alta mar para el movimiento de sus buques a través de los océanos. Asimismo, tienen un derecho de libre pesca y cuando se produce dicha actividad pesquera, el producto o resultado de la misma pasa a ser propiedad del buque. En el espacio ultraterrestre, de forma similar, los Estados tienen un derecho idéntico a que sus vehículos espaciales se muevan libremente ("la exploración y utilización del espacio ultraterrestre incumben a toda la humanidad"), pero no se ha alcanzado acuerdo alguno en lo que respecta a si los Estados pueden extraer recursos ("patrimonio común de la humanidad").

Estos dos principios no son intercambiables, aunque algunos autores aleguen que lo son. El principio de que "la exploración y utilización del espacio ultraterrestre incumben a toda la

humanidad" tiene su fundamento en la noción de *res communis*: la cosa pertenece a todos. Esto significa que todos los Estados tienen el derecho de utilización y exploración del espacio. Es un principio inclusivo, no exclusivo. Esto es, el espacio ultraterrestre puede ser utilizado parcialmente, pero no adquirido.

Todos los Estados tienen libertad de acceso a cualquier zona del espacio ultraterrestre y de los cuerpos celestes sobre un principio de igualdad. Asimismo, todos los Estados tienen el derecho a utilizar y explorar el espacio ultraterrestre. Ejemplos de dicha utilización son las actividades de observación de la Tierra (teleobservación) y las comunicaciones. Supuestos de exploración del espacio son las misiones *Apolo*, las misiones robóticas de órbitas terrestres bajas y la exploración de otros cuerpos celestes como Marte.

El artículo II del Tratado del Espacio Ultraterrestre señala que "el espacio ultraterrestre, incluso la Luna y otros cuerpos celestes, no podrá ser objeto de apropiación nacional por reivindicación de soberanía, uso u ocupación, ni de ninguna otra manera." Cuando Cristóbal Colón llegó a América del Norte, reclamó la soberanía española sobre este territorio. En aquel momento, el ordenamiento jurídico reconocía que si un Estado reclamaba para sí un territorio determinado y tenía medios para controlarlo, el mismo pasaba a ser territorio de dicho Estado. Neil Armstrong también emplazó una bandera de su país en la superficie lunar, pero al contrario de lo que había ocurrido anteriormente en el caso de Cristóbal Colón, no constituyó un ejercicio de reclamación de soberanía territorial sobre la luna. El Derecho había cambiado. La bandera emplazada por Colón significaba un ejercicio de reivindicación de soberanía territorial para España. La bandera de Armstrong constituía la demostración de un logro o éxito nacional, pero no la adquisición de un territorio.

"La utilización para fines pacíficos" es un principio general con una larga historia en el Derecho del espacio ultraterrestre. Ya estaba contemplado en las primeras resoluciones de Naciones Unidas en relación con el espacio ultraterrestre. El debate inicial se centró en lo que la expresión "fines pacíficos" debía significar. Dos conceptos se discutían. El primero se refería a que la expresión "fines pacíficos" debía equivaler a fines "no

ofensivos". La segunda noción afirmaba que "fines pacíficos" significaba fines "no militares". Hoy día ha imperado el significado de fines "no ofensivos" por dos razones:

En primer lugar, tanto la Unión Soviética como Estados Unidos han desarrollado una presencia militar en el espacio ultraterrestre desde el principio de la carrera espacial. Por ello, sostener que la utilización del espacio ultraterrestre debía hacerse con fines no militares contradiría los hechos. En segundo lugar, en el período de la Guerra Fría, las actividades militares de gran entidad contribuían al fomento de la estabilidad. Por ejemplo, tanto la Unión Soviética como Estados Unidos disponían de satélites de reconocimiento y vigilancia que les permitían conocer lo que cada uno de ellos estaba haciendo hasta un cierto grado. Esta actividad disminuyó la necesidad de adoptar el primer ataque y ayudó a estabilizar el ambiente político.

"Fines pacíficos" también implica la prohibición de utilizar o colocar determinadas armas en el espacio extra-planetario. Esta prohibición afecta a las armas nucleares y a las armas de destrucción masiva. El concepto de armas de destrucción masiva incluye a las armas atómicas, biológicas y químicas. Dos regímenes distintos se aplican al espacio ultraterrestre y a los cuerpos celestes. Los cuerpos celestes pueden utilizarse exclusivamente para fines pacíficos, lo que implica restricciones adicionales de las que se imponen en el espacio ultraterrestre.

En este sentido, existen actividades militares que son jurídicamente admisibles mientras que otras están prohibidas. Así, la investigación científica y la utilización de equipos y medios militares necesarios para llevar cabo investigaciones científicas (pacíficas) son actividades posibles legalmente. Están prohibidas las actividades relacionadas con el establecimiento de bases militares, instalaciones y fortificaciones militares, la realización de ensayos con cualquier tipo de armas y las maniobras militares en el espacio.

Aunque parecería obvio suponer que exista un régimen de responsabilidad para las actividades en el espacio ultraterrestre, esto no ha sido siempre así. En los momentos iniciales de la actividad espacial, no era evidente que los Estados pudieran ser declarados responsables por sus actividades en el espacio ultraterrestre sin la definición e implantación de un régimen jurídico

específico que estableciera tal responsabilidad. En consecuencia, se llevó a cabo la articulación del Convenio sobre responsabilidad. Dicho Convenio establece un régimen dual de responsabilidad. En el supuesto de daños causados en la superficie de la Tierra o a las aeronaves en vuelo, rige un principio de responsabilidad absoluta. La responsabilidad absoluta implica que es irrelevante que el posible causante del daño incurra o no en culpa o negligencia. Aunque el causante no haya actuado a título de culpa, será responsable del daño. Sin embargo, si el daño se causa a objetos espaciales, se aplica un principio de responsabilidad por negligencia. El sistema establecido en el Convenio sobre responsabilidad incluye determinados mecanismos para permitir la atribución de responsabilidad en supuestos de acción conjunta de varios participantes. Entre dichos mecanismos se encuentra la declaración de responsabilidad mancomunada y solidaria de los Estados u organizaciones participantes, la carga de la indemnización por los daños y el reparto de dicha indemnización. Finalmente, el régimen establecido por el Convenio sobre responsabilidad prevé un procedimiento de reclamaciones de indemnización por daños que incluye el establecimiento de una Comisión de Reclamaciones y de reglas específicas de compensación.

El Derecho internacional del espacio ultraterrestre prevé que los Estados tienen responsabilidad internacional por todo tipo de actividades, ya sean de carácter público o privado. A título de ejemplo, las compañías americanas que se dedican a actividades de teledetección son autorizadas por el Gobierno de los Estados Unidos de forma que pueden ser supervisadas tal y como establece el Derecho internacional del espacio.

De otra parte, el Derecho espacial reconoce el papel de las organizaciones intergubernamentales. Un supuesto es la Agencia Europea del Espacio (ESA), una organización internacional de carácter regional que ha tenido y tiene un gran éxito en el desarrollo de sus actividades. La ESA fue constituida por un tratado internacional, la Convención de la ESA, en 1975.

Finalmente, el Secretario General de las Naciones Unidas tiene asignada una función en una gran variedad de circunstancias. Por ejemplo, en virtud de lo prevenido por el Convenio sobre responsabilidad, las reclamaciones de indemnización por

daños pueden ser presentadas por conducto del Secretario General de las Naciones Unidas. De otra parte, conforme al Convenio sobre registro, un Estado signatario puede requerir información, a través del Secretario General, sobre cualquier objeto espacial que haya causado daños. Finalmente, en el marco del Acuerdo sobre salvamento, los Estados signatarios tienen la obligación de notificar al Secretario General los accidentes y casos de emergencia que surjan incluyendo aquellos que se produzcan en espacios fuera de la jurisdicción estatal (i.e. un océano, la Antártida).

Con independencia de los cinco tratados que hemos señalado, el Derecho consuetudinario y los principios adoptados por Naciones Unidas, concurren todavía muchas cuestiones por resolver. Se mencionan a continuación, a título de ejemplo, varias de esas cuestiones todavía carentes de una respuesta específica ante la falta de consenso en la comunidad internacional.

- No obstante no puede haber ejercicios de soberanía sobre territorios espaciales, no está tan claro si no se puede ejercer dicha soberanía sobre los recursos. Esto es: ¿se extiende la prohibición de apropiación territorial a los recursos que se obtengan en el espacio ultraterrestre?
- ¿Es la apropiación de los recursos espaciales una "utilización" del espacio ultraterrestre?
- ¿Es la declaración de soberanía necesaria para el establecimiento de derechos de propiedad?
- El principio de no apropiación nacional, ¿impide las reclamaciones de dominio o derechos de propiedad de personas físicas, organizaciones intergubernamentales o compañías privadas?

De todos, el aspecto más controvertido por resolver es la cuestión de la utilización de los recursos en espacio. Para alcanzar el consenso necesario tiene que concurrir la voluntad política de subscribir un acuerdo en que los Estados confluyan.

Otro extremo discutido es si el régimen de los tratados debería permanecer tal y como está en la actualidad. Tanto los Estados tradicionales como los que han iniciado recientemente cierta actividad espacial coinciden en que ha comenzado una

nueva fase en el desarrollo del Derecho espacial. No obstante lo anterior, concurren ideas distintas de cual sea el mejor enfoque a adoptar para dirigir dicho desarrollo.

Algunos países, como Rusia, estiman que las previsiones contenidas actualmente en los tratados son inadecuadas porque no prevén todas las posibles situaciones. Los Estados que estiman que el sistema actual tiene carencias, mas allá de un fortalecimiento del mismo a través de la modificación de los instrumentos existentes, han sugerido que se negocie un nuevo tratado, de vocación y alcance universal.

Estos Estados entienden esta propuesta como la forma lógica de afrontar con éxito las necesidades cambiantes de las distintas actividades espaciales. En este sentido, argumentan que los Estados están actuando al margen del sistema actual de los tratados debido a la incertidumbre e interpretaciones dispares de sus disposiciones.

Otros países sostienen que el régimen actual de tratados podría resolver los interrogantes antes mencionados si se permite su modificación y desarrollo. En fin, otro grupo de Estados considera que el régimen jurídico existente, representado básicamente por los tratados, es adecuado y establece los fundamentos para un desarrollo legal posterior. Éstos últimos son de la opinión de que fomentar la adhesión a los tratados existentes es la manera más práctica de alcanzar un avance. Los Estados que sustentan esta idea también arguyen inconvenientes procedimentales en el sentido de que la consideración de un tratado general, de vocación universal, se encuentra fuera de las competencias del Comité de la Naciones Unidas sobre el Uso Pacífico del Espacio Ultraterrestre y su Subcomité Legal. Finalmente, alegan que toda vez que los Estados siguen adhiriéndose a los tratados en vigor, el sistema actual se muestra válido.

Un grupo creciente de Estados posicionados en cada lado del debate de esta cuestión muestra que, con excepción de Rusia, las potencias espaciales tradicionales son contrarias a un nuevo tratado general. Incluidos en este grupo se encuentran India, Japón y Estados Unidos. En el otro lado del debate se encuentran naciones con poca, inexistente o muy reciente capacidad espacial, como Bulgaria, China, Irán y Grecia.

Algunos países que poseen una industria madura en el segmento terreno para la teledetección, la teleobservación y otras actividades espaciales, pero con escasa capacidad de lanzamiento propia, ocupan una posición intermedia. Marruecos y Australia, por ejemplo, muestran cierta preocupación en relación con las incertidumbres existentes en algunas disposiciones de los tratados, pero únicamente apoyarían una revisión y clarificación de los mismos.

Todos los grupos mencionados coinciden en que existe una necesidad de elaborar principios o normas jurídicas comunes. Asimismo, coinciden en las razones de porque dicho desarrollo adicional es necesario. Dichos motivos están referidos a los cambios tecnológicos que se han producido en los últimos años y a la creciente comercialización del espacio ultraterrestre.

El debate sobre la adopción de un nuevo tratado general exige que se consideren con atención cuales serían los aspectos a mejorar y qué logros pueden perderse con tal proyecto. Con independencia de las limitaciones, retos o dificultades existentes en el Derecho espacial, el problema no es el Derecho. El reto real consiste en alcanzar la voluntad política necesaria para escribir y modificar el Derecho.

Gracias por ser tan pacientes con mi tratamiento del castellano. Si tienen alguna cuestión, por favor envíen un correo electrónico a la Directora del Centro, la profesora Joanne Gabrynowicz o a mi misma a las direcciones de correo siguientes: jgabryno@olemiss.edu o a jserrao@olemiss.edu. Gracias por su tiempo.



# **A MOSQUITO IN THE OINTMENT: ADVERSE HIPAA IMPLICATIONS FOR HEALTH-RELATED REMOTE SENSING RESEARCH AND A "REASONABLE" SOLUTION**

*Paul M. Secunda\**

## **I. INTRODUCTION**

Consider the following scenario: a researcher investigating the spread of West Nile Virus<sup>1</sup> in the United States seeks to determine whether increased precipitation levels in different geographical regions across the country correlate with (through a larger population of mosquitoes)<sup>2</sup> a higher frequency of West Nile Virus in humans.<sup>3</sup> After gathering the relevant precipitation georeferenced data through remote sensing techniques,<sup>4</sup> the

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\* Assistant Professor of Law, University of Mississippi School of Law. I would like to thank Joanne Gabrynowicz and Jacqueline Serrao of the National Remote Sensing and Space Law Center for humoring a novice and introducing me to the exciting field of remote sensing and space law. I dedicate this piece to my children, Jacob Ari and Isabella Julia, and to the betterment of their world.

<sup>1</sup> West Nile Virus is a vector-borne, viral infection that can cause inflammation of the brain. In certain cases, it can be fatal. For a general description of the characteristics of West Nile Virus, see generally WebMD Website, *Health Guide A-Z: West Nile Virus*, at [http://my.webmd.com/hw/health\\_guide\\_atoz](http://my.webmd.com/hw/health_guide_atoz) (last visited May 6, 2004) [hereinafter *Health Guide A-Z*]; see also Center for Disease Control and Prevention Website, *West Nile Virus*, at <http://www.cdc.gov/ncidod/dvbid/westnile/index.htm> (last visited May 8, 2004).

<sup>2</sup> West Nile Virus is spread by mosquitoes throughout North America. The first major outbreak was in New York in 1999. Mosquitoes obtain the virus by biting infected birds. See *Health Guide A-Z*, *supra* note 1.

<sup>3</sup> This hypothetical is based, at least in part, on the work of four NASA students at the Ames Research Center who produced a risk map showing the potential risk of West Nile Virus being carried by mosquitoes in Monterey County, California. See SGE News, SGE: Ecosystem Science and Technology Branch of the Earth Science Division of NASA's Ames Research Center web site, at <http://geo.arc.nasa.gov/sge/news.html> (last visited Aug. 8, 2004) (news release regarding this study was first released on September 2, 2003).

<sup>4</sup> "Remote sensing refers to satellite or aircraft technology used to observe the earth from distant vantage points. Cameras mounted on these platforms capture detailed pictures of the earth that can be employed for a range of business applications, such as

researcher still requires health information from numerous local hospitals and other health care providers and agencies to attempt to link the precipitation data with the number of West Nile Virus cases in a given location. Unbeknownst to our well-meaning researcher, he is about to face numerous procedural hurdles as he seeks access to this necessary health information for his research protocol.

Although the connection between this researcher's information-gathering conundrum and space law may not at first glance appear evident, this type of dilemma has important ramifications for space law in general, as remote sensing law has become an increasingly significant and emerging area within the field of space law.<sup>5</sup> Indeed, over recent years, remote sensing has been utilized for a growing number of applications, including in the areas of public and human health research.<sup>6</sup> It is this

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identifying very early stages of diseased or drought-stressed crops in farmlands; managing forests, wetlands and fisheries; and measuring climatic or oceanic conditions." National Remote Sensing and Space Law web site, *About the Center*, at <http://www.spacelaw.olemiss.edu> (last visited Oct. 11, 2004). The data acquired from remote sensing research techniques is sometimes referred to as "geospatial" or "geo-referenced" data. *Id.* Geospatial data should become more available as NASA hopes to launch more than eighty missions between 1995 and 2010, carrying over 200 different instruments, providing measurements of many environmental change parameters, some for the first time. See SENSOR EVALUATION PROJECT: INTRODUCTION, CENTER FOR HEALTH APPLICATIONS OF AEROSPACE RELATED TECHNOLOGIES (CHAAART), at <http://www.geo.arc.nasa.gov/sge/health/sensor/sensor.html> (last updated Aug. 2002); see also Louisa R. Beck et al., PERSPECTIVE, *Remote Sensing and Human Health: New Sensors and New Opportunities*, 6 EMERGING INFECTIOUS DISEASES 217, 217 (2000) ("These new capabilities will improve spectral, spatial, and temporal resolution, allowing exploration of risk factors previously beyond the capabilities of remote sensing."). Specifically, factors which will be able to be remotely sensed are: vegetation or crop type, deforestation, flooded forests, general flooding, permanent water, wetlands, and soil moisture. See *id.* at 222.

<sup>5</sup> Generally, all nations have nonexclusive right to use space. See Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, art. I, 18 U.S.T. 2410, 610 U.N.T.S. 205 (entered into force on Oct. 10, 1967) [hereinafter Outer Space Treaty]. Remote sensing, in turn, has long been recognized as a permitted "use" of outer space. See CARL Q. CHRISTOL, *THE MODERN INTERNATIONAL LAW OF OUTER SPACE* 730-32 (1982).

<sup>6</sup> The growing relevance of remote sensing to health research applications has been consistently demonstrated over the last number of years by the increased number of institutional resources available for conducting health-related remote sensing research, as well as the increased number of articles and workshops dealing with these issues. See, e.g., Beck et al., *supra* note 4, at 217 (describing the increased number of investiga-

connection between remote sensing and health research that this article seeks to explore in light of the newly enacted Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule,<sup>7</sup> the first comprehensive federal statute dealing with health information privacy concerns.

Prior to April 14, 2003, this remote sensing researcher in the hypothetical above would most likely have been able to contact these health care providers and work out an arrangement to obtain the necessary health information,<sup>8</sup> all the while pledging to maintain, to the greatest extent possible, the confidentiality of the health records of the affected individuals.<sup>9</sup> Today,

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tors in the health community using remote sensing techniques to explore disease-vector habitats and human transmission risks, and describing two such studies involving Lyme disease and cholera); Joanne Irene Gabrynowicz, Paper Presentation, *Data, Information, Confidentiality, and the Legal Landscape*, NASA Confidentiality & Geospatial Data Workshop (Washington D.C. July 16, 2003) (examining the application of remote sensing law to human health research issues at a workshop sponsored by NASA's Public Health Application Program in conjunction with the National Academy of Sciences) (materials on file with author); see also Beck et al., *supra* note 4, at 220-21 ("NASA has participated in sessions on remote sensing and health at professional meetings sponsored by national and international health organizations."). Indeed, NASA's Ames Research Center in California has been involved in public health work since 1985. CHAART was established by NASA in 1995 to continue this work in the area of remote sensing and health and it continues to develop technologies for disease risk modeling (also called "landscape epidemiology"), with a special emphasis on vector-borne diseases. See SGE Research web site, at <http://www.arc.nasa.gov/sge/research.html> (last visited Aug. 8, 2004). CHAART seeks to make its remote sensing expertise available to researchers throughout the health community. *Id.*

<sup>7</sup> Health Insurance Portability and Accountability Act, PUB. L. NO. 104-191, § 264, codified at 42 U.S.C. § 1320d-2 note (Aug. 21, 1996) [hereinafter HIPAA]. HIPAA was enacted as an amendment to the Employee Retirement Insurance and Security Act of 1973 (ERISA), 29 U.S.C. §§ 1001-1461 (1999). The applicable HIPAA provisions can be found at 29 U.S.C. §§ 1181-1183.

<sup>8</sup> But see *infra* Part III.B (discussing the need for an institutional review board's approval for certain federally conducted or supported human subjects research, even prior to the enactment of the HIPAA Privacy Rule).

