

Space Law: Its Cold War Origins and Challenges in the Era of Globalization*

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I. ABSTRACT

Space law is a complex mixture of international and domestic laws that govern a wide spectrum of activities. Such activities can range from the exotic, like creating the institutional framework for an international lunar mining consortium, to the more routine, like drafting telecommunications agreements. The fields of law these activities can involve include administrative law, intellectual property law, arms control law, insurance law, environmental law, criminal law, and commercial law, as well as international treaties and domestic legislation written specifically for space. This paper outlines the origin and scope of space law and addresses the emerging challenges that this body of law faces in the 21st Century.

II. THE COLD WAR ORIGINS OF SPACE LAW

A. International Law

Starting with international space law, there are five major treaties drafted in the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) that are currently in force: the *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*¹ (Outer Space Treaty); the *Convention on International*

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1. Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

*Liability for Damage Caused by Space Objects*² (Liability Convention); the *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space*³ (Rescue and Return Agreement); the *Convention on Registration of Objects Launched into Outer Space*⁴ (Registration Convention); and the *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*⁵ (Moon Treaty). All but the last are widely accepted. The Outer Space Treaty is quasi-constitutional⁶ and entered into force in 1967.⁷ President Lyndon Johnson believed that the Outer Space Treaty was important enough to the United States' national interests to ask then Supreme Court Justice Arthur Goldberg to step down from the Supreme Court in order to negotiate it for the United States. The treaty has almost one hundred signatories⁸ and is the basis for all other treaties that reference it in their texts. It incorporates the United Nations (U.N.) Charter and all of international law.⁹ Together, the treaties form an interrelated legal framework that governs international space activities, complete with laws and dispute resolution mechanisms.

Other important international space law has been forged regionally through multinational agreements. Among the more important are the *Convention for the Establishment of a European Space Agency*,¹⁰ the *Agreement Relating to the International Telecommunications Satellite Organization*¹¹ (Intelsat Agreement), the *European Organization for the Exploration of Meteorological Satellites*¹² (Eumetsat Convention), and the international space station agreement.¹³ These multilateral treaties and agreements set the legal

2. Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter Liability Convention].

3. Apr. 22, 1968, 19 U.S.T. 7570, 672 U.N.T.S. 119 [hereinafter Rescue and Return Agreement].

4. Jan. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15 [hereinafter, Registration Convention].

5. Dec. 18, 1972, 1362 U.N.T.S. 3, 18 I.L.M. 1434 [hereinafter Moon Treaty].

6. See GEORGE S. ROBINSON & HAL M. WHITE, JR., ENVOYS OF MANKIND-A DECLARATION OF FIRST PRINCIPLES FOR THE GOVERNANCE OF SPACE SOCIETIES 187 (1987) (discussing Outer Space Treaty's constitutional nature).

7. Outer Space Treaty, *supra* note 1.

8. *United Nations Treaties and Principles of Space Law*, at <http://www.oosa.unvienna.org/SpaceLaw/treaties.html> (last visited March 8, 2004).

9. Outer Space Treaty, *supra* note 1, at 5.

10. European Space Agency, *Convention for the Establishment of a European Space Agency* (5th ed. Mar. 2003) [hereinafter ESA Convention], at http://esamultimedia.esa.int/docs/SP1271En_final.pdf (last visited March 8, 2004).

11. International Telecommunications Satellite Organization, *Agreement Relating to the International Telecommunications Satellite Organization*, Aug. 20, 1971, at http://www.itso.int/php_docs/tpl1_itso.php?dc=agreement (last visited Mar. 8, 2004).

12. *Convention for the Establishment of a European Organisation [sic] for the Exploitation of Meteorological Satellites*, Jan. 1981, at <http://www.eumetsat.de/en/area1/pdf/Convention.pdf> (last visited Mar. 27, 2004).

13. Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station, Jan. 29, 1998, at <http://www.hq.nasa.gov/ogc/iss/01agreement.html> (last visited Mar. 27, 2004).

foundation for satellite communications, meteorological observations, space station design, construction, use and maintenance, and can have scores of signatories. Bilateral agreements, such as the *Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water*¹⁴ and the now-terminated *Treaty on the Limitation of Anti-Ballistic Missile Systems*¹⁵ between the United States and the former U.S.S.R., have also been a source of international space law.