<sup>9</sup> The remote sensing researcher would also likely have previously been constrained from disclosing sensitive health information under state statutory medical privacy laws and principles of state tort law (including the torts of invasion of privacy and breach of confidentiality). See DEPARTMENT OF HEALTH AND HUMAN SERVICES, *Protecting Personal Health Information in Research: Understanding the HIPAA Privacy Rule* 1 (Apr. 14, 2003), available at [http://privacyruleandresearch.nih.gov/pr\\_02.asp](http://privacyruleandresearch.nih.gov/pr_02.asp) (last modified Sept. 25, 2003) [hereinafter *Understanding HIPAA*]. Some of these state laws may still apply after HIPAA to the extent that state law is more stringent than HIPAA. In such cases, HIPAA would not preempt such state laws. See *In re: PPA Litigation*, 2003 WL 22203734, at \*12 (N.J. Super. L., Sept. 23, 2003) (discussing HIPAA preemption provisions at 45 C.F.R. § 160.203(a) (2003)).

however, the enactment of HIPAA, and the subsequent promulgation of the HIPAA Privacy Rule,<sup>10</sup> have altered the applicable legal rules for any remote sensing researcher contemplating the use of health information as part of his or her research.<sup>11</sup> Indeed, it is the central thesis of this article that the new HIPAA Privacy Rule is a fly (or, better put, a mosquito) in the ointment; a more inconvenient than necessary procedural scheme that could potentially, and inadvertently, derail new advances in medical research made possible for the first time by innovative remote sensing technologies.

Interestingly enough, this change in legal orientation for remote sensing researchers engaged in health-related research does not derive from the fact that a remote sensing researcher is a "covered entity"<sup>12</sup> under the HIPAA Privacy Rule; in almost all cases, they are not.<sup>13</sup> Nevertheless, hospitals, doctors, and other health care providers from whom health information must be obtained are normally considered covered entities.<sup>14</sup> As a result, under HIPAA authorization standards,<sup>15</sup> the health care provider must normally obtain a signed HIPAA-compliant authorization form<sup>16</sup> from each individual from whom the researcher seeks protected health information (PHI).<sup>17</sup> Since there may be thousands, if not hundreds of thousands of individuals being studied for a particular research study, it might be very difficult to obtain an authorization from every individual; and/or at the very least, it would be prohibitively expensive.

Nonetheless, recognizing that researchers still need access to health information to conduct medical research, the HIPAA Privacy Rule contains an express exception from the authoriza-

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<sup>10</sup> HIPAA, *supra* note 7.

<sup>11</sup> See *PPA Litigation*, 2003 WL at \*8 (noting that enactment of HIPAA Privacy Rule marks dramatic departure from the current state of medical and legal practice).

<sup>12</sup> For a definition of this term, see *infra* notes 29-32 and accompanying text.

<sup>13</sup> See DEPARTMENT OF HEALTH AND HUMAN SERVICES, *Privacy Boards and the HIPAA Privacy Rule* 1 (Sept. 25, 2003), available at [http://privacyruleandresearch.nih.gov/privacy\\_boards\\_hipaa\\_privacy\\_rule.asp](http://privacyruleandresearch.nih.gov/privacy_boards_hipaa_privacy_rule.asp) (last modified Aug. 4, 2004) ("Researchers are not themselves covered entities, unless they also provide health care and engage in any of the covered electronic transactions.") [hereinafter *Privacy Board Fact Sheet*].

<sup>14</sup> See *infra* notes 29-32 and accompanying text.

<sup>15</sup> See *infra* Part II.B.

<sup>16</sup> See *id.*

<sup>17</sup> See *infra* note 33.

tion requirement for researchers.<sup>18</sup> Under the research exception, the researcher normally must obtain a waiver of, or alteration to, the authorization requirement through either the use of an institutional review board (IRB) or HIPAA privacy board (HPB).<sup>19</sup> Unfortunately, the waiver standards promulgated for utilization by these review boards are vague and ambiguous and could potentially cause disparate and inequitable results in whether, and how, such health information is disclosed to researchers.<sup>20</sup> For this reason, this article proposes that the HIPAA Privacy Rule's research waiver standards be modified to substitute more readily understandable, and precedentially-based, legal terminology. This proposed legal salve substitutes the application of a Fourth Amendment-like "reasonableness/special needs" approach for the current "necessary and adequate" approach for future research waiver cases.<sup>21</sup>

As discussed in more detail below, the benefits of substituting this new standard are many. As currently written, the research waiver standards under the HIPAA Privacy Rule may lead to many unanticipated, and undesirable, results, including: (1) a dramatic increase in the cost associated with the collection of health data; (2) an increase in time expended before such data can be obtained; and, in the end, (3) a reduction in the use of sophisticated remote sensing techniques altogether in medical research. In short, compliance with the HIPAA Privacy Rule's research exemption might generate difficulties with a West Nile Virus-type research study as a consequence of remote sensing researchers not being able to know for certain whether they will ever receive the necessary health-related information

<sup>18</sup> See *infra* Part III. "The Rule balances an individuals' interest in keeping his or her health information confidential with other social benefits, including health care research." See *Understanding HIPAA*, *supra* note 9, at i.

<sup>19</sup> See *infra* Parts III.B and III.C.

<sup>20</sup> See *infra* Part IV.A; see also Pietrina Scaraglino, *Complying with HIPAA: A Guide for the University and its Counsel*, 29 J.C. & U.L. 525, 565 (2003) ("The requirements of the Privacy Regulations concerning access to PHI pursuant to an IRB or Privacy Board waiver are more complex and have created some anxiety in the research community.")

<sup>21</sup> U.S. CONST. amend. IV. The Fourth Amendment of the United States Constitution applies only to government and state actors and most remote sensing researchers do not fall into this category. *Id.* For reasons discussed below the reasonableness standard is borrowed from the public sector for purposes of this analysis. See *infra* Part IV.B.

to complete their studies. On the other hand, the proposal advanced in this article has the advantage of being part of a well-developed area of law to which researchers and covered entities alike may turn for guidance when deciding whether to grant a waiver to the HIPAA authorization requirement and release PHI to remote sensing researchers for research purposes.

In Part II of this Article, I offer a brief introduction to the HIPAA Privacy Rule, including its legislative and regulatory history, as well as pertinent substantive provisions surrounding the authorization requirement. In Part III, I focus on the research exception to the normal PHI authorization requirement, with special emphasis on the nature and characteristics of IRBs and HPBs. Finally, with the applicable HIPPA provisions concerning health-related remote sensing research front and center, Part IV concludes by proposing an important modification to the existing research waiver standards through application of a "reasonableness/special needs" balancing analysis, first developed in the Fourth Amendment privacy context.

## II. A HIPAA PRIMER

### A. *Legislative and Regulatory History*

The Health Insurance Portability and Accountability Act of 1996 (HIPAA)<sup>22</sup> was enacted by Congress to address concerns relating to non-discrimination in the provision of health insurance, the portability of health insurance coverage, pre-existing conditions exclusions, electronic data interchanges, and concerns surrounding the confidentiality of health information.<sup>23</sup> Specifically with regard to privacy concerns, Congress included a section entitled, "Recommendations With Respect to Privacy of Certain Health Information,"<sup>24</sup> which mandated the Secretary of

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<sup>22</sup> HIPAA, *supra* note 7.

<sup>23</sup> See generally ABA SECTION OF LABOR AND EMPLOYMENT LAW, EMPLOYEE BENEFITS LAW 46-47 (2nd ed. 2000).

<sup>24</sup> This mandate was a response to growing concerns over the potential abuse of confidential health information by health care entities and others without an individual's consent or authorization. See DEPARTMENT OF HEALTH AND HUMAN SERVICES, *Institutional Review Boards and the HIPAA Privacy Rule - NIH Fact Sheet* 1 (Aug. 15,

Health and Human Services (HHS) to provide to Congress "detailed recommendations on standards with respect to the privacy of individually identifiable health information."<sup>25</sup> Congress directed HHS to issue such a recommendation by August 21, 1997.<sup>26</sup>

Eventually, HHS' final health privacy regulations (the HIPAA Privacy Rule)<sup>27</sup> went into effect for most "covered entities" on April 14, 2003.<sup>28</sup> As defined by the HIPAA Privacy Rule, "covered entities" include health care providers,<sup>29</sup> health care clearinghouses,<sup>30</sup> and other health plan entities<sup>31</sup> that transmit any health information in electronic form in connection with a transaction covered by HIPAA.<sup>32</sup> These covered entities are

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2003), available at <http://privacyruleandresearch.nih.gov/irbandprivacyrule.asp> (last modified Aug. 4, 2004) [hereinafter *IRB Fact Sheet*].

<sup>25</sup> HIPAA, *supra* note 7, at § 264(a). HHS was directed to consider: "(1) The rights that an individual who is a subject of individually identifiable health information should have[;] (2) The procedures that should be established for the exercise of such rights[;] and] (3) The uses and disclosures of such information that should be authorized or required." *Id.* § 264(b).

<sup>26</sup> *See id.* § 264(c).

<sup>27</sup> *See* General Administrative Requirements, General Provisions, 45 C.F.R. §§ 160.101 - 160.104 (2003); Security and Privacy, Privacy of Individually Identifiable Health Information, 45 C.F.R. §§ 164.501 - 164.534 (2003).

<sup>28</sup> After HHS submitted a report to Congress urging the enactment of extensive privacy legislation, and Congress failed to act by August 21, 1999, HHS was required by HIPAA to finalize its regulations on privacy. *See* ABA SECTION OF LABOR AND EMPLOYMENT LAW, EMPLOYEE BENEFITS LAW - 2002 CUMULATIVE SUPPLEMENT 218-219 (Stanley ed. 2002). After submitting proposed regulations in November 1999 and receiving many comments from numerous parties, the final HIPAA Privacy Rule was issued in December 2000. *Id.* at 219. After further postponement by the new presidential administration, final modifications to the Privacy Rule were adopted on August 14, 2002, with a new compliance date for most plans of April 14, 2003. *Id.* In reality, all covered entities are now required to be in compliance with the Privacy Rule, as even smaller covered entities had only until April 14, 2004 to comply. *See* HIPAA, *supra* note 7, at § 264(c)(1); *see also* 42 U.S.C. § 1320d-4(b).

<sup>29</sup> Health care providers include doctors, hospitals, and pharmacies. 45 C.F.R. § 160.103.

<sup>30</sup> Health care clearinghouse "means a public or private entity, including a billing service, repricing company, community health management information system or community health information system, and 'value-added' networks and switches," that either processes health information in one of two designated manners. *Id.*

<sup>31</sup> Other health plan entities include health insurance issuers, health maintenance organizations (HMOs), issuers of long-term care policies, other employee welfare benefit policies that provide health benefits, and other government-related programs. *Id.*

<sup>32</sup> Interestingly, this definition suggests that as long as a health care provider or other covered entity does not "transmit health information in electronic form," the health care provider is not covered under HIPAA. *Id.* Unfortunately for most covered

regulated by the terms of the HIPAA Privacy Rule in how they both use and disclose PHI.<sup>33</sup>

As a result, unless a remote sensing researcher is employed by a covered entity, it is unlikely that the HIPAA Privacy Rule would apply directly to the activities of the researcher.<sup>34</sup> Nevertheless, because remote sensing researchers, like other researchers, utilize medical research, and by extension PHI, as part of their research activities,<sup>35</sup> it is likely that many remote sensing researchers will have to adhere to several HIPAA standards in order to obtain PHI from covered entities with whom they interact.<sup>36</sup>

### B. Pertinent Substantive Provisions<sup>37</sup>

Because researchers are not directly covered entities as discussed above, the issue regarding use of PHI for remote sensing research purposes boils down to essentially one issue: Under what circumstances may a covered entity disclose PHI to a researcher wishing to combine geospatial data with medical research data?

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entities, this exception does not provide much solace as almost all potentially covered entities, with the possible exception of some doctors or pharmacies, engage in some manner of electronic transmission of health information.

<sup>33</sup> PHI is defined in the HIPAA Privacy Rule as individually identifiable health information that is transmitted or maintained in any form of media. Notable exceptions to this broad rule are provided for employment records and education records. *Id.* The HIPAA Privacy Rule is enforced by HHS' Office of Civil Rights. See *Understanding HIPAA*, *supra* note 9, at i.

<sup>34</sup> See *supra* note 13.

<sup>35</sup> This scenario is demonstrated by the West Nile Virus example in the introductory section of this article. See *supra* Part I.

<sup>36</sup> See *Understanding HIPAA*, *supra* note 9, at 1.

<sup>37</sup> This article is limited to discussing the HIPAA Privacy Rule's authorization requirement, and waivers or modifications of that requirement, as discussed below. Thus, other important aspects of the HIPAA Privacy Rule, including consent requirements, non-research exceptions to the authorization requirement, notice of privacy practice provisions, internal safeguard provisions, certification provisions, and business associate provisions, are beyond the scope of this article and will not be discussed. For an in depth discussion of these topics, see generally Julie Bruce, *Bioterrorism Meets Privacy: An Analysis of the Model State Emergency Health Powers Act and the HIPAA Privacy Rule*, 12 ANNALS HEALTH L. 75 (2003); Diane Kutzko et al., *HIPAA in Real Time: Practical Implications of the Federal Privacy Rule*, 51 DRAKE L. REV. 403 (2003); Peter A. Winn, *Confidentiality in Cyberspace: The HIPAA Privacy Rules and the Common Law*, 33 RUTGERS L. J. 617 (2002).



As far as the circumstances under which PHI may be used or disclosed under the HIPAA Privacy Rule, the Rule seeks to limit significantly the number of permissible uses and disclosures.<sup>38</sup> In particular, there are six permitted uses and disclosures of PHI under the HIPAA Privacy Rule.<sup>39</sup> However, only two of these provisions are pertinent to remote sensing researchers seeking the disclosure of PHI: the authorization provisions and the provisions providing exceptions to the authorization provisions.<sup>40</sup>

Generally, under the authorization provisions, "a covered entity may not use or disclose protected health information without an authorization that is valid under [the HIPAA Privacy Rule]."<sup>41</sup> For the authorization to be "valid," it must contain six "core elements"<sup>42</sup> and three "required statements."<sup>43</sup> Once an authorization is received by a covered entity, all subsequent uses of PHI under the authorization must be consistent with the terms of the authorization.<sup>44</sup>

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<sup>38</sup> See 45 C.F.R. § 164.502(a).

<sup>39</sup> *Id.* § 164.502(a)(1).

<sup>40</sup> *Id.* § 164.502(a)(1)(iv), (vi). The other four provisions which are not pertinent concern permitted disclosures of PHI: (1) to the individual; (2) for treatment, payment, or health care operations; (3) consistent with the "minimum necessary" standard, where applicable; and (4) to other specified situations where the individual does not object to the use or disclosure. See *id.* § 164.502(a)(1)(i), (ii), (iii) and (v). The "minimum necessary" standard does not apply to disclosures pursuant to a signed authorization. *Id.* § 164.502(b)(2)(iii).

<sup>41</sup> *Id.* § 164.508(a)(1). An authorization can generally be revoked at the discretion of the individual who initially signed the authorization, unless the covered entity has taken action in reliance on the authorization. *Id.* § 164.508(b)(5)(i).

<sup>42</sup> These core elements include: (1) a specific and meaningful description of the information to be used or disclosed; (2) the name of people authorized to make the requested use or disclosure; (3) the name of people to whom the covered entity may make the requested use or disclosure; (4) a description of each purpose of the requested use or disclosure; (5) an expiration date or expiration event; and (6) signature of the individual or personal representative and the date. *Id.* § 164.508(c)(1)(i)-(vi). It is the last core element, the individual signature, which makes the authorization provisions so incompatible with the needs of most medical researchers dealing with massive data sets.

<sup>43</sup> The required statements are designed to place the individual on notice concerning his or her rights under the HIPAA Privacy Rule. They include: (1) a statement that the individual may revoke the waiver in writing; (2) a statement that treatment, payment, enrollment or eligibility is a condition or not a condition on such a waiver; and (3) a statement concerning the potential for PHI disclosure pursuant to the authorization to be redisclosed by the recipient and no longer be protected by the HIPAA Privacy Rule. *Id.* § 164.508(c)(2)(i)-(iii).

<sup>44</sup> *Id.* § 164.508(a)(1).

Not all uses and disclosures of protected health information, however, require an authorization from the affected individual. In addition to certain permitted uses and disclosures,<sup>45</sup> required disclosures,<sup>46</sup> and uses and disclosures requiring an opportunity for the individual to agree or to object,<sup>47</sup> the HIPAA Privacy Rule also establishes twelve categories of uses and disclosures for which an authorization or opportunity to agree or object is not required.<sup>48</sup> In other words, in these twelve categories, a covered entity is permitted to use or disclose PHI without an authorization; the authorization requirement in these cases is altered or modified.<sup>49</sup> The one exception to the authorization requirement which is of primary importance to this article is the so-called "research exception."<sup>50</sup> The next section explores the research exception to the authorization requirement and the manner in which IRBs and HPBs may be utilized to obtain a research waiver of the authorization requirement.

### III. THE RESEARCH EXCEPTION, IRBS, AND HPBS

#### A. *The Research Exception*

"Research" is defined by the HIPAA Privacy Rule as a "systematic investigation, including research development, testing,

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<sup>45</sup> *Id.* § 164.502(a)(1).

<sup>46</sup> *Id.* § 164.502(a)(2).

<sup>47</sup> *Id.* § 164.510.

<sup>48</sup> *Id.* § 164.512. For instance, exceptions exist for uses and disclosures required by law, concerning victims of abuse, neglect, or domestic violence, for judicial and administrative proceedings, and for law enforcement purposes. *Id.* § 164.512(a),(c), (e), and (f).

<sup>49</sup> *Id.* § 164.512.

<sup>50</sup> *Id.* § 164.512(i); see also *infra* Part III.A. Although some of the other categories may appear on their face to assist remote sensing researchers engaging in medical research (see, e.g., "public health activities" (*Id.* § 164.502(b)), "health oversight activities" (*Id.* § 164.512(d)), and "serious threat to health or safety" (*Id.* § 164.512(j))), these exceptions generally would not apply to remote sensing researchers engaging in medical research. For instance, the "public health activities" exception only applies to public health authorities authorized by law to collect or receive such information or other similar entities, see *id.* § 164.512(b)(1)(i)-(v), and the "health oversight activities" exception only applies to an health oversight agency engaged in oversight activities authorized by law. See *id.* § 164.512(d)(1)(i)-(iv). Most independent remote sensing researchers would not appear to come under these exceptions (with the notable exception of such individuals working for the Food and Drug Administration (FDA) or similar government health agency).

and evaluation, designed to develop or contribute to generalizable knowledge."<sup>51</sup> A covered entity may use or disclose PHI for research, regardless of the source of funding, in three different circumstances: (1) if an IRB or HPB approves a waiver of the authorization requirement; (2) if the scenario involves reviews merely preparatory to research; and (3) if the research concerns a decedent's health information.<sup>52</sup>

Proceeding in reverse order in examining these three types of research exceptions, a remote sensing researcher may only obtain PHI from a decedent for research purposes without obtaining an authorization if three additional conditions are met. First, the researcher must represent that the PHI is solely for research on the PHI of decedents.<sup>53</sup> Second, the researcher must provide documentation that the decedents in question are, in fact, dead.<sup>54</sup> Third, the researcher must explain why the decedents' PHI is "necessary" for research purposes.<sup>55</sup>

This third condition regarding the necessity of the decedent PHI for research purposes may prove to be the most difficult requirement to meet, depending on the predisposition of the covered entity to cooperate with the researcher. One can easily imagine where a health care provider, especially one who is gun-shy of HIPAA's well-publicized labyrinthine procedures, may say that no research is "necessary" under any circum-

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<sup>51</sup> *Id.* § 164.501. Such a broad definition would seem to clearly apply to all forms of remote sensing research.

<sup>52</sup> *Id.* § 164.512(i)(1)(i)-(iii). Another possible way to avoid the impact of the HIPAA Privacy Rule as a researcher is to "de-identify" the health information to be disclosed, thus making the information no longer "individually identifiable health information," and not subject to HIPAA generally. See 45 C.F.R. § 164.502(d); § 164.514(a), (b) (implementation specifications for de-identification). Although de-identification serves as a possible method by which remote sensing researchers may obtain relevant health information, in most cases the researchers will need demographic information concerning the individual (including their addresses) which will make it unlikely that the de-identified health information would be of much use to the researcher.

<sup>53</sup> *Id.* § 164.512(i)(1)(iii)(A). This requirement is needlessly confusing. Does it mean that one can only use decedent PHI for research purposes if the researcher represents that his or her research only concerns decedents or instead that the researcher must represent that the decedent PHI will not be used for non-research purposes? Either interpretation is certainly plausible, but the latter one seems more reasonable.

<sup>54</sup> *Id.* § 164.512(i)(1)(iii)(B). Morbid humor aside, one assumes that a death certificate will suffice in this regard.