Born of Cold War forces, the COPUOS space treaties contain both the aspirations and fears of the times. Their affirmative mandates include that space is “the province of all mankind”¹⁶ and is not subject to national appropriation by the exercise of sovereignty.¹⁷ Astronauts are the “envoys of all mankind,” bestowed with ambassadorial status.¹⁸ The exploration and use of space is for the benefit of all countries without regard to the degree of their economic or scientific development.¹⁹ To prevent national rivalries from extending into space, the treaties require signatories to promote cooperation in space activities and to maintain international peace and security.²⁰ The provisions that separate open space from celestial bodies for demilitarization purposes embody the fears of the day.²¹ While military personnel engaged in peaceful or scientific activities are allowed on celestial bodies, military bases, installations, fortifications, weapons testing, and maneuvers are prohibited.²² In contrast, open space is partially demilitarized, with prohibitions covering only nuclear and other weapons of mass destruction.²³ Lacking complete knowledge of the other’s capability and concerned that they might give up an advantage, neither the Soviet Union nor the United States would agree to more.

The treaties also contain practical and innovative elements. Space-related accidents are provided for with both fault-based and strict liability regimes,²⁴ choice of fora,²⁵ a claims commission,²⁶ claims processing,²⁷ claims adjudication,²⁸ statutes of limitation,²⁹ and compensation rules.³⁰ Many of

14. Aug. 5, 1963, 14 U.S.T. 1313.

15. May 26, 1972, U.S.-U.S.S.R., 23 U.S.T. 3435.

16. Outer Space Treaty, *supra* note 1, at art. I.

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

18. *See* Outer Space Treaty, *supra* note 1, at art. V.

19. *See* Outer Space Treaty, *supra* note 1, at art. I.

20. *See* Outer Space Treaty, *supra* note 1, at art. III.

21. *See* Outer Space Treaty, *supra* note 1, at art. IV.

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

23. *See* Outer Space Treaty, *supra* note 1, at art. IV.

24. *See* Liability Convention, *supra* note 2, at arts. II-III; Outer Space Treaty, *supra* note 1, at art. VII.

25. *See* Liability Convention, *supra* note 2, at art. XI.

26. *See* Liability Convention, *supra* note 2, at art. XIV.

27. *See* Liability Convention, *supra* note 2, at arts. X-XI.

28. *See* Liability Convention, *supra* note 2, at arts. XV-XIX.

29. *See* Liability Convention, *supra* note 2, at art. X.

30. *See* Liability Convention, *supra* note 2, at arts. XII-XIII.

these provisions reflect the fact that the only two spacefaring nations at the time were deadly adversaries. For example, the Liability Convention embodies a strong pro-victim philosophy by establishing absolute liability for any damage caused by a space object on Earth or to an aircraft in flight.³¹ This principle was activated in 1978 when the Soviet *Cosmos 954* crashed in Canada's Northwest Territories, spewing radioactive debris over a five-hundred mile swath. The Soviets negotiated a \$3 million settlement after the Canadians presented them with a bill for \$6 million. This case highlighted the different expectations for state behavior in satellite accidents and addressed four governing norms: the duty to forewarn, to provide information, to clean up, and to compensate for injuries.³² Although the treaties were not formally invoked in the diplomatic negotiations surrounding the *Cosmos 954* accident, the negotiations involved provisions of both the Liability Convention and the Rescue and Return Agreement³³ that greatly influenced the diplomatic process at the time and continued to influence later events.

Space-age legal entities, international intergovernmental organizations, are recognized under the treaties,³⁴ affording organizations like the European Space Agency some rights and obligations once reserved only to nation-states. For example, international intergovernmental organizations may declare that they accept the rights and obligations of the treaties.³⁵ Further, State parties to the treaties who are members of such an organization are obliged to ensure that the organization makes this declaration.³⁶ References to States in the treaties are deemed applicable to international intergovernmental organizations that make the required declaration.³⁷ Regarding questions of liability, an international intergovernmental organization must be presented with a claim before it is presented to the State parties to the Liability Convention that are also members of the organization.³⁸ Only if the organization itself does not pay the compensation due can the claimant State "invoke the liability" of the organization's member nations.³⁹ Innovations like these add to the overall debate about the legal status of emerging supranational entities that was a

31. Liability Convention, *supra* note 2, at art. IV(1)(a).

32. See Alexander Cohen, *Cosmos 954 and the International Law of Satellite Accidents*, 10 YALE J. INT'L L. 78 (1984).

33. See CARL Q. CHRISTOL, *THE MODERN INTERNATIONAL LAW OF OUTER SPACE* 180 (Pergamon Press 1984) (1982).

34. See Outer Space Treaty, *supra* note 1, at art. XIII.

35. See Registration Convention, *supra* note 4, at art. VII(1); Moon Treaty, *supra* note 5, at art. 16; Liability Convention, *supra* note 2, at art. XXII(1); Rescue and Return Agreement, *supra* note 3, at art. 6.