<sup>55</sup> *Id.* § 164.512(i)(1)(iii)(C).

stance. In such instances, it is unclear in what manner an aggrieved researcher needing decedent PHI could challenge this determination. Nevertheless, to the extent a remote sensing researcher needs only decedent PHI to complete his or her research, it would appear, in most cases, that the HIPAA Privacy Rule would not pose insurmountable difficulties.<sup>56</sup>

With regard to reviews preparatory to research, the second type of research exception, the usefulness of this provision to remote sensing researchers is substantially limited. Under these provisions, use or disclosure is restricted to preliminary utilization of PHI to develop a research protocol or "for similar purposes preparatory to research."<sup>57</sup> This condition appears to leave little room for the more thorough research manipulation for which most remote sensing researchers would require PHI. This prong of the research exception is also hindered by the same "necessary" query surrounding decedent PHI.<sup>58</sup> As a result, this prong of the research exception provides little relief for the remote sensing researcher hoping to obtain PHI for medical research purposes.

Because the decedent and the preparatory language provisions are limited in their overall usefulness to remote sensing researchers seeking to obtain and use PHI for medical research, researchers most likely will have to attempt to comply with the remaining research exception, which requires either an IRB or HPB to sign off on a waiver of the HIPAA authorization requirement. Under the waiver prong, the burden appears to be on the *covered entity*, rather than the researcher,<sup>59</sup> in acquiring

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<sup>56</sup> Of course, this prong of the exception does not assist a remote sensing research needing to combine geospatial data with PHI concerning the living.

<sup>57</sup> *Id.* § 164.512(i)(1)(ii)(A).

<sup>58</sup> *Id.* § 164.512(i)(1)(ii)(C). A third condition is that no PHI may be removed by the researcher from the premises of the covered entity in the course of review. *Id.* § 164.512(i)(1)(iii)(B). Needless to say, it would be hard to perform effective research under this additional burdensome condition.

<sup>59</sup> In this regard, the statutory language states: "A covered entity may use or disclose protected health information for research, regardless of the source of funding of the research, provided that: (i) *Board approval of a waiver of authorization.* The covered entity obtains documentation that an alteration or waiver ... of the individual authorization [requirement] ... has been approved by either: (A) An Institutional Review Board (IRB) . . . , or (B) A privacy board . . ." *Id.* § 164.512(i)(1)(i)(A)-(B) (emphasis added). Compare this language to the decedent and preparatory language of the research excep-

documentation that an alteration to, or waiver of, the authorization requirement is necessary.<sup>60</sup>

### B. Institutional Review Boards (IRBs)

IRBs, unlike their HPB counterparts, are not new entities created by the HIPAA Privacy Rule. Indeed, IRBs have been around for quite a while and were created to protect research participants from risks surrounding human subjects research.<sup>61</sup> Not surprisingly, then, the HIPAA Privacy Rule not only requires IRBs to meet new privacy criteria established by the Rule, but also requires the IRB to conduct its waiver review in line with criteria already established under the so-called "Common Rule," also called the "Federal Policy for Protection of Human Subjects."<sup>62</sup>

Briefly,<sup>63</sup> an institutional review board "is a board, committee, or other group formally designated by an institution to re-

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tion in which the researcher must carry the burden of establishing that the requested PHI is "necessary" for the research purposes. *Id.* § 164.512(i)(1)(ii)(C), (iii)(C).

<sup>60</sup> *Id.* § 164.512(i)(1)(i)(A)-(B).

<sup>61</sup> See *IRB Fact Sheet*, *supra* note 24, at 1 (citing 45 C.F.R. Part 46 (Department of Health and Human Services Regulations for the Protection of Human Subjects) and 21 C.F.R. Parts 50 and 56 (Food and Drug Administration Regulations on Protection of Human Subjects)); see generally Office for Human Research Protections website, at <http://www.hhs.gov/ohrp/> (last visited Oct. 15, 2004) or the FDA Human Research website, at <http://www.fda.gov/oc/gcp> (last visited Oct. 14, 2004). Other federal and state laws may provide additional privacy limitations, which may not be waived by either an IRB or HPB. *IRB Fact Sheet*, *supra* note 24, at 1; see also *supra* note 9 (concerning HIPAA preemption).

<sup>62</sup> 45 C.F.R. § 164.512(i)(1)(A). Indeed, the HIPAA Privacy Rule does not change the composition or a number of procedural requirements that IRBs normally follow under the Common Rule when considering whether to approve proposed human subjects research. *IRB Fact Sheet*, *supra* note 24, at 3-4.

<sup>63</sup> A comprehensive recitation of all the regulations that typically apply to IRBs in human subjects research under the Common Rule is well beyond the scope of this article. For further information on this topic, see generally Judith F. Daar, Symposium, *Genetic Testing and Human Subjects Research*, 24 WHITTIER L. REV. 429 (2002); Bernard Lo, M.D. & Michelle Groman, Symposium, *NBAC Recommendations on Oversight of Human Subjects Research*, 32 SETON HALL L. REV. 493 (2002); Michael J. Malinowski, *Choosing the Genetic Makeup of Children: Eugenics Past, Present, and Future?*, 36 CONN. L. REV. 125 (2003); Nancy M. Pliske, *The Impact of the Privacy Rule on Research Activities*, 676 PLI/Pat 105 (2001) (published prior to August 2002 HHS modification of research waiver provisions); Daniel J. Powell, Symposium, *Using the False Claims Act as a Basis for Institutional Review Board Liability*, 69 U. CHI. L. REV. 1399 (2002).

view researching humans as subjects,"<sup>64</sup> and generally consists of at least five members with varying backgrounds to ensure complete and adequate review of the proposed research activities.<sup>65</sup> These IRBs are given broad authority to approve, disapprove, or modify, all research activities concerning the use of human research subjects, which are conducted or supported by federal departments or agencies.<sup>66</sup> Under the Common Rule, IRBs apply specified criteria to the proposed research to determine if the research in question should be approved.<sup>67</sup> Not only must an IRB initially approve human subjects research according to a defined set of criteria, it must periodically review the progress of the research.<sup>68</sup>

Even before the HIPAA Privacy Rule was contemplated, one of the criteria that IRBs applied to determine whether to approve human subjects research concerned the privacy of the human subject. The regulation in question provides that the research protocol must include, "adequate provisions to protect the privacy of subjects and to maintain the confidentiality of data."<sup>69</sup> Although it can be assumed that past IRBs sought to comply with this privacy standard in good faith; nevertheless, there did not exist either the comprehensive individual authorization requirements concerning PHI, nor provisions concerning

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<sup>64</sup> *IRB Fact Sheet*, *supra* note 24, at 2. The National Institute of Health's Fact Sheet underscores the importance of IRBs in stating that, "Every institution engaged in human subjects research conducted or supported by a Federal department or agency that has adopted the Common Rule (Federal Policy for Protection of Human Subjects) is required to designate one or more IRBs under an assurance of compliance." *Id.* Institutions covered by these regulations include hospitals, academic medical centers, and government units engaged in federally supported or conducted human subjects research. *Id.*

<sup>65</sup> *Id.* at 3. Not only is appointment to the IRB based on considerations of expertise, diversity, and experience, but at least one member must not be affiliated with the institution, one member must be from a scientific area, one member must be from a non-scientific area, and no member may have a conflict of interest. *Id.* at 3-4.

<sup>66</sup> *Id.* at 2.

<sup>67</sup> *Id.*

<sup>68</sup> *Id.*

<sup>69</sup> See 45 C.F.R. § 46.111(a)(7) (HHS provision); 21 C.F.R. § 56.111(a)(7) (FDA provision). The ambiguity inherent in legal standards relying upon "adequate provisions" language will be discussed in detail below. See *infra* Part IV.A.

the waiver of such requirements, prior to the effective date of the HIPAA Privacy Rule.<sup>70</sup>

Now, IRBs have been given the additional task to determine whether a covered HIPAA entity may release PHI without an individual's authorization for research purposes.<sup>71</sup> Although existing IRBs are most likely only to act on waiver of authorization requests in connection with research activities they already oversee,<sup>72</sup> IRB members will need to quickly familiarize themselves with the relevant substantive provisions of the HIPAA Privacy Rule. These provisions will require IRBs to produce documentation that establishes five specific conditions, in addition to any other existing requirements that may apply under the federal Common Rule.

First, the IRB waiver document must include a statement identifying the IRB and the date on which the waiver of the authorization requirement was approved.<sup>73</sup> Second, the waiver document must include "adequate assurances" that the IRB has determined that the release of the PHI to the researcher meets three express criterion: (1) the use of the PHI causes no more than a "minimal risk" to the privacy of individuals, based on the presence of an "adequate plan" (a) to protect identifiers from improper use,<sup>74</sup> (b) to destroy the identifiers at the earliest possible opportunity consistent with the conduct of the research,<sup>75</sup> and (c) to protect the PHI from improper reuse or disclosure to any other person or entity;<sup>76</sup> (2) the research could not be practi-

<sup>70</sup> The NIH Fact Sheet explains that the HIPAA Privacy Rule supplements previous HHS and FDA privacy provisions to ensure greater security of private health information. *IRB Fact Sheet*, *supra* note 24, at 2.

<sup>71</sup> All that being said, IRBs will not be responsible for ensuring compliance with other provisions of the HIPAA Privacy Rule. For example, IRBs will not be responsible for reviewing and approving individual authorizations to release PHI, only whether a waiver of the authorization requirement is appropriate under the circumstances. *Id.*

<sup>72</sup> *Id.*

<sup>73</sup> 45 C.F.R. § 164.512(i)(2)(i).

<sup>74</sup> *Id.* § 164.512(i)(2)(ii)(A)(1).

<sup>75</sup> *Id.* § 164.512(i)(2)(ii)(A)(2). Destruction of the identifiers within the released PHI need not occur to the extent that there is a health or research justification for retaining the identifiers or that such retention is required by law. *Id.*

<sup>76</sup> Again, there are exceptions to this general proscription against improper reuse or disclosure, including situations where such uses or disclosures are required by law, for authorized oversight of the research, or for other research for which the use of the PHI would be permitted by the HIPAA Privacy Rule. *Id.* § 164.512(i)(2)(ii)(A)(3).

cally done without a waiver;<sup>77</sup> and (3) the research could not practically be conducted without access to the PHI.<sup>78</sup>

Third, the IRB waiver documentation must include a brief description of the PHI for which access has been determined to be necessary.<sup>79</sup> Fourth, the documentation must contain assurances that the waiver has been approved under either normal<sup>80</sup> or expedited<sup>81</sup> review procedures already established by the Common Rule.<sup>82</sup> Fifth, and finally, the documentation supporting the waiver of the HIPAA individual authorization requirement must be signed by the chairman of the IRB, or a designee selected by the chairman of the IRB.<sup>83</sup> If all these conditions are met, the disclosure of the PHI to the researcher will be approved by the IRB, and the covered entity will be free to release the necessary PHI to the researcher without the researcher being required to obtain a HIPAA-compliant authorization from affected individuals.

### C. HIPAA Privacy Boards (HPBs)

So why does the HIPAA Privacy Rule also provide for HPBs in addition to already existing IRBs when a waiver of the HIPAA authorization requirement is at stake? Most simply, HPBs "do not exercise any other powers or authorities granted to IRBs under Federal laws relating to federally conducted or supported human subjects research and research involving products regulated by the Food and Drug Administration (FDA)."<sup>84</sup> Consequently, it is easier to establish an HPB if a researcher is not otherwise covered by federal human subjects research law. Thus, in situations in which a remote sensing

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<sup>77</sup> *Id.* § 164.512(i)(2)(ii)(B).

<sup>78</sup> *Id.* § 164.512(i)(2)(ii)(C).

<sup>79</sup> *Id.* § 164.512(i)(2)(iii). HHS has observed the researcher requesting the waiver of authorization may be in the best position to write the brief description of the PHI required by this section. HHS contemplates that the researcher could submit this information as part of the request for waiver approval. *Privacy Board Fact Sheet*, *supra* note 13, at 5.

<sup>80</sup> See generally 21 C.F.R. § 56.108; 45 C.F.R. § 108.

<sup>81</sup> See generally 21 C.F.R. § 56.110; 45 C.F.R. § 110.

<sup>82</sup> 45 C.F.R. § 164.512(i)(2)(iv).

<sup>83</sup> *Id.* § 164.512(i)(2)(v).

<sup>84</sup> *Privacy Board Fact Sheet*, *supra* note 13, at 2.



researcher is just obtaining health information records concerning past or current medical conditions, the HIPAA Privacy Rule allows an HPB to grant the necessary waiver of authorization without the researcher having to worry about complying with additional federal laws and regulations that apply to human subjects research.

In addition to not being subject to burdensome federal laws revolving around federal human subjects research, there are a number of other potential advantages to forming an HPB versus forming, or relying upon, an existing IRB.<sup>85</sup> For one thing, an HPB need only consist of at least two members, as opposed to the five member panels of an IRB.<sup>86</sup> Furthermore, the HIPAA Privacy Rule, in addition to a normal review procedure,<sup>87</sup> sets out a less burdensome expedited review procedure for cases in which there is only a "minimal risk" to the privacy of individuals involved.<sup>88</sup> In expedited instances, the Chair alone, or his or her designee, may grant the necessary waiver without convening the full HPB.<sup>89</sup>

Nevertheless, these additional advantages provided by the HPB provisions are still circumscribed by many of the same rules that apply to IRBs. For instance, as far as HPB membership is concerned, the HPB must produce the same documentation that establishes the five specific conditions discussed above in relation to an IRB.<sup>90</sup> These conditions also include the same three adequate assurances under which the HPB must deter-

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<sup>85</sup> An existing IRB set up at a given institution for one purpose does not preclude that same institution from establishing an HPB for another research purpose. IRBs and HPBs can coexist at the same institution. *See id.* at 3.

<sup>86</sup> *Id.* at 2; *see also* 45 C.F.R. § 164.512(i)(2)(iv)(B).

<sup>87</sup> The normal HPB review procedure requires that a majority of the HPB members be present, including one of whom satisfies the nonaffiliated criteria, and the waiver must be approved by the majority of the privacy board members present at the meeting, unless the HPB elects to utilize an expedited review. *See* 45 C.F.R. § 164.512(i)(2)(iv)(B).

<sup>88</sup> 45 C.F.R. § 164.512(i)(2)(iv)(C). The expedited procedures available for IRBs appear to be much more onerous for researchers to use than those expedited procedures established for HPBs under the HIPAA Privacy Rule. *See id.* § 164.512(i)(2)(iv)(A). For instance, to qualify for an expedited review by an IRB, one must fall within a list of categories of research established by the FDA. *See* 21 C.F.R. § 56.110(a),(b).

<sup>89</sup> 45 C.F.R. § 164.512(i)(2)(iv)(C). Nevertheless, that member must meet the unaffiliated criteria set forth in 45 C.F.R. § 164.512(i)(2)(iv)(B).

<sup>90</sup> *See supra* notes 70-80 and accompanying text.

mine that the release of the PHI in question is permissible.<sup>91</sup> Additionally, members of an HPB must have varying backgrounds and the requisite experience and knowledge,<sup>92</sup> including one of whom is not affiliated in any manner with the institution involved.<sup>93</sup> Similarly, no one may serve on the HPB if that person has a conflict of interest.<sup>94</sup>

All in all, however, the HPB appears to provide an easier procedural device for a remote sensing researcher to obtain the necessary waiver of authorization when individual authorizations for the release of PHI are impractical to acquire. Nonetheless, and as with the IRB provisions, there are many HPB provisions which may be subject to abuse and detrimentally impact the ability of a remote sensing researcher to obtain PHI to complete his or her geospatial research. The next Section explores some of these potential pitfalls and recommends a "special needs" approach consistent with Fourth Amendment privacy law.

#### IV. SWATTING THE MOSQUITO: A CONSTITUTIONAL-BASED OINTMENT

##### A. *The Mosquito: The Enigmatic Nature of the Research Waiver Approval Process Under the HIPAA Privacy Rule*

Not surprisingly, when the research waiver provisions were modified in August 2002 in response to growing criticism, they were still censured for being "confusing, redundant, and internally inconsistent."<sup>95</sup> Although HHS has since issued a number of guidance documents,<sup>96</sup> little comfort has been provided for IRB or HPB members who must implement the provisions. For instance, how does one know whether they are eligible for the

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<sup>91</sup> See *supra* notes 71-73 and accompanying text.

<sup>92</sup> 45 C.F.R. § 164.512(i)(1)(B)(1).

<sup>93</sup> *Id.* § 164.512(i)(1)(B)(2).

<sup>94</sup> *Id.* § 164.512(i)(1)(B)(3).

<sup>95</sup> See Scaraglino, *supra* note 20, at 566 (quoting Standards for Privacy of Individually Identifiable Health Information, 67 FED. REG. 53, 229).

<sup>96</sup> See generally *Understanding HIPAA*, *supra* note 9; *Privacy Board Fact Sheet*, *supra* note 13; *IRB Fact Sheet*, *supra* note 24.

quick, less expensive, expedited review procedure? This expedited review would appear to permit one, unaffiliated privacy board member to sign off on a disclosure of PHI for research purposes.<sup>97</sup> All that is known is that expedited review is permitted in cases in which "the research involves no more than *minimal risk* to the privacy of the individuals who are the subject of the protected health information."<sup>98</sup> Of course, the question is begged: What in the world is a "minimal risk"?

Although there is no definition provided in the expedited review section of the HIPAA regulations or in the guidance documents for this important terminology,<sup>99</sup> the same "minimal risk" language is used in discussing the waiver criteria for approving a waiver of authorization by either an IRB or HPB under normal review procedures. In this context, we are told that:

The use or disclosure of protected health information [must] involve[] no more than a *minimal risk* to the privacy of individuals, based on, at least, the presence of the following elements; (1) An adequate plan to protect the identifiers . . . ; (2) An adequate plan to destroy the identifiers at the earliest opportunity . . . ; and (3) Adequate written assurances that the protected health information will not be reused or disclosed to any other person or entity . . .<sup>100</sup>

At first sight, this language would suggest that these three waiver criteria create the floor for a HPB finding that the disclosure of certain research does not present more than a minimal risk to the privacy of the individual. But there are at least two problems with this reasoning. First, it makes the normal and expedited review procedures practically indistinguishable with regard to the minimal risk standard.<sup>101</sup> This result makes little sense since the normal review provisions specifically differentiates its procedures from the expedited review proce-

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<sup>97</sup> See *supra* note 9 and accompanying text.

<sup>98</sup> 45 C.F.R. § 164.512(i)(2)(iv)(C) (emphasis added).

<sup>99</sup> See 45 C.F.R. § 160.103; 45 C.F.R. § 164.501.

<sup>100</sup> *Id.* § 164.512(i)(2)(ii)(A)(1)-(3) (emphasis added).

<sup>101</sup> Of course, the normal review procedure would also require a statement that the research could not practically be conducted without the waiver and without access to and use of the protected health information. *Id.* § 164.512(i)(2)(ii)(B), (C).

dures.<sup>102</sup> Second, even if we were to make the three waiver criterion the *sine qua non* of meeting the minimal risk standard for expedited waiver purposes, these three criteria still require us to define the meaning of such imponderables as "adequate plan" or "adequate written assurances."

Again, a question is begged: "adequate" to whom? The notion that this determination may be based on little more than what an IRB or HPB member ate for breakfast<sup>103</sup> is more than a little disconcerting for those of us particular about such things as consistency and uniformity in the law. In short, we are left with highly-indeterminate legal standards, with no statutory definitions or precedent available for guidance, and whether PHI is permitted to be disclosed, and in how quickly a fashion this disclosure may proceed, may depend on nothing more than on how decisionmakers individually define "minimal risk," "adequate plan," or "adequate written assurances." Hardly the stuff to make remote sensing researchers rush to their nearest HIPAA covered entity, ask for the creation of an HPB, and then cross their fingers that their research meets the minimal risk/adequate plan/adequate assurances criteria of the HPB expedited review procedures.

*B. Proposed Constitutional-Based Ointment:  
A Fourth Amendment "Special Needs" Approach*

In deciding what would be a more appropriate approach to disclosure of PHI for research purposes than the current one, it is worthwhile to consider at least the following questions: How much value should we place on keeping our health records and information private? Is health information privacy so sacrosanct that we are willing to proscribe medical research that might assist in the eradication of diseases from which we and our loved ones now, or one day will, suffer? Are there not times when there is a substantial need for medical research to help

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<sup>102</sup> *Id.* § 164.512(i)(2)(ii)(B).

<sup>103</sup> See Frank B. Cross, *Decisionmaking in the U.S. Circuit Courts of Appeals*, 91 CAL. L. REV. 1457, 1464-65 (2003) (observing the common legal realist critique of judicial decision making).

fight a disease, but the inevitable price is the loss of some individual medical privacy?

My approach to these thorny questions is based on giving sufficient consideration to each of the competing interests and then attempting to balance these interests based on the specific circumstances of each PHI disclosure case. This balancing approach in the individual health privacy context is certainly not novel; it draws upon the Supreme Court's treatment of "reasonableness/special needs" cases<sup>104</sup> under the Fourth Amendment to the United States Constitution.<sup>105</sup> Even though the Fourth Amendment applies only to the federal government (and to the states through the Fourteenth Amendment),<sup>106</sup> and thus may not apply to a large number of remote sensing researchers seeking PHI for research purposes,<sup>107</sup> such a well-developed and well-established area of law nevertheless helps to fill in some of the more glaring gaps in the current version of the HIPAA Privacy Rule's research waiver provisions.

In "special needs" cases, the warrant and probable cause requirements of the Fourth Amendment are relaxed to permit the satisfaction of special government needs in carrying out governmentally-sanctioned searches of individuals and their effects.<sup>108</sup> In these cases, rather than require the government to

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<sup>104</sup> See *Griffin v. Wisconsin*, 483 U.S. 868, 875 (1987) (supervision of probationers constitutes "special need" requiring more relaxed rule for searches); *O'Connor v. Ortega*, 480 U.S. 709, 722 (1987) (the need of an employer to enter an employee's office, desk, or files comprises "special need" and no warrant is required); *New Jersey v. T.L.O.*, 469 U.S. 325, 340-41 (1985) (finding warrant requirement unsuited to school context because it unduly interferes with the maintenance of swift and informal disciplinary procedures).

<sup>105</sup> U.S. CONST. amend. IV ("The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.").

<sup>106</sup> See *Maryland v. Pringle*, 124 S. Ct. 795, 799 (2003) (citing *Mapp v. Ohio*, 367 U.S. 643 (1961)).

<sup>107</sup> The Fourth Amendment would presumably apply to remote sensing researchers employed by federal agencies, such as NASA, or state agencies, such as the Mississippi Bureau of Narcotics. It would not, however, apply to the purely private acts of remote sensing researchers. For an insightful discussion of the state action doctrine under the United States Constitution, see generally Erwin Chemerinsky, *Narrowing the State Action Doctrine*, 35 TRIAL 101 (1999).

<sup>108</sup> See Seth M. Haines, Comment, *Rounding Up The Usual Suspects: The Rights of Arab Detainees in a Post-September 11 World*, 57 ARK. L. REV. 105, 121 (2004) ("In spe-

obtain a warrant supported by probable cause before permitting such a search, the Supreme Court has permitted "reasonableness" to be the touchstone upon which the analysis revolves.<sup>109</sup> In turn, "whether a particular search meets the reasonableness standard 'is judged by balancing its intrusion on the individual's Fourth Amendment interests against its promotion of legitimate governmental interests.'"<sup>110</sup>

These "special needs" cases are, in fact, similar in orientation to the inquiry for research waivers under the HIPAA Privacy Rule. In each situation, a sensitive balancing of individual privacy interests in certain information must be weighed against some external (governmental or otherwise) need for that same information.<sup>111</sup> More specifically, in the HIPAA context, the question introduced may be "the single most important [one]

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cial needs cases, intrusions upon Fourth Amendment were allowed because they 'serve[d] special governmental needs, beyond the normal need for law enforcement . . .'" (quoting *Nat'l Treasury Employees Union v. Von Raab*, 489 U.S. 656, 665-66 (1989)) (alteration in original). The *Von Raab* Court stated, "our cases establish that where a Fourth Amendment intrusion serves special governmental needs . . . it is necessary to balance the individual's privacy expectations against the Government's interests to determine whether it is impractical to require a warrant or some level of individualized suspicion . . ." *Von Raab*, 489 U.S. at 665-66.

<sup>109</sup> See *Vernonia Sch. Dist. 47J v. Acton*, 515 U.S. 646, 652 (1995) ("As the text of the Fourth Amendment indicates, the ultimate measure of the constitutionality of a governmental search is 'reasonableness.'").

<sup>110</sup> *Id.* at 652-653 (quoting in part *Skinner v. Ry. Labor Executive Assn.*, 489 U.S. 602, 617 (1989)); see also *T.L.O.*, 469 U.S. at 337 (reasonableness depends on "balancing the need of the search against the invasion the search entails.") (quoting *Camara v. Mun. Ct.*, 387 U.S. 523, 536-37 (1967)). Specifically, the Court makes its reasonableness determination by weighing the nature and character of the individual's privacy interest against both the character of the intrusion by the government and the nature and immediacy of the government's concern. See generally *Vernonia*, 515 U.S. at 654-664; *Bd. of Educ. of Independent Sch. Dist. No. 92 v. Earls*, 536 U.S. 822, 829-838 (2002). In *Vernonia*, for instance, this balance was struck in favor of allowing the school district to implement a student athlete drug policy in a high school environment. See *Vernonia*, 515 U.S. at 663. In *Earls*, the Court extended *Vernonia* to permit drug testing to all students engaged in competitive extracurricular activities. See *Earls*, 536 U.S. at 830.

<sup>111</sup> Let me stress that this analogy to the Fourth Amendment only goes so far. Clearly, the HIPAA Privacy Rule does not normally concern criminal behavior, nor the potential of incarceration. Nevertheless, the schemata established by the "special needs" line of Fourth Amendment cases brings much needed clarity and simplification to the legal analysis surrounding research waivers under the HIPAA Privacy Rule.

raised in the 21st century by Americans, namely balancing... privacy concerns versus technological advancements."<sup>112</sup>

Under the special needs HIPAA balance, the nature of the individual's privacy interest in his or her medical records will always be strong, as individuals have significant and legitimate expectations of privacy in their PHI.<sup>113</sup> Nevertheless, as strong as that privacy interest is, in analogous contexts courts have recognized that others may have sufficient reason to justify intrusion into the private health records of an individual.<sup>114</sup> In the HIPAA research waiver context, if the character of the intrusion is minimally invasive (in that disclosure of the PHI is limited to a small number of researchers), and the nature and the immediacy of the concern is compelling (in that an epidemic of some sort is at hand), this might lead an IRB or HPB to permit the disclosure of PHI for research purposes.

More concretely, and starting where we began, the West Nile Virus example helps to illustrate how the "special needs" approach would apply in deciding whether to release medical information to a remote sensing researcher hoping to combine medical data with his or her geospatial research. To begin with, the individual privacy interest in their health records would be high.<sup>115</sup> Thus, an individual who has, or had, West Nile Virus, may be unwilling to sign an authorization to release their medical records for research purposes. Nevertheless, under a special

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<sup>112</sup> See *PPA Litigation*, 2003 WL 22203734, at \*8. "The more accessible that personal information becomes, the more critical it is to create intelligible guidelines to provide an equitable balance between the individual's interest in his or her privacy and the national interest, in this instance, [sic] HIPAA compliance." *Id.*

<sup>113</sup> As an example of the importance of the privacy of medical records, prior appellate decisions have held that the United States Constitution provides a qualified protection for medical records sought by search warrant or subpoena. See *In re Search Warrant (Sealed)*, 810 F.2d 67, 71-72 (3d Cir. 1987); *United States v. Westinghouse Elec. Corp.*, 638 F.2d 570, 577 (3d Cir. 1980). Of course, the HIPAA Privacy Rule itself is a strong indication of the strong federal policy in favor of protecting the privacy of individual health records. See *United States v. Sutherland*, 143 F. Supp. 2d 609, 612 (W.D. Va. 2001) (noting that the recent Health Insurance Portability and Accountability Act demonstrated "strong federal policy" of protecting medical records).

<sup>114</sup> See, e.g., *United States v. Mazzola*, 217 F.R.D. 84, 88-89 (D. Mass. 2003) ("[I]ndividual's privacy interest in medical records must be balanced against the legitimate need of others in obtaining disclosure.") (quoting *United States v. Polan*, 970 F.2d 1280, 1285 (3d Cir. 1992)).

<sup>115</sup> See *supra* note 113.

needs balancing test, the argument can be made that the character of the disclosure of the West Nile Virus PHI to the remote sensing researcher is minimally invasive, as the researcher may be able to limit his or her informational needs to the physical address of the individual, and may not need other demographic, sensitive information.

Moreover, the nature and immediacy of the researchers and the public's concern are substantial in light of the barrage of press coverage West Nile Virus has received in the last five years and the impact this disease had had, both physically and psychologically, on society in general.<sup>116</sup> Performing the special needs balancing in this manner, it appears that it would be reasonable for a HPB or IRB to grant a waiver to the normal authorization requirement and allow limited, specified disclosures of individual health information concerning an individual's contraction of the West Nile Virus. Although by no means empirically proven, my sense is that most people would be willing to agree to such a minimal intrusion into their health records if they believed that they, or their loved ones, could benefit from the eradication of a disease such as West Nile Virus.

The advantage of the "special needs" approach over the current "necessary and adequate" approach is obvious: there is a well-established and significant line of case law to which to analogize the situations that covered entities and remote sensing researchers are likely to find themselves in relation to the disclosure of PHI. On the other hand, as currently written, the HIPAA Privacy Rule provisions that shape IRB or HPB determinations are too ambiguous to properly place the competing interests to be balanced directly in front of the decisionmakers. There are simply no helpful definitions provided for these standards. The danger is that current waiver determinations will not be based on properly structured discretion, but rather on

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<sup>116</sup> A search of "West Nile Virus" on Westlaw's ALLNEWS database returned over 10,000 results on May 26, 2004. Some recent, representative press clippings include, Dan D'Ambrosio, *West Nile: Disease No One Can Figure Out How To Fight*, CAPITAL TIMES & WISCONSIN STATE JOURNAL, May 24, 2004, at A1; Edie Lau, *West Nile's Virulence in U.S. probed as new season nears*, CINCINNATI POST, May 20, 2004, at A22; Christopher Windham, *West Nile Vaccine Prompts Antibodies in Tests*, WALL ST. JOURNAL, May 25, 2004, at D3.



Board members' "gut" feelings; dissimilar results for similar factual scenarios being the unfortunate consequence.

Additionally, the current approach may lead remote sensing researchers to shy away from undertaking this important medical research if the procedural hurdles prove too difficult or unrewarding. For instance, having to proceed through the IRB or HPB process might both dramatically increase the time and expense associated with the collection of PHI. The unintentional consequence may be that remote sensing techniques that are essential to the eradication of a disease such as West Nile Virus might not be sufficiently utilized. In the end, of course, we will all be worse off if diseases like West Nile linger and continue to claim victims.

To avoid this unappealing scenario, this article proposes that the waiver approval process of the research exception to the HIPAA authorization requirement be modified to require both HPBs and IRBs to undertake a Fourth Amendment-type special needs analysis, with the concept of reasonableness at its foundation, in order to determine whether to disclose specific PHI to remote sensing researchers. Such a revamped, simplified procedure will have the advantage of being more time and cost-effective as time-tested legal analyses are applied in place of burdensome, technical provisions. This approach will also have the advantage of spurring additional remote sensing research in health-related areas.

## V. CONCLUSION

The challenge for those that administer the HIPAA Privacy Rule in the future will be to recognize that protecting patient health information is not an all or nothing proposition, but instead requires a nuanced and subtle approach which accommodates the competing interests at stake. By providing for the research exception and the related IRB and HPB waiver provisions in the HIPAA Privacy Rule, HHS seems to have already grasped this essential notion. Indeed, this article does not contest the basic approach that HHS has adopted in leaving waiver determinations to the individual IRBs and HPBs to decide under what conditions sensitive health information can be re-

leased for research purposes. Nevertheless, adoption of the proposed "special needs" analysis in place of the current "necessary and adequate" approach will substantially eliminate uncertainty for remote sensing researchers who will be increasingly utilizing medical records and information in conjunction with their remote sensing and geospatial research.

In the end, if IRBs and HPBs are successfully able to manage the balancing process through use of these clearer and simplified waiver standards, then society will surely reap the benefits of important new medical discoveries. This is because as more and more remote sensing researchers are able to access necessary medical research in a more timely and less expensive manner, diseases like West Nile Virus will more quickly become a distant memory of a less technologically-sophisticated past.

# AN INTERNATIONAL SPACE AUTHORITY: A GOVERNANCE MODEL FOR A SPACE COMMERCIALIZATION REGIME

Yun Zhao\*

## I. INTRODUCTION

For centuries, human beings have been viewing outer space as a source of inspiration. The launch of *Sputnik-1*<sup>1</sup> and Armstrong's walk on the Moon<sup>2</sup> marked the dawn of the space age. Technological developments have made exploration and use of outer space a reality. The race for accomplishment in outer space was a mark of the Cold War period. However, after the 1990s, the international political atmosphere fundamentally changed. Peace and Earth-bound development become main themes for State governments. The political change also substantially influenced the intended activities in outer space.<sup>3</sup> How to make full use of outer space in a peaceful way became the main concern of most space scientists, lawyers and practitioners. Outer space is replete with natural resources and the potential profits from the use of these resources justify commercializing outer space. The development of the legal regime for outer space rightly follows the evolution of space activities.

Recent developments in outer space signal the introduction of a new era in the rapidly developing field of space law. The 1998 Intergovernmental Agreement (IGA) provides the basic framework for establishing the International Space Station

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<sup>1</sup> Walter Sullivan, *Course Recorded-Navy Picks Up Radio Signals—4 Report Sighting Device*, N.Y. TIMES, Oct. 5, 1957, at A1.

<sup>2</sup> John Noble Wilford, *A Powdery Surface Closely Explored*, N.Y. TIMES, July 20, 1969, at A1.

<sup>3</sup> Frans G. von der Dunk, *Towards a European Space Agency, Mark II?*, 35 COLLOQUIUM ON THE LAW OF OUTER SPACE 172 (1992).

(ISS) and future commercial applications.<sup>4</sup> The successful trips of two space tourists to the ISS,<sup>5</sup> using the ISS for a global advertising campaign,<sup>6</sup> etc., further justify the diversified commercial potential of the ISS. This trend is not the end of the story. The successful launch of space stations that support humans has inspired China to establish a Chinese national space station in the near future.

While national governments remain as the primary entities undertaking responsibilities in outer space, private groups are increasingly getting involved in space activities. Throughout the 1980s, the government of the United States encouraged private enterprises to take the lead.<sup>7</sup> The lure for non-governmental entities is certainly present: the potential for profit is great in outer space.<sup>8</sup> Yet, the ambiguity in the existing legal regime for outer space remains an obstacle for further involvement of private parties.

The notion of States sharing a common interest in the exploration and use of outer space led the international community to declare outer space to be the "province of all mankind".<sup>9</sup> Some scholars have interpreted this to be the **functional and**

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<sup>4</sup> Agreement among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russia Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station, Jan. 29, 1998, Temp. State Department No. 01-52, CTIA No. 10073.000, available at 2001 WL 679938, (entered into force Mar. 27, 2001) [hereinafter IGA].

<sup>5</sup> Anna Badkhen, *US Tourist Arrives at Space Station: Tito is Greeted by Russians After Weekend Flight*, BOSTON GLOBE, May 1, 2001, at C4; *South African Tourist Docks at Space Station*, L.A. TIMES, Apr. 28, 2002, at A10; Sean R. Mikula, *Blue Helmets in the Next Frontier: The Future is Now*, 29 GA. J. INT'L & COMP. L. 531, 556-57 (2001).

<sup>6</sup> Henkel was the first company to use the ISS for advertisement: a set of Pritt gluesticks was tested by the cosmonauts under conditions of weightlessness and the experiments were filmed. Henkel later used the footage to produce TV commercials for the glue that works in space. See *World Wide Pritt—Space Proof Quality*, available at [http://www.prittworld.com/space\\_proof/index\\_hau.htm](http://www.prittworld.com/space_proof/index_hau.htm) (last visited Oct. 15, 2004).

<sup>7</sup> Anthony R. Filiato, *The Commercial Space Launch Act: America's Response to the Moon Treaty?*, 10 FORDHAM INT'L L.J. 763, 772 (1987).

<sup>8</sup> See Ty S. Twibell, *Space Law: Legal Restraints on Commercialization and Development of Outer Space*, 65 UMKC L. REV. 589, 591 (1997).

<sup>9</sup> See Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, art. I, 18 U.S.T. 2410, 610 U.N.T.S. 205 (entered into force on Oct. 10, 1967) [hereinafter Outer Space Treaty].

**legal equivalent** of "common heritage of mankind" (CHM),<sup>10</sup> which was officially introduced to the mineral resources of the Moon.<sup>11</sup> The use of the two terms above rightly shows the concerns of the international community as a whole. However, the ambiguity and ramifications of those terms have left space law as one of the least stable and clarified areas of international law. No treaties offer guidance on how to implement the CHM concept in outer space.

Actually, it is not the only area where the CHM concept is used. In the United Nations Convention on the Law of Sea (UNCLOS), deep seabed resources are also defined as CHM. A regime was established to realize the purpose of the term.<sup>12</sup> Part one of this paper compares the use of the term in the two regimes and discusses the feasibility of transplanting the model of deep seabed to outer space for the sole purpose of commercialization.

Part two discusses the term "common heritage of mankind" and its use in the two treaties: the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Treaty) and the UNCLOS. Part three addresses the establishment of the International Seabed Authority (Seabed Authority) and the realization of the purpose of the CHM. Part four suggests an International Space Authority (ISA) might be established, following the model of the deep seabed. The ISA can

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<sup>10</sup> The two terms, as applied in two different treaties for different purposes, cannot be used interchangeably. B. Maiorsky, *A Few Reflections on the Meaning and the Interrelation of "Province of All Mankind" and "Common Heritage of Mankind Notions"*, 29 COLLOQUIUM ON THE LAW OF OUTER SPACE 58-61 (1986). Nevertheless, the principles outlined in the Outer Space Treaty—for the benefit of all countries, free for exploration and use, on a basis of equality, free access, and not subject to national appropriation—form the heart of the CHM. Both terms share the following **functions**: apply to the exploitable space resources and protect the interests of technologically less advanced states. The CHM allegedly establishes a legal framework to implement the declaration in the Outer Space Treaty. See also Gijsbertha Cornelia Maria Reijnen, *THE UNITED NATIONS SPACE TREATIES ANALYZED* 96 (Kluwer ed., 1992); Sylvia Maureen Williams, *The Law of Outer Space and Natural Resources*, 36 INT'L & COMP. L.Q. 142, 145 (1987); Aldo Armando Cocca, *The Advances in International Law through the Law of Outer Space*, 9 J. SPACE L. 13, 16 (1981).

<sup>11</sup> Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 5, 1979, Art 11, U.N. GAOR, Doc. A/RES/34/68 [hereinafter Moon Treaty].

<sup>12</sup> United Nations Convention on the Law of the Sea, Dec. 10, 1982, art. 156, 1833 U.N.T.S. 3 (entered into force Nov. 16, 1994) [hereinafter UNCLOS].

the create a stable governance regime for private activities in outer space that will be acceptable to both developed and developing countries. Based on the analysis of these parts, part five reaffirms the necessity and feasibility of the establishment of the ISA to accommodate the commercialization trend in outer space.

## II. THE CONCEPT OF "COMMON HERITAGE OF MANKIND"

More than any technical challenge, the lack of legal stability is the primary impediment to the commercial development of outer space.<sup>13</sup> There are no insurmountable technological impediments to the exploitation of outer space resources. The restraints are imposed by policy, economics and law.<sup>14</sup> CHM was the chief source of confusion and uncertainty in the outer space legal regime. The use of this concept can resort to the Roman law theory of *res communis*, which was applied to community property that could not be owned by a person, a state, or a collection of states.<sup>15</sup> This concept was later applied to the Antarctic, the deep seabed and outer space.<sup>16</sup> However, the modern version has incorporated an additional element of reasonable use: *res communis* property still cannot be owned, but it can be used in an appropriate way to benefit mankind.<sup>17</sup>

There are five elements generally considered to be central to the modern application of the CHM concept: the area is not subject to national appropriation; all countries share in the management of the area; the benefits derived from exploitation

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<sup>13</sup> See generally Ty S. Twibell, *Circumnavigating International Space Law*, 4 ILSA J. INT'L & COMP. L. 259 (1997).

<sup>14</sup> Richard Berkley, *Space Law Versus Space Utilization: The Inhibition of Private Industry in Outer Space*, 15 WIS. INT'L L.J. 421, 428 (1997).

<sup>15</sup> Lea Brilmayer & Natalie Klein, *Land and Sea: Two Sovereignty Regimes in Search of a Common Denominator*, 33 N.Y.U. J. INT'L L. & POL. 703, 706-07 (2001); L. F. E. Goldie, *A Note on Some Diverse Meanings of "The Common Heritage of Mankind"*, 10 SYRACUSE J. INT'L L. & COM. 69, 81 (1983); See generally L. F. E. Goldie, *Title and Use (and Usufruct)—An Ancient Distinction Too Oft Forgotten*, 79 AM. J. INT'L L. 689 (1985).

<sup>16</sup> Oscar Schachter, *Philip Jessup's Life and Ideas*, 80 AM. J. INT'L L. 878, 894 (1986); Carl Q. Christol, *The Moon Treaty Enters into Force*, 79 AM. J. INT'L L. 163, 164 (1985).

<sup>17</sup> Mahdi El-Baghdadi, *The Seabed's Mineral Resources and the Conditions Affecting the Regime to Regulate Their Exploitation*, 26 J. WORLD TRADE 88 (1992).

of resources in the area must be shared with all regardless of the level of participation; the area must be dedicated to peaceful purposes; and the area must be preserved for future generations.<sup>18</sup>

Divergences exist concerning the detailed implementation of the CHM concept. The primary problems derive from its demand for a forced transfer of benefits in the name of equity and the legal uncertainty that this doctrine has engendered regarding private property rights and an international governance regime.<sup>19</sup> Developed and developing countries<sup>20</sup> hold totally different views towards the concept.<sup>21</sup> That is, the need to recover invested costs and return a profit to finance future activities *vs.* an opportunity to correct past inequalities and to redistribute global resources and wealth. Accordingly, some scholars have concluded that the divergence results from a conflict between the efficient allocation of communal resources and equitable allocation of these resources.<sup>22</sup>

Various scholars have deeply discussed their understandings of the CHM concept.<sup>23</sup> The discussions during the drafting of the UNCLOS led to the adoption of the governance regime: establishment of the Seabed Authority.<sup>24</sup> This body undertook

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<sup>18</sup> Barbara Ellen Heim, *Exploring the Last Frontiers for Mineral Resources: A Comparison of International Law Regarding the Deep Seabed, Outer Space and Antarctica*, 23 VAND. J. TRANSNAT'L L. 819, 827 (1990); see generally Christopher C. Joyner, *Legal Implications of the Concept of the Common Heritage of Mankind*, 35 INT'L. & COMP. L.Q. 190 (1986). R.J. Rao, RECENT TRENDS IN INTERNATIONAL SPACE LAW AND POLICY 195-99 (V.S. Mani ed. 1997).

<sup>19</sup> Kevin V. Cook, *The Discovery of Lunar Water: An Opportunity to Develop a Workable Moon Treaty*, 11 GEO. INT'L. ENVTL. L. REV. 647, 648 (1999).

<sup>20</sup> M.C.W. Pinto, *The Developing Countries and the Exploitation of the Deep Seabed*, 15 COLUM. BUS. L. REV. 30 (1980).

<sup>21</sup> Kelly M. Zullo, *The Need to Clarify the Status of Property Rights in International Space Law*, 90 GEO. L.J. 2413, 2424-26 (2002).

<sup>22</sup> Christopher M. Petras, "Space Force Alpha": *Military Use of International Space Station and the Concept of "Peaceful Purposes"*, 53 A.F. L. REV. 135, 151-52 (2002); Michael J. Finch, *Limited Space: Allocating the Geostationary Orbit*, 7 NW. J. INT'L L. & BUS. 788, 798 (1986).

<sup>23</sup> See Eric Husby, *Sovereignty and Property Rights in Outer Space*, 3 J. INT'L. L. & PRAC. 359, 369 (1994); 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. 347 (1995).

<sup>24</sup> UNCLOS, *supra* note 12, at arts. 159-69.

its duty from 1994 after several revisions of the original UNCLOS.

However, heated discussions did not lead to any substantial improvement in the legal regime accommodating the commercialization of outer space. Existing space law does not provide any guidance enabling the creation of an effective regime fostering commercial space exploitation.<sup>25</sup> Theoretical analysis did not come to any conclusion acceptable to all the parties.<sup>26</sup> Nevertheless, even with the unstable legal status in place, various parties, foreseeing potential profit, have started their own projects aiming at commercializing outer space. For example, the IGA provides a specific model for multinational cooperation among active participants without an overarching international legal and governance regime.<sup>27</sup> The United States has also executed a series of bilateral Memoranda of Understanding with Partner States concerning outer space activities.<sup>28</sup> With no clear-cut rules and regimes in place, the activities are carried out subject to Partner States' own interpretations. This is increasingly detrimental to the development of commercial activities in outer space. States can take actions at will and there are no defined rules governing their activities, which ultimately leads to the devastating result of a "gold rush" by space-faring states. Developing states will be completely left out of the game. Such a situation will fail to provide a predictable and stable environment which is necessary for the involvement of private entities, and will fail to win international approval.

While no theoretical framework can be agreed upon to govern the commercial activities in outer space,<sup>29</sup> states should

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<sup>25</sup> Keefe, *supra* note 23, at 357-58.

<sup>26</sup> Brian M. Hoffstadt, *Moving the Heavens: Lunar Mining and the "Common Heritage of Mankind" in the Moon Treaty*, 42 UCLA L. REV. 575, 581, note 30 (1994).

<sup>27</sup> See generally Lara L. Manzione, *Multinational Investment in the Space Station: An Outer Space Model for International Cooperation?*, 18 AM. U. INT'L L. REV. 507 (2002); Andrew D. Watson & William G. Schmidt, *Legal Issues Surrounding the International Space Station*, 7 USAFA J. LEG. STUD. 159 (1996).

<sup>28</sup> A. Farand, *Space Station Cooperation: Legal Arrangements*, in OUTLOOK ON SPACE LAW OVER THE NEXT 30 YEARS: ESSAYS PUBLISHED FOR THE 30<sup>TH</sup> ANNIVERSARY OF THE OUTER SPACE TREATY 153 (G. Lafferranderie & D. Crowther eds., 1997) [hereinafter OUTLOOK].

<sup>29</sup> The Moon Treaty has achieved so far only a very little number of ratifications. Neither developed nor even developing countries had become parties to the Treaty. The



adopt a pragmatic approach to deal with the issue. Simply put, they should start formulating a governance regime for the purpose of commercialization in outer space. Appropriate guidance could be formulated to accommodate the interests of different parties. Though some might argue that this approach is premature, the result is better than needless quarreling over the essentials of the concept. A good example has been set by the UNCLOS. States should follow similar steps and formulate a regime subject to further discussion and adoption.<sup>30</sup>

Based on the example of the deep seabed, it appears that CHM has lost much of its attraction for developing countries. The political and economic conditions that led to the UNCLOS have changed significantly. The treaties containing the concept of the CHM were argued vehemently in the politically tense atmosphere of the Cold War. The primary goal was to prevent the former Soviet Union and the United States from gaining a military advantage, rather than developing a regime that would support private development.<sup>31</sup> The end of the Cold War and the adoption of a market-economy approach by most developing countries has pushed the idea of capitalism and the free market approach into the limelight.<sup>32</sup> Through years of discussion, most scholars believe that the CHM, while maintaining some policy significance, lacks the force of accepted international law.<sup>33</sup> A great number of persons even consider the concept as meaningless and lacking no practical value.<sup>34</sup>

While continuing upholding the concept of CHM, the free-market approach plays an important role in devising the regime for the deep seabed. Most scholars believe that only by making full use of the resources in the deep seabed rather than estab-

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CHM concept in the Moon Treaty has long been and still is subject to different interpretations by developed and developing nations.

<sup>30</sup> 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, 739 (1986).

<sup>31</sup> Ezra J. Reinstein, *Owning Outer Space*, 20 NW. J. INT'L. L. & BUS. 59, 62 (1999).

<sup>32</sup> Jonathan I. Charney, *The United States and the Revision of the 1982 Convention on the Law of the Sea*, 23 OCEAN DEV. & INT'L. L. 279 (1992).

<sup>33</sup> Peter Malanczuk, *Actors: States, International Organizations, Private Entities*, in OUTLOOK, *supra* note 28, 32-33; Arthur W. Blaser, *The Common Heritage in its Infinite Variety: Space Law and the Moon in the 1990s*, 5 J. L. & TECH. 79, 93 (1990).

<sup>34</sup> Joyner, *supra* note 18, at 198.

lishing a regime installing commercial exploitation, can the living standards in all the Nations be effectively improved.<sup>35</sup> Acknowledging the benefits of commercial exploitation, all nations, developed and otherwise, have a basis to work together to find an appropriate resolution. Essentially, the same political and economic environment exists for outer space. A similar regime to that of the deep seabed could, thus, be possible for the exploitation of outer space resources. Consequently, the focus for now is to identify the legal mechanisms and political compromises that successfully resolved the CHM dilemma for the deep seabed and apply it to outer space. This is more efficient than developing new legal, economic, and political theories.

### III. THE INTERNATIONAL SEABED AUTHORITY

The Seabed Authority, established in 1994 under the UNCLOS, is an intergovernmental body.<sup>36</sup> It organizes and controls all mineral-related activities in the international seabed area beyond the limits of national jurisdiction.<sup>37</sup> Part XI of the Convention uses the CHM to preclude the deep seabed from national appropriation.<sup>38</sup> It is Part XI that has caused the most debate and is the principal obstacle to U.S. ratification of the Convention.<sup>39</sup>

The Authority is responsible for licensing and regulating mineral exploration and exploitation of the seabed beyond the limits of national jurisdiction.<sup>40</sup> According to Part XI, a multinational mining company is created to participate in mining activities in competition with private companies licensed by the Authority.<sup>41</sup> Access to the resources is prohibited if not approved

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<sup>35</sup> Glenn H. Reynolds, *Outer Space and Peace: Some Thoughts on Structures and Relations*, 59 TENN. L. REV. 723, 731 (1992).

<sup>36</sup> *International Seabed Authority: From Wikipedia, The Free Encyclopedia*, at [http://en.wikipedia.org/wiki/International\\_Seabed\\_Authority](http://en.wikipedia.org/wiki/International_Seabed_Authority) (last visited Aug. 3, 2004) [hereinafter *Encyclopedia*].

<sup>37</sup> *Id.*

<sup>38</sup> UNCLOS, *supra* note 12, at art. 136-37.

<sup>39</sup> Charney, *supra* note 32, at 280.

<sup>40</sup> UNCLOS, *supra* note 12, at art. 156.

<sup>41</sup> *Id.* at art. 170.

by the licensing authority.<sup>42</sup> Applicants are required to present two sites of roughly equal value.<sup>43</sup> The Authority may reserve one site for its own use.<sup>44</sup> Furthermore, the Authority is empowered to collect fees from the licensees and to distribute funds in excess of that necessary to cover its operating expenses to developing countries.<sup>45</sup> Other provisions in the Convention include a decision-making process<sup>46</sup> and the transfer of technology to member states.<sup>47</sup>

Part XI is the subject of heated discussion. The absence of customary international law on the particular question of mining resources from the deep seabed<sup>48</sup> made Part XI of the Convention all the more important.<sup>49</sup> No doubt, the Convention acknowledges the CHM,<sup>50</sup> and the Authority is created to realize the purpose of the CHM.<sup>51</sup> However, the controversy exists concerning the level of control exercised by the Authority and its preferential treatment for developing countries.<sup>52</sup> Several provisions of the Convention were considered to deter the development of natural resources: the imposition of specific production guidelines and limits;<sup>53</sup> requirements of mandatory private technology transfer and benefit sharing;<sup>54</sup> the failure to give a valid decision-making role to the countries actively involved in the mining of deep seabed resources;<sup>55</sup> and the failure to provide

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<sup>42</sup> *Id.* See also Cook, *supra* note 19, at 680.

<sup>43</sup> UNCLOS, *supra* note 12, at art. 8.

<sup>44</sup> *Id.*

<sup>45</sup> UNCLOS, *supra* note 12, at art. 173.

<sup>46</sup> *Id.* at art. 159.

<sup>47</sup> *Id.* at art. 144; art. 5, Annex III.

<sup>48</sup> Patricia Minola, *The Moon Treaty and the Law of the Sea*, 18 SAN DIEGO L. REV. 455, 459-60 (1981).

<sup>49</sup> Cook, *supra* note 19, at 681-82.

<sup>50</sup> UNCLOS, *supra* note 12, at art. 136.

<sup>51</sup> *Id.* at art. 157.

<sup>52</sup> The U.S. and the European Community were both against Part XI. See James L. Malone, *The United States and the Law of the Sea*, 24 VA. J. INT'L L. 785, 786 (1984); Michael Hardy, *The Law of the Sea and the Prospects for Deep Seabed Mining: The Position of the European Community*, 17 OCEAN DEV. & INT'L L.J. 309, 314 (1986).

<sup>53</sup> UNCLOS, *supra* note 12, at arts. 6-7, Annex III.

<sup>54</sup> *Id.* at art. 5, Annex III.

<sup>55</sup> UNCLOS, *supra* note 12, at art. 159.

assured access to qualified deep seabed companies to conduct mining activities.<sup>56</sup>

Negotiations continued until the adoption of the 1994 Agreement relating to the Implementation of Part XI (seabed provisions) of the Convention.<sup>57</sup> The difficulties posed by the CHM are in the process of being successfully resolved. The original divergence between developed and developing countries was reconciled when voluntary multilateral agreements were reached by the developed countries and their mining companies in the 1980s and also by discussions initiated by the Secretary-General of the UN in the early 1990s.<sup>58</sup> While maintaining strong opposition before 1994 to the adoption of the Part XI of the Convention, the US signed the new Agreement, enabling it to provisionally apply the seabed-related portion of the Convention and to participate in the work of the Authority.<sup>59</sup>

While reaffirming that deep seabed and its resources are CHM, the new Agreement establishes rules and procedures governing the exploitation of those resources, which rightly resolve the concerns of developed countries. The following summarizes the important changes in the new Agreement.

First, a consensus-based decision-making process took the place of the one-member, one-vote system. Representation on the Council is evenly distributed among different categories of members. Only when consensus is not possible, should the decision be made by a two-thirds majority vote.<sup>60</sup> Second, a market-oriented approach was adopted to resolve the issue of technology transfer. The application fee and the annual fees are reduced.<sup>61</sup> Developing countries can obtain technology on fair and reason-

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<sup>56</sup> Charney, *supra* note 32, at 286; Heim, *supra* note 18, at 828.

<sup>57</sup> Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, with Annex, July 28, 1994, 1836 UNTS 41, reprinted in 33 I.L.M. 1309 (1994). The Annex entered into force on July 28, 1996 [hereinafter Annex].

<sup>58</sup> Charney, *supra* note 32, at 287; James H. Andrews, *US Changes Tack on Ocean Treaty*, CHRISTIAN SCIENCE MONITOR, May 18, 1994, at 8.

<sup>59</sup> Marjorie Ann Browne, *Law of the Sea: the International Seabed Authority—Its Status and U.S. Participation Therein*, Sept. 16, 1996, available at <http://www.ncseonline.org/NLE/CRSreports/Marine/mar-22.cfm?&CFID=16587223&CFTOKEN=99935987> (last visited Oct. 18, 2004).

<sup>60</sup> UNCLOS, *supra* note 12, at art. 3, Annex III.

<sup>61</sup> Annex, *supra* note 57, § 8.

able commercial terms.<sup>62</sup> Production ceilings are abolished. Third, the Agreement provides that subsidization or any other discriminatory practices shall not be applied in the development of deep seabed resources.<sup>63</sup> Furthermore, fifteen-year timetables, instead of five-year, were provided for the approval of proposed exploration work plans, thus providing economic certainty for investors.<sup>64</sup>

The modifications adopted in this Agreement are relevant to the discussion regarding outer space, which has characteristics similar to the deep seabed. This similarity forms the basis for employing the model and style of deep seabed governance to outer space. The improvements in the new Agreement are considered in the discussion on formulating a governance system for outer space.

#### IV. ESTABLISHMENT OF THE INTERNATIONAL SPACE AUTHORITY

Realizing the commercial potential of outer space is an issue in need of urgent resolution. It is important to devise a regime for the exploitation of outer space by reaching a balance between protecting the profits of relevant exploiting entities and serving the interests of humankind.<sup>65</sup> While previous discussions focused on the theoretical framework of the CHM concept, it is the purpose of the present paper to focus on establishing a governance regime based on the successful example of the Seabed Authority. Discussions concerning the use of CHM will continue, just like the situation regarding the deep seabed: heated discussions continued even after the Seabed Authority was established and commercial activities began. Nonetheless, the existence of a stable governance regime can, as in the case of the deep seabed, enhance the confidence of space investors and promote further development of commercial space activities.

The deep seabed and space share the following similarities: they have potentially valuable natural resources; they both re-

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<sup>62</sup> *Id.* § 5.

<sup>63</sup> *Id.* § 6.

<sup>64</sup> *Id.* § 2.

<sup>65</sup> David Tan, *Towards a New Regime for the Protection of Outer Space as the "Province of All Mankind"*, 25 YALE J. INT'L L. 145, 193 (2000).

quire high technology and sufficient financial backing for exploration; and activities in the two areas should be carried out for the benefit of all humankind. The main difference between them is their geographical locations. However, this will not require a significant or substantial impact on the final rules and the regime adopted governing space activities.<sup>66</sup> Space law has therefore been largely influenced by factors similar to the deep seabed.<sup>67</sup>

The Moon Treaty did not create an international regime, but it requires that States party to the agreement do so "as such exploitation is about to become feasible".<sup>68</sup> Witnessing the rapid development of outer space activities, it is time for space lawyers to take a pragmatic approach. Theoretical discussions are beneficial to the clarification of the CHM concept. However, commercial activities will proceed and will not wait for the final resolution of the issue. It is thus all the more important to start devising a regime as required by space commercial activities. Commercial projects had actually started before reaching the final stage of the ISS: the sending of the two space tourists to the ISS meant even more for the future.<sup>69</sup>

## V. GUIDELINES

The original text of the UNCLOS on the deep seabed was not well received in several aspects.<sup>70</sup> Only after making several amendments did the governance regime for the deep seabed re-

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<sup>66</sup> The rules and the regime for both areas share the same purpose: to create a stable and equitable legal environment where the financial risks are tempered and property rights are protected. Governance regimes for both areas can provide economic incentives necessary to promote and sustain the development of commercial activities. Accordingly, economic and equitable considerations are most important in devising a governance regime.

<sup>67</sup> Husby, *supra* note 23, at 362.

<sup>68</sup> Moon Treaty, *supra* note 11, at art. 11. It provides that "States Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the exploration of the natural resources of the moon as such exploitation is about to become feasible."

<sup>69</sup> See generally R. Thomas Rankin, *Space Tourism: Fanny Packs, Ugly T-Shirts, and the Law in Outer Space*, 36 SUFFOLK U. L. REV. 695. (2003).

<sup>70</sup> Edith Brown Weiss, *International Environmental Law: Contemporary Issues and the Emergence of a New World Order*, 81 GEO. L.J. 675, 704 (1993).

ceive wide acceptance. It is thus important to bring the disputed issues to notice before formulating a similar regime for outer space. No doubt, the CHM is the underlying principle guiding the formulation of these rules.<sup>71</sup> Several guidelines should be further formulated for better implementation of the CHM.

First, the proposed ISA should have a Council consisting of a wide and balanced representation in the decision-making process. Similar to the Seabed Authority, representation on the Council should consist of thirty-six members, and be distributed as follows: four from the largest consumers or importers of products; four from among the largest exporters of products; four from among those States that have made the largest investments in preparation for commercial activities in the area; six from developing countries; and the rest selected to achieve equitable geographical distribution.<sup>72</sup> Consensus should be the primary mechanism in decision-making. Where consensus is not possible, then a decision should be made by a two-thirds majority of the Council.<sup>73</sup>

Second, technology transfer to developing countries should not be obligatory. Modern technologies represent valuable assets that must be equally protected by existing laws governing intellectual property rights.<sup>74</sup> The entities, having worked, risked, and spent money on research and development, should be allowed to maintain their technologies and retain any profits from them.<sup>75</sup> Developing countries should obtain technology at market price, but the price should be fair and reasonable. Other ways can be formulated to promote the transfer of technology to developing countries, such as establishment of joint ventures with developing countries. Furthermore, as a balance to benefit the exploring entities and States, rules regarding economic assistance to developing countries, especially to those having been seriously affected by the commercial activities in outer space, should be formulated. A special fund can be established to assist

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<sup>71</sup> *Encyclopedia*, *supra* note 36.

<sup>72</sup> Annex, *supra* note 57, § 3(15).

<sup>73</sup> *Id.* § 3 (2), (3).

<sup>74</sup> Roger K. Hoover, *Law and Security in Outer Space from the Viewpoint of Private Industry*, 11 J. SPACE L. 115, 122-24 (1983).

<sup>75</sup> *Id.* at 118.

economic development in these countries; the funds can be levied from payments received from contractors', including the exploring entities', voluntary contributions.

Third, a free-market approach should be adopted. Formerly, national governments have been the main body responsible for space activities. Government regulation has resulted in a poorly managed space industry with little accountability for failures.<sup>76</sup> When private entities become increasingly involved in this field, a free-market approach has been called on. As claimed by Fountain, 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.<sup>77</sup> Exploitation of outer space resources should thus be based on commercial principles: anti-competitive practices, such as subsidization and discriminatory treatment should not be permitted during the process of commercializing outer space. Important rules in the World Trade Organization concerning liberalization of relevant markets, such as the principle of national treatment<sup>78</sup> and rules on monopolies and exclusive service providers,<sup>79</sup> should also be applied.

Fourth, closely related to the last point, transparency in granting access should be advocated. Transparency measures, as an important mechanism of both reassurance and verification when linked to cooperative obligations, serve to demonstrate peaceful intent, good faith and ongoing compliance with the rules.<sup>80</sup> Basically, commercial ventures will be the most important vehicles for future space activities. Equal access to outer space resources should be well available and guaranteed.<sup>81</sup> Procedures for approval of new applications should be in place. The availability of accurate information on space resources is also

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<sup>76</sup> Lynn M. Fountain, *Creating Momentum in Space: Ending the Paralysis Produced by the "Common Heritage of Mankind" Doctrine*, 35 CONN. L. REV. 1753, 1774-75 (2003).

<sup>77</sup> *Id.*

<sup>78</sup> See General Agreement on Trade in Services, Apr. 15, 1994, art. 17, reprinted in 33 ILM 1168.

<sup>79</sup> *Id.* at art. 8.

<sup>80</sup> Nina Tannenwald, *Law Versus Power On the High Frontier: The Case for a Rule-Based Regime for Outer Space*, 29 YALE J. INT'L L. 363, 419 (2004).

<sup>81</sup> Outer Space Treaty, *supra* note 9, at art. 1.



vital to the success of exploitation. Accurate information can enable private entities to plan efforts, deploy assets effectively, and reduce costs and risks.<sup>82</sup> Thus, transparency and easy access to information relevant to space exploitation should be provided.<sup>83</sup>

Fifth, the proposed body should try to balance the interests of exploring countries and developing countries.<sup>84</sup> The Outer Space Treaty establishes that all nations, on the basis of equality and without discrimination, are free to explore and use outer space. Exploration and use must be for the benefit of all countries, irrespective of their economic or scientific development.<sup>85</sup> However, in view of the fact that only a few nations have the ability to carry out space activities, the proposed body should offer exploring countries efficient guidance and impetus to develop their programs and conduct their activities in space.<sup>86</sup> The point here is to balance equity and efficiency.<sup>87</sup> While addressing the economic development of developing countries, an equitable and efficient governance regime should also be able to guarantee a sufficient return on investments<sup>88</sup> and enough profits for exploring entities in successful space activities.<sup>89</sup> Failing the latter can deter commercial activities in space. To promote fairness and maintain control, it is advisable to limit the years of the continued use of resources. Once the initial period expires, the private entity can apply for an extension of its license. On the other hand, the system of payments to the body should be

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<sup>82</sup> See for example, Sergio Marchisio, *Remote Sensing for Sustainable Development*, in *OUTLOOK*, *supra* note 28, at 348.

<sup>83</sup> See International Law Association Resolution 1/2002: Space Law (2002) [ILA Resolution].

<sup>84</sup> Outer Space Treaty, *supra* note 9, at art. 9.

<sup>85</sup> *Id.* at art. 1.

<sup>86</sup> James S. Trimble, *The International Law of Outer Space and Its Effect on Commercial Space Activity*, 11 PEPP. L. REV. 521, 530 (1984).

<sup>87</sup> This point was made in the context of geosynchronous orbital slots, but it applies equally to many other outer space resources. Finch, *supra* note 22, at 798. It also applies to the deep seabed. See Marietta Benko & Kai-Uwe Schrogl, *Article I of the Outer Space Treaty Reconsidered After 30 Years*, in *OUTLOOK*, *supra* note 28, at 69.

<sup>88</sup> Robert Rachlin, RETURN ON INVESTMENT STRATEGIES FOR DECISION-MAKING 2 (1987).

<sup>89</sup> Lawrence L. Risley, *An Examination of the Need to Amend Space Law to Protect the Private Explorer in Outer Space*, 26 W. ST. U. L. REV. 47 (1998-1999).

fair and reasonable.<sup>90</sup> The level of payments should be based on several factors: the investment made, profitability, the environment affected; the economic situation of affected States, etc. For this purpose, a special Finance Committee should be established to oversee financial issues. The body should monitor the development of outer space activities, establishing the level of payments in proportion to the scope of outer space activities.

Finally, while acknowledging that economic gain is the primary purpose for developing space resources, the proposed body should offer the opportunity to create a new paradigm that avoids past conflicts and promotes peace.<sup>91</sup> Ideally, space activities should be carried out in the interests of maintaining international peace and security.<sup>92</sup> Peaceful use of outer space, being the basic principle in international space law, should be upheld.<sup>93</sup> Particular attention should be paid to illegal activities, such as terrorist activities, that might be carried out in the name of commercialization. Furthermore, as provided in the Outer Space Treaty, States should pursue studies and conduct exploration of outer space so as to avoid harmful contamination and also adverse changes in the environment of the Earth.<sup>94</sup> Accordingly, the body should promote a co-operative environment for commercialization, reduce environmental impacts on Earth, and protect the terrestrial environment.<sup>95</sup>

## VI. FORMULATION OF THE SPACE AUTHORITY

Several approaches have been suggested as institutional models for an ISA. They range from one similar to the Seabed

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<sup>90</sup> Carl Q. Christol, *Commercial Uses of Outer Space: Highlights of American Policies*, 10 ANNUAIRE DE DROIT MARITIME ET AEROSPATIALE 348 (1989); Carl Q. Christol, *The Common Heritage of Mankind Provision in the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, 14 INT'L. LAW. 429, 473 (1980). Private entities need attractive return on their research and development investment. See Richard A. Posner, *The Material Basis of Jurisprudence*, 69 IND. L.J. 1, 10 (1993).

<sup>91</sup> Reynolds, *supra* note 35, at 726.

<sup>92</sup> Outer Space Treaty, *supra* note 9, at art. 3.

<sup>93</sup> Fountain, *supra* note 76, at 1761-62.

<sup>94</sup> Outer Space Treaty, *supra* note 9, at art. 9.

<sup>95</sup> We should avoid a regime that will ultimately mirror the over-exploitation of resources and environmental havoc we have wreaked on Earth. See Fountain, *supra* note 76, at 1760.

Authority, to one that is more scientifically and technologically oriented to one that would serve as a subsidiary body under the International Civil Aviation Organization.<sup>96</sup> So what style should be adopted? The basic purpose of the proposed body is to have jurisdiction over development and exploitation of outer space resources for the benefit of all humankind.<sup>97</sup> An international authority will result in a more equitable distribution of benefits than will a private enterprise regime, which conversely might create a monopoly over space resources and exclude other public and private entities.<sup>98</sup> It is, thus, advisable that the body be an international governmental authority to which all countries can be members.

The UN is institutionally weak and incapable of enforcing any mandate;<sup>99</sup> while maintaining responsibility in a wide range of activities, it cannot respond effectively to resource development on celestial bodies.<sup>100</sup> Nevertheless, the UN is the body maintaining an important position in procuring the benefits of the international society. Therefore, it is necessary for the proposed body to have a relationship agreement with the UN. Considering similar political, economic and legal backgrounds, formulation of a body similar to the Seabed Authority is an appropriate means to reach a balance among developing and developed countries.

Two organs, the Assembly and the Council, can be established under the proposed ISA.<sup>101</sup> In the Assembly, all the mem-

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<sup>96</sup> Rao, *supra* note 18, at 205-06; see also Gennady M. Danilenko, *SPACE LAW: VIEWS OF THE FUTURE* 106-07 (Zwann, ed. 1988); A.S. Piradov, *Creating a World Space Organization*, 4 *SPACE POLY* 112 (1988); V. Vereschetin & E. Kamenetskya, *On the Way to a World Space Organization*, 12 *ANNALS AIR & SPACE L.* 337 (1987).

<sup>97</sup> G.A. Res. 1348, 13 U.N. GAOR Supp. (No. 18) at 5, U.N. Doc. A/4090 (1958).

<sup>98</sup> Fred Kosmo, *The Commercialization of Space: A Regulatory Scheme that Promotes Commercial Ventures and International Responsibility*, 61 *S. CAL. L. REV.* 1055, 1080-82 (1988); see also Berkley, *supra* note 14, at 437-38.

<sup>99</sup> Berlin & L. I. Tennen, *The Role of the United Nations in Colonization of Outer Space, or Chicken Little was Right*, 19 *COLLOQUIUM ON THE LAW OF OUTER SPACE* 215 (1977).

<sup>100</sup> Moses Moskowitz, *THE ROOTS AND REACHES OF UNITED NATIONS ACTIVITIES AND DECISIONS* 8 (1980).

<sup>101</sup> The Authority could have a secretariat. See Bruce Stockfish, *Space Transportation and the Need for New International Legal and Institutional Regime*, 17 *ANNALS AIR & SPACE L.* 359 (1992).

bers would be represented. It will formulate policy, elect officers, and approve budgets and rules. The Council elected by the Assembly, would be selected according to a formula ensuring equitable representation of countries from various groups. The Council is the executive body and responsible primarily for the administration of the space activities regime.

As discussed above, a Finance Committee can be established to take the role of financial and budgetary arrangements, including the draft financial rules, regulations, procedures of the organs, the financial aspects of the Authority's work, assessed contributions of the Authority's Members, project application fees and renewal fees, and most importantly, the level of payments (possibly in the form of tax) from exploring entities. The fees collected would be the Authority's primary source of income, covering its administrative costs, budgets for public research, and other activities.<sup>102</sup>

Taking the model of the Seabed Authority, a Legal and Technical Commission can be instituted, consisting of persons with appropriate qualifications relating to exploration, exploitation and processing of resources, environmental protection, and economic or legal matters relating to outer space. This Commission will undertake the task of supervising exploration and commercial activities, assessing the environmental impact of such activities, and making recommendations on environmental protection in outer space.<sup>103</sup>

A licensing system should be instituted.<sup>104</sup> An entity planning to exploit outer space resources should submit its proposal to the Authority and the Authority should have the power to decide on granting the request or not. The decision should be made based upon previously-determined criteria. A license could be renewed or revoked. No permanent property rights would be conferred by the license. Only the resources exploited by the licensed entity would come under its exclusive control.<sup>105</sup>

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<sup>102</sup> See IGA, *supra* note 4, at art. 15.

<sup>103</sup> *Id.* at art. 14, para. 4-5.

<sup>104</sup> See ILA Resolution, *supra* note 83.

<sup>105</sup> Allen Duane Webber, *Extraterrestrial Law on the Final Frontier: A Regime to Govern the Development of Celestial Body Resources*, 71 GEO. L.J. 1427, 1453-54 (1983).

The ISA would operate by contracting with private and public corporations and entities authorized to conduct specific activities and exploitation in outer space. The detailed tasks and duties of the ISA can follow the example of the Seabed Authority, subject to relevant modifications according to the specific situation in outer space.<sup>106</sup>

## VII. CONCLUSION

Outer Space and its resources have been widely considered as the Common Heritage of Mankind. The concept of CHM *per se* has resulted in serious discussions. The ambiguous term is argued to be the obstacle to the commercial use of outer space.<sup>107</sup> In the absence of definite property rules and an enforcement authority, there is likely to be chaos in the commercialization of outer space. Both developing and developed countries recognize the importance of a stable regime fostering the exploration and development of outer space.<sup>108</sup> Some scholars have rightly suggested that it is time for scientists, engineers, lawyers, and management experts to develop a workable set of guidelines for space commercialization.<sup>109</sup>

A pragmatic approach is proposed in the present paper. The progress made on the UNCLOS led to an improved understanding of the CHM and suggests that the differences between developing and developed countries can be reconciled. While leaving the theoretical discussion of the term unresolved, formulation of an international body to address the use of outer space resources can begin. Whatever form it takes, the body should be able to address and further the common, equitable interests of the developing countries (the non-space powers), and the interests of developed countries (the space powers).<sup>110</sup> The proposed

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<sup>106</sup> Annex, *supra* note 57, at art. 1.

<sup>107</sup> Kosmo, *supra* note 98, at 1067.

<sup>108</sup> Webber, *supra* note 105, 1432-33.

<sup>109</sup> Eilene Galloway, *Status of the Moon Treaty*, SPACE NEWS, Aug. 3-9, 1998, at 21-22; Bin Cheng, *The Commercial Development of Space: The Need for New Treaties*, 19 J. SPACE L. 17, 43 (1991).

<sup>110</sup> Harinderpal Singh Rana, *The "Common Heritage of Mankind" & The Final Frontier: A Revaluation of Values Constituting the International Legal Regime for Outer Space Activities*, 26 RUTGERS L.J. 225, 250 (1994).

governance regime will try to encourage the beneficial aspects of property rights and formulate rules that discourage conflict and predation.<sup>111</sup>

While following the example of Seabed Authority, this paper proposes the establishment of an International Space Authority. The commercialization of outer space is no longer a fantasy. There is an urgent need to take a practical look at the issue and formulate feasible rules and organs to guard against taking the wrong direction. Humankind has taken the first tentative steps laying the technological foundation for commercial expansion. The challenge lying ahead is to build on the existing technological foundation and create the appropriate legal regime that will support and encourage this expansion.

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<sup>111</sup> Glenn Harlan Reynolds, *International Space Law: Into the Twenty-First Century*, 25 VAND. J. TRANSNAT'L L. 225 (1992).

## CASE NOTE

### ***NEMITZ v. UNITED STATES, A CASE OF FIRST IMPRESSION: APPROPRIATION, PRIVATE PROPERTY RIGHTS AND SPACE LAW BEFORE THE FEDERAL COURTS OF THE UNITED STATES***

*Robert Kelly\**

#### I. FACTS AND DISPOSITION OF THE CASE BELOW

The present case involves Gregory W. Nemitz' (Appellant) assertion of private property rights in asteroid 433, "Eros" (hereinafter Eros). Eros is a large asteroid in stable orbit around the Sun.<sup>1</sup> On its closest orbit between the Earth and Mars, Eros was 14 million miles away.<sup>2</sup> The Appellant claims that his ownership of Eros is based on his registration on the Archimedes Institute website<sup>3</sup> and his filing of a California Uniform Commercial Code security interest, in which he named himself as both creditor and debtor.<sup>4</sup> The claim arises out of the February 12, 2001 land-

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<sup>1</sup> Eros has a reported mass of  $7.2 \times 10^{15}$  kg and has dimensions of 33 km x 13 km x 13 km. Gregory W. Nemitz, *The Eros Project Overview*, at <http://www.erosproject.com/433erosproj.html?source=ErosProject> (last visited Oct. 18, 2004).

<sup>2</sup> Appellee's Brief at 3, *Nemitz v. United States* (9th Cir. 2004) (No. 04-16223) [hereinafter Appellee's Brief].

<sup>3</sup> The Archimedes Institute, at <http://www.permanent.com/archimedes> (last visited Oct. 18, 2004).

<sup>4</sup> *Nemitz v. United States*, CV-N-03-0599-HDM-(RAM) (D. Nev. Apr. 27, 2004) (order granting defendant's motion to dismiss).

ing of NASA's *NEAR Shoemaker* spacecraft on Eros.<sup>5</sup> The Appellant claimed that the landing of the NASA spacecraft infringed his private property rights and that he should be compensated for "parking" and "storage" fees which total twenty cents per year.<sup>6</sup> He estimates Eros' initial value to be \$8,000,000,000.<sup>7</sup> Every day the spacecraft remains on Eros without paying the claimed fees, the Appellant alleges that he is suffering special damages of \$5,000,000 because he is legally inhibited from accessing the full value of the asteroid and proceeding with his planned developments.<sup>8</sup>

After an exchange of letters with NASA and the United States Department of State, the Appellant filed a complaint on November 6, 2003 in the United States District Court for the District of Nevada.<sup>9</sup> On January 28, 2004, the Federal Defendants filed a motion to dismiss pursuant to Section 12(b)(6) of the Federal Rules of Civil Procedure for failure to state a claim.<sup>10</sup> The motion to dismiss was granted by the District Court on April 27, 2004.<sup>11</sup> From that motion, appeal was taken to the Ninth Circuit Court of Appeals. The Appellant filed a motion for expedited review which was also denied by the Appellate Court.<sup>12</sup> As of this writing, the appeal is still pending.

"[The Appellant] originally advanced five causes of action: violation of the Fifth, Ninth, and Tenth Amendments to the U.S. Constitution, a breach of implied contract and violation of Public Law 85-568 § 102(c), (d)(9), which is codified at 42 U.S.C.

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<sup>5</sup> *Id.* The spacecraft landed in what Nemitz refers to as parking space #29. Gregory W. Nemitz, *The Eros Project for Space Property Law*, at <http://www.erosproject.com> (last visited Oct. 18, 2004).

<sup>6</sup> *Nemitz*, CV-N-03-0599-HDM-(RAM) (D. Nev. Apr. 27, 2004) (order granting defendant's motion to dismiss).

<sup>7</sup> Appellant's Informal Brief at 21-22, *Nemitz* (9th Cir. 2004) (No. 04-16223) [hereinafter Appellant's Brief].

<sup>8</sup> *Id.* at 26.

<sup>9</sup> Plaintiff's Complaint for Declaratory Judgment, *Nemitz v. United States*, CV-N-03-00599-HDM-(RAM) (Nov. 6, 2003).

<sup>10</sup> Defendant's Motion to Dismiss and Memorandum in Support Thereof, *Nemitz v. United States*, CV-N-03-00599-HDM-(RAM) (Jan. 28, 2004).

<sup>11</sup> *Nemitz*, CV-N-03-0599-HDM-(RAM) (D. Nev. Apr. 27, 2004) (order granting defendant's motion to dismiss).

<sup>12</sup> *Nemitz* (9th Cir. 2004) (No. 04-16223) (order denying Appellant's motion for expedited review).



2451(c), (d)(9).<sup>13</sup> The District Court found the Appellant's property claims deficient because neither his registration with the Archimedes Institute website nor his filing under the California Commercial Code created any private property rights.<sup>14</sup> The District Court also held that "neither the Ninth nor Tenth Amendments provides a cognizable cause of action for the denial of a property interest in outer space."<sup>15</sup> The District Court further found that the Appellant did not seek a determination that he had ownership of Eros thus failing to assert a property interest capable of being protected.<sup>16</sup> Since the Appellant has no property interest to be "taken" any Fifth Amendment cause of action was also deficient.<sup>17</sup> The Appellant's claim under 42 U.S.C. §2451(c) and (d)(9) is also lacking because he did not establish that either provision creates a legal foundation for a claim of private property on Eros.<sup>18</sup> Lastly, the failure by the United States to sign the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies<sup>19</sup> (hereinafter Moon Agreement) or the signing and ratifying of the Treaty on the Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Ce-

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<sup>13</sup> *Nemitz*, CV-N-03-0599-HDM-(RAM), at 1 (D. Nev. Apr. 26, 2004) (order granting defendant's motion to dismiss).

<sup>14</sup> "The Archimedes Institute registration on which he relies disclaims any authority to confer title or rights to property on its registrants. All the website does is create a registry." *Id.* at 2. "While Article 9 of the California Commercial Code sets forth a procedure for the regulation of security interests in property, it does not create a property interest in an asteroid." *Id.*

<sup>15</sup> *Id.* at 3.

<sup>16</sup> *Id.* at 2, lines 19-21.

<sup>17</sup> *Id.* at 2-3 (citing *McIntyre v. Bayer*, 339 F.3d 1097, 1099 (9th Cir. 2003)).

<sup>18</sup> 42 U.S.C. § 2451 (c) and (d)(9) are mandates by Congress to NASA to encourage "the fullest commercial use of space" and to preserve "the United States preeminent position in aeronautics and space."

<sup>19</sup> Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 18, 1979, 18 I.L.M. 1434; 1363 U.N.T.S. 3 [hereinafter Moon Agreement]. The United States has neither signed nor ratified the Moon Agreement, thus it is not considered binding. Also it has received very weak international support thereby defeating any argument that it would be binding as creating a norm of customary international law. The Appellate Court will therefore, more than likely not, give the Moon Agreement much consideration in its analysis.

lestial Bodies<sup>20</sup> (hereinafter Outer Space Treaty) did not provide for a right to private property on asteroids.

## II. APPELLANT'S ARGUMENT

The Appellant proceeds on appeal, *pro se*, without the aid of an attorney.<sup>21</sup> On appeal he raises five sources of error. First, the Appellant claims that he has a natural right to the property and that the failure by the Government to recognize his property rights is a violation of the Fifth, Ninth and Tenth Amendments. Second, he claims that the Outer Space Treaty does not apply to him and that any application of the treaty would be unconstitutional. Third, he argues that the District Court erred in not reviewing the case in equity. The fourth, and last, legal argument is that NASA's actions are in contravention to its enacting legislation. This leads to the fifth and final argument which is based on policy. The argument is that to allow such an understanding to continue would lead to a chilling effect on the development of space related activities.

The Appellant concedes the fact that neither his filing under the California Commercial Code nor his registration on the Archimedes Institute website created a property right in Eros.<sup>22</sup> He explains that these actions were a means of publishing a claim which originated under his natural rights as an American.<sup>23</sup> The Appellant defines himself as a "constitutional preamble' Person", which he argues means that he retains the power to act as a sovereign in all areas that the Federal Government has not affirmatively acted.<sup>24</sup> From this position the

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<sup>20</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, Jan. 1, 1967, 18 U.S.T. 2410; 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

<sup>21</sup> The Appellant is not an attorney nor has he had a legal education. The author has construed the Appellant's arguments in legal terms and with proper language. Each argument is followed by a detailed footnote quoting the exact language from the Appellant's brief so that the reader may see the original language and draw their own conclusions from that language.

<sup>22</sup> Appellant's Brief, *supra* note 7, at 20-21.

<sup>23</sup> "The true basis of his property claim is his own inherent republican sovereign authority to act Lawfully in an area where no legislated nor case law exists." *Id.* at 21.

<sup>24</sup> "Nemitz is a 'constitutional preamble' Person (sovereign), one of 'We the People', in a **Republic** (United States of America), not a 'democracy,' therefore he retains indi-

Appellant claims that he has the power to act, with constitutional protection, when there is an absence of statutory or other prohibition.<sup>25</sup> The Appellant claims that since the power to own or regulate the ownership of lunar and celestial property was not delegated by the Constitution to the Federal Government nor reserved to the States, it is retained by individuals as part of the unenumerated and reserved powers of the Ninth and Tenth Amendments.<sup>26</sup> Thus, the Government's failure to recognize his claim is a violation of the Ninth and Tenth Amendments.<sup>27</sup> The Government's refusal to pay the parking fees therefore is a "taking" which requires compensation under the Fifth Amendment.<sup>28</sup>

The Appellant asserts that Article II of the Outer Space Treaty, the non-appropriation clause, is not relevant to the case at hand because his right to own Eros does not derive from the treaty.<sup>29</sup> He argues that the District Court's analysis of Article II was irrelevant to the case and served only to find "created rights" which the Appellant did not need because he possessed "inherent rights".<sup>30</sup> The Outer Space Treaty is not relevant, in

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vidual sovereignty to lawfully act **directly** in areas where there is not legislation nor case law, such as property claims to celestial bodies." *Id.* at 15-16.

<sup>25</sup> "In the absence of any established legislated law or case law, an American sovereign such as Nemitz, lawfully and with constitutional protection, retains an inherent authority to act and proceed in his lawful capacity." *Id.* at 13.

<sup>26</sup> "Among rights recognized by Common Law and Rights protected by the Fifth, Ninth and Tenth Amendments to the Constitution of the United States of America remain a natural man's ability to originate a claim of private 'personal' property to an unowned asteroid orbiting the Sun **specifically** because that ability was not delegated as a power to the United States by that restrictive Constitution and that power to originate property has **never** been claimed by any of the fifty states respectively." *Id.* at 14.

<sup>27</sup> "The Department of State's and NASA's official determination and conclusions of law construe to violate the Rights of Nemitz protected by the Ninth Amendment to the Federal Constitution. The US/USA are prohibited by this Amendment from construing to deny or disparage unenumerated and retained rights have violated the rights of this free and natural, living man (Nemitz) to claim and own an asteroid as private property." *Id.* at 7.

<sup>28</sup> *Id.* at 6.

<sup>29</sup> "Nemitz's Right to establish such a property claim is based upon his inherent sovereign lawful authority that precedes the treaties. Nemitz holds no basis of reliance whatsoever in either treaty for perfecting his property claim to Asteroid 433, Eros." *Id.* at 25.

<sup>30</sup> "The District Court looks to the treaty for 'created rights', finds none, and ignores or misapprehends the un rebutted evidence presented that Nemitz's Lawful Rights do indeed proceed and supercede the treaty." *Id.* at 10.

the Appellant's view, because it does not apply to him. He never granted the United States Government the right to act in this manner nor has he acted in any manner that could strip him of his "sovereign" authority to enter into agreements of this type.<sup>31</sup> Since he personally never entered into such an agreement nor was the power explicitly delegated to the Government to regulate this conduct, he claims that the Outer Space Treaty cannot strip him of a constitutionally protected right.<sup>32</sup> The Appellant contends that if the Outer Space Treaty was to be read contrary to his interpretation, and thus prohibiting his ownership of Eros, it would be communistic and therefore unconstitutional.<sup>33</sup>

The Appellant's third claim of error was that the District Court misconstrued his request for relief by failing to address his claim for equity. The Appellant argues that the District Court erred because they considered only what he characterizes as "legal" or "at law".<sup>34</sup> The Appellant claims that the Court was never cognizant of what he characterizes as "lawful" or "equity".<sup>35</sup>

The last legal claim is that NASA's determination is counter to its enacting legislation. 42 U.S.C. §2451(c) charges NASA with the duty to "seek and encourage, to the maximum extent possible, the fullest commercial use of space." The Appel-

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<sup>31</sup> "Nemitz presented un rebutted evidence ... that he has never knowingly entered into any commercial or political agreement that abrogates his rights or sovereignty." *Id.* at 16.

<sup>32</sup> "The Department of State's and NASA's Official determination and conclusions of law violate the rights of Nemitz protected by the Tenth Amendment to the Federal Constitution. The power to prevent any natural man of one of the several states from claiming and owning an asteroid as an individual's private property was never delegated to the United States government by the Federal Constitution and has never been claimed, declared or reserved by any one of the several states, thus all such powers are reserved to the People. The United States Senate's act of ratification of the Outer Space Treaty **cannot abrogate** that Constitutional power reserved to the People." *Id.* at 7-8.

<sup>33</sup> "It is unimaginable that when the Outer Space Treaty was being negotiated with the Soviet Union in the United Nations, during 1966-67 at the height of the Cold War, that the American delegation intended for our American society's fundamental order of private property rights should be completely withheld from the People who will conduct their business and their lives in outer space . . . (such determinations) are as if the United States of America and the United States were dominated by Communist regimes." *Id.* at 29-30.

<sup>34</sup> *Id.* at 17.

<sup>35</sup> *Id.* at 23.

lant claims that NASA's refusal to acknowledge his claim violates that legislation.<sup>36</sup> This leads to the Appellant's policy argument that failure to recognize his claim will lead to a chilling effect on future space commerce and the development of space resources.<sup>37</sup> He asserts that in keeping with traditional economic theory, Government regulation is contrary to the interests of the development of new industries and that such activities are best left to private commercial enterprises.<sup>38</sup>

### III. APPELLEE'S ARGUMENT

The Federal Appellees argue that the District Court correctly dismissed the case because "a court should grant a motion to dismiss under Fed. R. Civ. P. 12(b)(6) when the plaintiff's complaint, even liberally construed, fails to state a cognizable legal theory."<sup>39</sup> The Appellees state the Appellant's claim, that his "natural right" to have a property interest in Eros protected by the Constitution, is without basis.<sup>40</sup> It is their contention that the Constitution does not create property rights; but they are established by independent sources like state law.<sup>41</sup> The Appellant's claim that the Ninth and Tenth Amendments protect his property right in Eros is incorrect because these amendments are rules of interpretation and not a source of rights.<sup>42</sup> The rights which exist under the Ninth Amendment

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<sup>36</sup> *Id.* at 24.

<sup>37</sup> "If the District Court's Order is allowed to stand, and the Complaint is not adjudicated to nullify the United States Department of State's Official Determination in this matter, a major 'chilling effect' on the potential for trillions of dollars of lawful commerce in Space will prevent or substantially delay human progress at recovering the vast and valuable resources on celestial bodies." *Id.* at 9.

<sup>38</sup> "Since shortly after the publication of Adam Smith's 'Wealth of Nations' in 1776, it is widely acknowledged and accepted that the **most efficient means** of economic development are accomplished by free people acting in the free market with control of **private property**." *Id.* at 23-24.

<sup>39</sup> Appellee's Brief, *supra* note 2, at 6-7 (citing *SmileCare Dental Group v. Delta Dental Plan of Cal., Inc.*, 88 F.3d 780, 783 (9th Cir. 1996)).

<sup>40</sup> *Id.* at 9.

<sup>41</sup> *Id.* (citing *Board of Regents of State Colleges v. Roth*, 408 U.S. 564, 577 (1972)). "(The Ninth and Tenth Amendments) are meant to serve as a guide for constitutional interpretation rather than as a blanket grant of substantive rights." *Id.* at 12.

<sup>42</sup> *Id.* at 11 (citing *Froehlich v. Department of Corr.*, 196 F.3d 800, 801 (7th Cir. 1999)).

are those that are not found in other Constitutional provisions, but "that are 'so basic and fundamental and so deep-rooted in our society' to be truly 'essential rights.'" <sup>43</sup> The Appellees claim that these protected rights are in their very substance different from the right to own lunar and celestial property. <sup>44</sup> The Appellees point out that the Appellant has acknowledged, in his brief, that no support for his claim can be found either in statute or common law and since the Constitution does not create a right, there is no basis for granting him relief. <sup>45</sup> Without that source, the Appellant has conclusively failed to demonstrate a basis for his "natural right" except for his own claim. <sup>46</sup> As a matter of law the Appellant is not permitted to receive a declaration perfecting ownership without demonstrating a legal basis for such ownership. <sup>47</sup>

The Appellees state that the Appellant's assertion of ownership is merely "a conclusory allegation, and his claim for a declaratory judgment affirming his ownership of Eros is entirely void of any legal or factual basis." <sup>48</sup> Nowhere in his brief or complaint has the Appellant demonstrated an act of ownership or use that would bolster his claim. <sup>49</sup> In the end the Appellant has only an expectation of ownership, and a "mere unilateral expectation is not a property interest entitled to protection." <sup>50</sup> Property law seeks to protect claims which people rely upon in their day-to-day lives not mere expectations. <sup>51</sup> As a result the Appellees assert that the Appellant has failed to provide a basis upon which the District Court could award relief. <sup>52</sup> Further, since there is a complete absence of any showing of a property interest in Eros, the District Court did not have to construe the

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<sup>43</sup> *Id.* (citing *United States v. Choate*, 576 F.2d 165, 181 (9th Cir. 1978)).

<sup>44</sup> *Id.*

<sup>45</sup> *Id.* at 9.

<sup>46</sup> *Id.* at 12.

<sup>47</sup> *Id.* at 8 (citing *King County v. Rasmussen*, 299 F.3d 1077, 1089 (9th Cir. 2002), *cert denied*, 538 U.S. 1057 (2003) ("dismissing a takings claim in the absence of a finding that the Rasmussens owned the uncontested land.")

<sup>48</sup> *Id.* at 11.

<sup>49</sup> *Id.* at 12.

<sup>50</sup> *Id.* (citing *Roth*, 408 U.S. at 577).

<sup>51</sup> *Id.* at 9 (citing *Roth*, 408 U.S. at 577).

<sup>52</sup> *Id.* at 7-8.

Outer Space Treaty nor answer the question of whether or not the treaty prohibited private ownership of lunar or celestial property.<sup>53</sup>

#### IV. ANALYSIS

The Appellant advances a number of creative and original claims in his argument, but he is limited by the fact that he is neither a lawyer nor a legal scholar. The Appellant argues his position in a legal vacuum and without knowledge of U.S. national and international space law. In his informal brief he cites only tangentially to any recognized legal opinion to support his claim. The failure to know and correctly use the formal body of law developed on this topic will more than likely be fatal to his claim.

Regrettably, both parties in this dispute seek to determine whether or not the Appellant has an existing property right in a particular asteroid, rather than asking the real question: does the Appellant have the legal capacity to possess a property right in the asteroid? The great underlying question in this dispute is whether or not natural persons, corporations or non-governmental entities have the legal capacity to appropriate lunar and celestial property without violating the Non-appropriation Clause of Article II of the Outer Space Treaty.<sup>54</sup> The purpose of this section is to provide support for the argument that no natural person, corporation or non-governmental entity, may appropriate lunar or celestial property. To do so, would allow a State to appropriate space through the actions of its nationals and thereby circumvent the prohibition of Article II of the Outer Space Treaty.

The fundamental principle of the Outer Space Treaty, found in Article I, recognizes the right of States to the free use and exploration of outer space.<sup>55</sup> Article II "was adopted to imple-

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<sup>53</sup> *Id.* at 8.

<sup>54</sup> "Outer Space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." <sup>54</sup> Outer Space Treaty, *supra* note 20, at art. II.

<sup>55</sup> "Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality

ment the freedom of use principle, as appropriation undermines freedom of use.<sup>56</sup> One State's appropriation of an area of outer space, or a celestial body, permanently denies every other State the right to freely use and explore that unique territory. This is antithetical to Article I.<sup>57</sup> The purpose of these articles is to protect space from Earthbound conflicts. They are intended to keep war and violence from spreading into outer space.<sup>58</sup> "By removing the common cause of disputes from outer space, armed conflict would be confined to the terrestrial environment thereby reducing the costs of space exploration."<sup>59</sup>

Clearly the Outer Space Treaty prohibits appropriation by a State. However, private appropriation is not directly addressed in Article II.<sup>60</sup> Article II does not explicitly prohibit appropriation by natural persons, corporations or non-governmental entities.<sup>61</sup> Prior to the drafting of the Outer Space Treaty, several international NGOs and legal organizations presented drafts, which contained explicit prohibitions, targeted at private entities, which were not incorporated into the final draft of the Outer Space Treaty.<sup>62</sup> This lends support to the argument that

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and in accordance with international law, and there shall be free access to all areas of celestial bodies." *Id.* at art. I.

<sup>56</sup> Susan Cahill, Note and Comment, *Give Me My Space: Implications for Permitting National Appropriation of the Geostationary Orbit*, 19 WIS. INT'L L.J. 231, 236 (2001).

<sup>57</sup> Jannat C. Thompson, Comment, *Space for Rent: The International Telecommunications Union, Space Law, and Orbit/Spectrum Leasing*, 62 J. AIR L. & COM. 279, 306 (1996).

<sup>58</sup> Leslie I. Tennen, Article II of the Outer Space Treaty, the Status of the Moon and Resulting Issues, presentation at the IISL/ECSL Space Law Symposium (Mar. 29, 2004) (PowerPoint presentation on file with author).

<sup>59</sup> *Id.* "The risk of disputes between competing claimants in space would be significant, and armed conflicts beyond the confines of this planet become not merely foreseeable but inevitable. Thus, an atmosphere of insecurity would pervade the outer space environment, and the cost of conducting missions would increase in direct proportion to the defensive planning, armaments and weaponry made necessary for protection of personnel and spacecraft. *Id.* at 5.

<sup>60</sup> Lynn M. Fountain, Note, *Creating Momentum in Space: Ending the Paralysis Produced by the "Common Heritage of Mankind" Doctrine*, 35 CONN. L. REV. 1753, 1753 (2003).

<sup>61</sup> *Id.* at 1763.

<sup>62</sup> Setsuko Aoki, *Commentary on Emerging System of Property Rights in Outer Space*, in PROCEEDINGS: UNITED NATIONS/REPUBLIC OF KOREA WORKSHOP ON SPACE LAW: UNITED NATIONS TREATIES ON OUTER SPACE: ACTIONS AT THE NATIONAL LEVEL 59, 60 (2004).



private appropriation might be tolerated by the Outer Space Treaty.

Taking the principles of the Outer Space Treaty as a whole, it is clear that "national appropriation includes all forms of appropriation whether national, private or otherwise."<sup>63</sup> Until recognized by a sovereign State, a natural person's, corporation's or non-governmental entity's control of previously unoccupied land is merely a fact of occupation.<sup>64</sup> It is not until that occupation is recognized by the sovereign that a property right vests in the natural person, corporation or non-governmental entity.<sup>65</sup> This requires some type of state action to legitimate control, which would be seen as appropriation under the pretext of national authority, if not national appropriation via the recognition of control itself. By this reasoning a State's recognition of the claims of its nationals to lunar or celestial property would violate the "by any other means" clause of Article II of the Outer Space Treaty.<sup>66</sup>

The Outer Space Treaty, like all treaties, is not intended to be read article by article, but rather as a whole.<sup>67</sup> Article II cannot be read by itself but should be read in conjunction with the other articles of the Outer Space Treaty. Article VI of the Outer Space Treaty defines the term 'national' as including non-

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<sup>63</sup> Hongkyun Shin, *Emerging System of Property Right in the Outer Space*, in PROCEEDINGS: UNITED NATIONS/REPUBLIC OF KOREA WORKSHOP ON SPACE LAW: UNITED NATIONS TREATIES ON OUTER SPACE: ACTIONS AT THE NATIONAL LEVEL 50. See also Statement by the Board of Directors of the International Institute of Space Law on Claims to Property Rights Regarding the Moon and other Celestial Bodies, available at [http://www.iafastro-iisl.com/additional%20pages/Statement\\_Moon.htm](http://www.iafastro-iisl.com/additional%20pages/Statement_Moon.htm) (2004) [hereinafter Statement by the Board of Directors].

<sup>64</sup> Aoki, *supra* note 62, at 61.

<sup>65</sup> *Id.*

<sup>66</sup> Leslie I. Tennen, *Second Commentary on "Emerging System of Property Right in the Outer Space"*, in PROCEEDINGS: UNITED NATIONS/REPUBLIC OF KOREA WORKSHOP ON SPACE LAW: UNITED NATIONS TREATIES ON OUTER SPACE: ACTIONS AT THE NATIONAL LEVEL 67 [hereinafter *Commentary*].

<sup>67</sup> "A treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose." Vienna Convention on the Law of Treaties; May 23, 1969, art. 31(1), 1155 U.N.T.S. 331, 8 I.L.M. 679. The term "context" is later explained to mean "the text, including its preamble and annexes." *Id.* at art 31(2).

governmental entities.<sup>68</sup> Non-governmental entities have been interpreted to mean private parties, whether natural persons or corporations.<sup>69</sup> Thus, the Outer Space Treaty prohibits national appropriation, because when the treaty is read as a whole private appropriation is part of the definition of national appropriation.

Drawing further from Article VI, States "bear international responsibility" for the acts of their nationals in outer space.<sup>70</sup> Thus, the appropriation of a national, if recognized or legally sanctioned by the State, would create international responsibility on that State for their national's actions.<sup>71</sup> Also, it would be illogical to believe that a State could authorize a private actor to act when the State itself is denied the same action.<sup>72</sup> To do so would allow States to circumvent treaty obligations by delegating authority to act in unauthorized manners to non-state actors.<sup>73</sup>

## V. CONCLUSION

The law on this issue is clear. The Appellant does not present a claim for which the District Court may provide relief. The Appellant presents no legal or factual evidence for the source of his "natural right" in Eros. He merely claims that this right lies within the unenumerated rights of the Ninth and Tenth Amendments. These Amendments have never been interpreted to create property rights. Thus, the Appellant's claim

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<sup>68</sup> "States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty." Outer Space Treaty, *supra* note 20, at art. VI.

<sup>69</sup> Statement by the Board of Directors, *supra* note 63.

<sup>70</sup> Outer Space Treaty, *supra* note 20, at art. VI.

<sup>71</sup> "According to international law, States party to a treaty are under a duty to implement the terms of that treaty within their national legal systems. Therefore, to comply with their obligations under Articles II and VI of the Outer Space Treaty, States Parties are under a duty to ensure that, in their legal systems, transactions regarding claims to property rights to the Moon and other celestial bodies or parts thereof, have no legal significance or recognised legal effect." Statement by the Board of Directors, *supra* note 63.

<sup>72</sup> Aoki, *supra* note 62, at 61.

<sup>73</sup> *Commentary*, *supra* note 66, at 69.

is without merit and cannot survive a Federal Rules of Civil Procedure Section 12(b)(6) motion to dismiss for failure to state a claim.

The case does contain an interesting issue, but which was not raised by the parties and therefore which, regrettably, the court will not address: whether or not Article II and Article VI of the Outer Space Treaty allow for private ownership of lunar or celestial property. Appropriation of lunar and celestial property by natural persons, corporations and non-governmental entities is prohibited by Article II and VI of the Outer Space Treaty for three reasons. First, natural persons, corporations and non-governmental entities may act in outer space only with the authorization and under the supervision of States. If a government was to recognize an appropriation made by one of them, it would constitute national appropriation "by any other means". Second, Article VI of the Outer Space Treaty defines "national" to include non-governmental entities such as natural persons and corporations. If these actors are viewed as national then their appropriation is likewise national. Third, if private actors were allowed to appropriate lunar and celestial property, then it would allow States to circumvent their treaty obligations merely by delegating authority to act in otherwise unauthorized manners to non-state actors. This is not to say that natural persons, corporations and non-governmental entities might not be able to acquire some types of property interests in lunar and celestial property or engage in some types of private activities. That is not the focus of this study. This merely means that they are prohibited from appropriating lunar and celestial property.

## COMMENTARY

### MAINTAINING INTERNATIONAL SPACE COOPERATION FOR PEACEFUL USES

*Eilene Galloway\**

The dramatic orbiting of *Sputnik* over all nations on October 4, 1957 raised fears of weapons of mass destruction, but nations responded by organizing with hope for peace. International space cooperation has brought the world 47 years of safety and order to develop benefits for all humankind: profitable global satellite communications systems, new industries from remote sensing, economic savings from improved meteorology, advances in agriculture, medicine, and many more applications from knowledge obtained from space. This is a remarkable achievement that we must protect against any influence that could destroy the system of international space cooperation.

Now, demands for private property rights on the Moon and other celestial bodies are threatening to destroy the existing international system, and without regard for consequences such as conflicting national claims, and the inability to use such property because of hazardous conditions and cost.

The idea of owning space property began when an unauthorized individual decided to sell lots on the Moon. At first, this action was regarded as an amusing fantasy, but the seller profited from the sale and the practice, now followed by imitation, is regarded by most space law experts as unlawful.

However, no official action has been taken to stop such claims, and the idea has spread. The "Report of the President's Commission on Implementation of United States Space Explo-

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\* Dr. Eilene Galloway is Honorary Director of the International Institute of Space Law, and a Trustee Emeritus of the International Academy of Astronautics. She served on the NASA Advisory Committee on the International Space Station, and the NASA Advisory Committee on Space Flight.

ration Policy"<sup>1</sup> (June 2004) called attention to the United States being signatory to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies<sup>2</sup> which prohibits claims of national sovereignty on any extraterrestrial body. The Commission recommended that Congress "increase the potential for commercial opportunities...by assuring appropriate property rights for those who seek to develop space resources and infrastructure."<sup>3</sup>

This recommendation is not based on all the facts essential for analyzing the question of property rights in connection with Article II, which provides that—

Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.<sup>4</sup>

This policy has been adhered to by all nations since 1957-58, even before the Outer Space Treaty was completed, because sovereign claims were judged to be a potential cause for conflict and war. The United States played a leading role in the adoption of this policy. As satellites orbit quickly over all nations while preserving safety and order, the policy is recognized as international customary law.<sup>5</sup>

We have proved that outer space can be used for a variety of humanitarian, commercial, and beneficial purposes without the necessity for ownership. The global satellite communication industry alone produces millions of dollars in profits.

We must recall the dramatic incident in American history when President Eisenhower asked Lyndon Johnson, then the

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<sup>1</sup> REPORT OF THE PRESIDENT'S COMMISSION ON IMPLEMENTATION OF UNITED STATES SPACE EXPLORATION POLICY, A JOURNEY TO INSPIRE, INNOVATE, AND DISCOVER, (June 2004), available at [http://www.nasa.gov/pdf/60736main\\_M2M\\_report\\_small.pdf](http://www.nasa.gov/pdf/60736main_M2M_report_small.pdf) (last visited Oct. 29, 2004) [hereinafter PRESIDENT'S COMMISSION REPORT].

<sup>2</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, Jan. 1, 1967, 18 U.S.T. 2410; 610 U.N.T.S. 205. [hereinafter Outer Space Treaty].

<sup>3</sup> PRESIDENT'S COMMISSION REPORT, *supra* note 1, at 33, Recommendation 5-2.

<sup>4</sup> Outer Space Treaty, *supra* note 2, at art. II.

<sup>5</sup> Kerrest Arnel, *New Developments in the Legal Framework Covering the Exploitation of the Resources of the Moon*, in IISL/ECSL SPACE LAW SYMPOSIUM (2004).

Majority Leader of the Senate, to go to the United Nations on November 17, 1958 and promote U.S. foreign policy by persuading other nations to join us in creating the Ad Hoc Committee on the Peaceful Uses of Outer Space. Senator Johnson pointed out that the President was a Republican while he was a Democrat, and said:

These are distinctions. They are not, on this Resolution, differences. On the goal of dedicating outer space to peaceful purposes for the benefit of all mankind there are no differences within our Government, between our parties, or among our people. The executive and the legislative branches of our Government are together. United we stand.<sup>6</sup>

On September 22, 1960, President Eisenhower addressed the United Nations General Assembly on the opportunity to control the future of outer space, proposing that—

1. We agree that celestial bodies are not subject to national appropriation by any claims of sovereignty.
2. We agree that the nations of the world shall not engage in warlike activities on those bodies.
3. We agree, subject to appropriate verification, that no nation will put into orbit or station in outer space weapons of mass destruction. All launchings of space craft should be verified in advance by the United Nations.
4. We press forward with a program of international cooperation for constructive peaceful uses of outer space under the United Nations. Better weather forecasting, improved world-wide communications, and more effective exploration not only of outer space but of our own earth—these are but a few of the benefits of such cooperation.<sup>7</sup>

The initiative of President Eisenhower in starting the process that led to creation of the U.N. Committee on Peaceful Uses

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<sup>6</sup> FINAL REPORT OF THE SENATE COMMITTEE ON SPACE AND ASTRONAUTICS. S. REP. NO. 100, 1<sup>st</sup> Sess., at 58 (1959).

<sup>7</sup> President Eisenhower's Address to the General Assembly of the United Nations, 1960 PUB. PAPERS 714-15 (1960).

of Outer Space (UNCOPUOS) in 1959 led to the formulation of space treaties which furthered the application of space science and technology for beneficial uses. The Committee's membership, today representing 65 nations, makes all decisions by consensus. The 1967 Outer Space Treaty reiterated the space policy against national claims for sovereignty that has been followed since the space age began. This Treaty has been ratified by 98 nations and signed by 27 others.<sup>8</sup>

The problem created by advocates of property rights in space and on celestial bodies cannot be solved by a unilateral attack on the 1967 Outer Space Treaty. The proposal evidently arises from the unquestioned assumption that an accepted practice on Earth can automatically be transferred to outer space. Actually, all space activities must conform by means of space science and technology to the unique condition of the outer space environment which is lethal, hostile to humans and vehicles, and extremely expensive to develop. We could expect rival claims among nations. Who would decide what is "appropriate" for private property rights? How could we have an efficient system if some nations permit private property rights and others do not? Exactly what rights are being considered? And how would a divided world system adjust to the fact that every nation has the right of self defense? All the probable consequences of such a proposal have not been thought through.

The irony is that the issue of private property rights in space can be solved without threatening the existing successful system of international cooperation. A study should be made of all the private entities that make profits from property they do not own. For example, fishing from the ocean, logging from public forests, drilling oil from the Gulf of Mexico, running hotels in public parks, and mining for minerals from the bottom of the sea. If difficulties arise, such as a diminishing supply of fish, the problem can be settled by negotiation. Even now we do not need to own parts of outer space in order to make profits from space applications. Commercial space uses are apt to differ, but

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<sup>8</sup> *Status of International Agreements Relating to Activities in Outer Space* as at 1 January 2004, U.N. Treaties and Principles on Outer Space, Addendum, Ref.: Sales No. E.02.I.20, ST/SPACE/11/Add.1/Rev. 1 (2004).

their unique characteristics could be accommodated as long as they are in compliance with the safety and order required for maintaining peace. This study should lead to action for positive results in dealing with the problem of private property rights. We have the responsibility of preserving Article II from attack.

The United States should decide how to implement its international responsibility for national space activities, particularly in connection with U.S. sellers of deeds to the Moon and other celestial bodies. Article VI of the Outer Space Treaty provides that "The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision."

The Board of Directors of the International Institute of Space Law concluded in 2004 that "[t]he sellers of such deeds are unable to acquire legal title to their claims...[which] have no legal value," "States party to a treaty are under a duty to implement the terms of that treaty within their national legal systems," and such "claims to property rights to the Moon and other celestial bodies or parts thereof, have no legal significance or recognised legal effect."<sup>9</sup>

The United States Government should designate an agency to be responsible for supervising such unlawful national activities as soon as possible to stop the unmanageable growth of unauthorized sales.

The problem created by proposals unfavorable to the policy of non-sovereign claims to outer space and celestial bodies could be handled by the Department of State in cooperation with NASA.

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<sup>9</sup> Statement by the Board of Directors of the International Institute of Space Law on Claims to Property Rights Regarding the Moon and other Celestial Bodies, *available at* [http://www.iafastro-iisl.com/additional%20pages/Statement\\_Moon.htm](http://www.iafastro-iisl.com/additional%20pages/Statement_Moon.htm) (2004).



## BIBLIOGRAPHY

### SPACE LAW CASES AND RELEVANT PUBLICATIONS

*Laura Dyer\**

#### I. LAW JOURNAL ARTICLES

*Commercialization of Space Commercial Space Launch Amendments Act of 2004*, 17 HARV. J. L. & TECH. 619 (2004).

Daniel C. Esty, *Environmental Protection in the Information Age*, 79 N.Y.U. L. REV. 115 (2004).

Joanne Irene Gabrynowicz, *Space Law: Its Cold War Origins and Challenges in the Era of Globalization*, 37 Suffolk U. L. Rev. 1041 (2004).

Jonathon F. Galloway, Book Review, 98 Am. J. Int'l L. 633 (2004) (reviewing BIN CHENG, STUDIES IN INTERNATIONAL SPACE LAW (1997)).

Nina Tannenwald, *Law Versus Power on the High Frontier: The Case for a Rule-Based Regime for Outer Space*, 29 YALE J. INT'L L. 363 (2004).

#### II. CASES

Department of Information Technology v. Freedom of Information Commission, 2003 Conn. Super. LEXIS 3617 (2004).

#### III. UNITED STATES GOVERNMENT DOCUMENTS

Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005, H.R. 4200, as approved in conference and adopted by the House and Senate on Oct. 9, 2004, Section 914. Nondisclosure of Certain Products of Commercial Satellite Op-

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erations, available at <http://fas.org/sgp/congress/2004/hr4200/conf.html#914>.

14 CFR §§ 1-199, Federal Aviation Administration, Department of Transportation, (revised Jan. 1, 2004) available at <http://www.access.gpo.gov/cgi-bin/cfrassemble.cgi?title=200414>.

14 CFR §§ 200-399, Office of the Secretary, Department of Transportation (Aviation Proceedings), (revised Jan. 1, 2004) available at <http://www.access.gpo.gov/cgi-bin/cfrassemble.cgi?title=200414>.

14 CFR §§ 400-499, Commercial Space Transportation, Federal Aviation Administration, Department of Transportation, (revised Jan. 1, 2004) available at <http://www.access.gpo.gov/cgi-bin/cfrassemble.cgi?title=200414>.

14 CFR §§ 1200-1299, National Aeronautics and Space Administration, (revised Jan. 1, 2004) available at <http://www.access.gpo.gov/cgi-bin/cfrassemble.cgi?title=200414>.

47 CFR §§ 1, 5, 25, & 97, Federal Communications Commission, Space Station Licensing Rules and Policies (revised Sept. 9, 2004).

GAO Doc. No. 04-530-T Unmanned Aerial Vehicles: Major Management Issues Facing DOD's Development and Fielding Efforts (March 17, 2004) (testimony of Neal P. Curtain and Paul L. Francis) available at <http://www.house.gov/hasc/openingstatementsandpressreleases/108thcongress/04-03-17francis.pdf>.

Notice of Release of Draft Strategic Plan for U.S. Integrated Earth Observation System, Office of Science & Technology Policy, 69 FR 54666-01 (Sept. 9, 2004) (request for public comment).

#### IV. RUSSIAN SPACE LAW\*

Presidential edict, *On the System and Structure of Federal Organs of Executive Power*, gave the Russian Aerospace Space

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\* This section was provided by Ms. Maria Nikolaevna Bjornerud, a third year law student at the University of Mississippi School of Law, student researcher at the National Remote Sensing and Space Law Center, JOURNAL OF SPACE LAW editor, and associate member of the American Translators Association.

Agency new ministerial status, in order to speed up and simplify the procedures dealing with international activities.<sup>1</sup>

The Russian Aerospace Agency was transformed into the Federal Space Agency by Presidential Edict No. 649, *Questions of the Structure of Federal Organs of Executive Power*, of May 20, 2004.<sup>2</sup> The Space Agency is no longer a separate operating agency under the purview of the Deputy Prime Minister but is now subordinated to the Ministry of Industry and Energy.<sup>3</sup> Nevertheless, the agency can hold direct negotiations and sign contracts with foreign partners, issue licenses for space activities and solve all management issues concerning space-related enterprises and facilities.<sup>4</sup> The agency is no longer in charge of the aviation industry, which used to drain the budget allocated to space activities.<sup>5</sup>

The appointment of General Anatoly Perminov as a new head of the Federal Space Agency raises concerns of a major change in the agency's policy and a shift from commercial to mainly military flights.<sup>6</sup>

#### V. PRESS RELEASES AND NEWS ARTICLES

J. Bequignon, *Executive Secretariat Disaster Charter, Third Annual Report, January to December 2003*, available at <http://www.disasterscharter.org/downloadable/3rdAnnualReport.pdf>.

*Floods in Argentina, Charter Activated July 7, 2004*, available at [http://www.disasterscharter.org/disasters/CALLID\\_067\\_e.html](http://www.disasterscharter.org/disasters/CALLID_067_e.html).

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<sup>1</sup> Presidential Edict No. 314 of March 9, 2004. See Resolution No. 195 of April 8 2004, available at [http://www.government.gov.ru/data/news\\_print.html?he\\_id=103&news\\_id=14024](http://www.government.gov.ru/data/news_print.html?he_id=103&news_id=14024) (last visited Oct. 14, 2004).

<sup>2</sup> See *Questions of the Structure of Federal Organs of Executive Power*, Presidential Edict No. 649 of May 20, 2004, available at [www.government.ru](http://www.government.ru) (last visited : Oct. 14, 2004).

<sup>3</sup> *Id.*

<sup>4</sup> *Id.*

<sup>5</sup> *Id.*

<sup>6</sup> See James Oberg, *Anxiety at NASA After Russian Space Chief Replaced*, MSNBC Space News, Mar. 14, 2004, at <http://msnbc.com/id/4527950/> (last visited Oct. 14, 2004).

*Heavy Floods and Torrential Rains in Sudan, Charter Activated August 11, 2004, available at [http://www.disasterscharter.org/disasters/CALLID\\_068\\_e.html](http://www.disasterscharter.org/disasters/CALLID_068_e.html).*

*Anna Marie Kinerney, ASPRS Releases Guidelines on Vertical Accuracy Reporting Requirements for Lidar-Derived Elevation Data, AMERICAN SOCIETY FOR PHOTOGRAMMETRY & REMOTE SENSING (Aug. 19, 2004) available at <http://www.asprs.org/>.*

*More Developmental Milestones Passed for EUMETSAT Polar System: Europe's first Polar Satellite on Target for Launch at End of 2005, News Release (Aug. 11, 2004) available at <http://www.knmi.nl/voorl/nieuws/persberichteumetsatfirstpolarsatellite2005.htm>.*

*NASA Announces Geoscience and Remote Sensing Presentations, GODDARD SPACE FLIGHT CENTER, Sept. 14, 2004, available at <http://www.gsfc.nasa.gov/topstory/2004/0916igarss.html>.*

*Space and Major Disasters Charter Agencies Strengthen Ties with UN, June 16, 2000, Colloquium at UNESCO, Paris available at [http://www.disasterscharter.org/press/press160604\\_e.html](http://www.disasterscharter.org/press/press160604_e.html).*

*Volcanic Activity in Columbia, Charter Activated August 26, 2004, available at [http://www.disasterscharter.org/disasters/CALLID\\_069\\_e.html](http://www.disasterscharter.org/disasters/CALLID_069_e.html).*

*Vanessa Wood, Unmanned Aerial Vehicles Take Joint Training to New Heights, USJFCOM (June 25, 2004) available at <http://www.jfcom.mil/newslink/storyarchive/2004/pa062504.htm>.*

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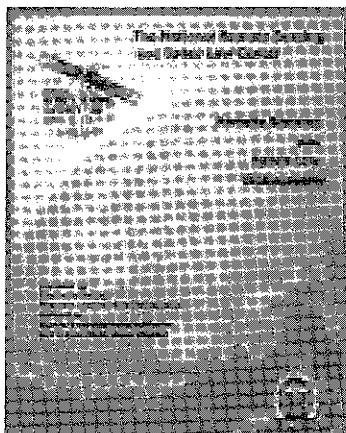
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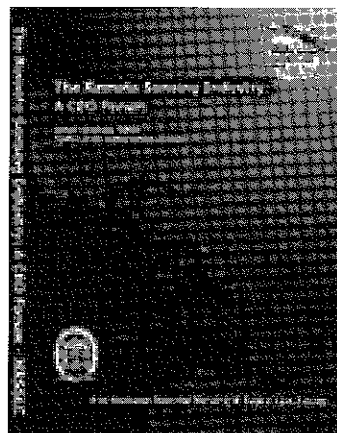
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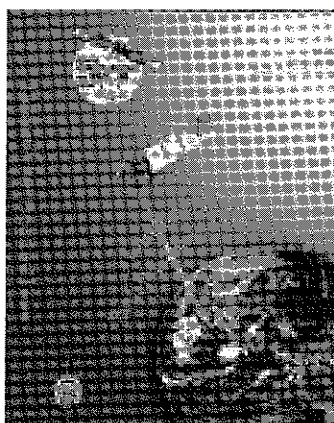
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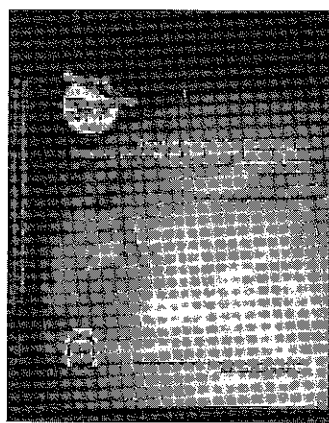
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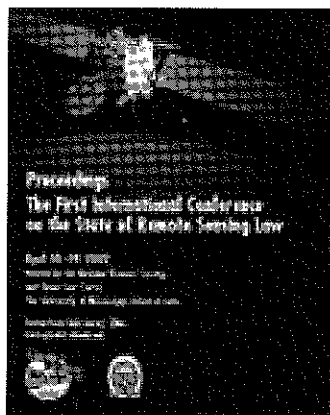
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**Landsat 7: Past, Present,  
and Future** \$50.00



**The UN Principles Related to Remote  
Sensing of Earth from Space** \$45.00



**Proceedings, The First International Conference  
on the State of Remote Sensing Law** \$80.00