36. See Registration Convention, *supra* note 4, at art. VII(2); Moon Treaty, *supra* note 5, at art. 16; Liability Convention, *supra* note 2, at art. XXII(2).

37. See Registration Convention, *supra* note 4, at art. VII; Moon Treaty, *supra* note 5, at art. 16; Liability Convention, *supra* note 2, at art. XXII(1); Rescue and Return Agreement, *supra* note 3, at art. 6; Outer Space Treaty, *supra* note 1, at art. XIV.

38. See Liability Convention, *supra* note 2, at art. XXII(3)(a).

39. See Liability Convention, *supra* note 2, at art. XXII(3)(a).

hallmark of international law in the last decades of the 20th Century. However, specific limitations on an organization's legal capacity also exist. For example, claims for damage caused to the organization must be presented by a member of the organization who is also a State party to the convention.⁴⁰ Moreover, international intergovernmental organizations may not ratify,⁴¹ amend,⁴² review,⁴³ or withdraw⁴⁴ from the treaties. Adding to the ambiguity of the legal

40. See Liability Convention, *supra* note 2, at art. XXII(4).

41. See Registration Convention, *supra* note 4, at art. VII (excluding intergovernmental organizations from ratification process); Moon Treaty, *supra* note 5, at art. 16 (containing ratification exclusion similar to Registration Convention's); Liability Convention, *supra* note 2, at art. XXII (containing ratification exclusion similar to Registration Convention's). Interestingly, both the Outer Space Treaty and the Rescue and Return Agreement are silent on ratification by international intergovernmental organizations, each limiting ratification to "States" in Article XIV(2) and Article 7(2), respectively. See Rescue and Return Agreement, *supra* note 3, at art. 7(2); Outer Space Treaty, *supra* note 1, at art. XIV(2). However, language limiting ratification to "States" is also contained in the Liability Convention at Article XXIV(1), the Registration Convention at Article VIII(1), and the Moon Treaty at Article 19(2). See Registration Convention, *supra* note 4, at art. VIII(1) (allowing only "State Parties" to ratify convention); Moon Treaty, *supra* note 5, at art. 19(2) (containing ratification provision similar to Registration Convention's); Liability Convention, *supra* note 2, at art. XXIV(1) (containing ratification provision similar to Registration Convention's).

42. See Registration Convention, *supra* note 4, at art. VII (excluding intergovernmental organizations from amendment provision); Moon Treaty, *supra* note 5, at art. 16 (containing amendment exclusion similar to Registration Convention's); Liability Convention, *supra* note 2, at art. XXII (containing amendment exclusion similar to Registration Convention's). Again, the Outer Space Treaty and the Rescue and Return Agreement are silent on amendment by international intergovernmental organizations, each limiting amendment to a "State Party" in Article XV and Article 8, respectively. See Rescue and Return Agreement, *supra* note 3, at art. 8; Outer Space Treaty, *supra* note 1, at art. XV. However, the same term is also contained in the Liability Convention at Article XXV, the Registration Convention at Article IX and the Moon Treaty at Article 17. See Registration Convention, *supra* note 4, at art. IX (allowing only "States Parties" to propose amendments); Moon Treaty, *supra* note 5, at art. 17 (containing amendment provision similar to Registration Convention's); Liability Convention, *supra* note 2, at art. XXV (containing amendment provision similar to Registration Convention's).

43. See Registration Convention, *supra* note 4, at art. VII (excluding intergovernmental organizations from review provision); Moon Treaty, *supra* note 5, at art. 16 (containing review exclusion similar to Registration Convention's); Liability Convention, *supra* note 2, at art. XXII (containing review exclusion similar to Registration Convention's). Regarding review, there is another interesting variation: neither the Outer Space Treaty nor the Return and Rescue Agreement have any review provision. See generally Rescue and Return Agreement, *supra* note 3; Outer Space Treaty, *supra* note 1. If what is not included is excluded, then both States and intergovernmental organizations are excluded from participating in a review process unless the treaties are amended to do so. See generally Rescue and Return Agreement, *supra* note 3; Outer Space Treaty, *supra* note 1.

44. See Registration Convention, *supra* note 4, at art. VII (excluding intergovernmental organizations from withdrawal provision); Moon Treaty, *supra* note 5, at art. 16 (containing withdrawal exclusion similar to Registration Convention's); Liability Convention, *supra* note 2, at art. XXII (containing withdrawal exclusion similar to Registration Convention's). As with ratification and amendment, the Outer Space Treaty and the Rescue and Return Agreement are once again silent on withdrawal by international intergovernmental organizations, limiting withdrawal to a "State Party" in Article XVI and Article 9, respectively. See Rescue and Return Agreement, *supra* note 3, at art. 9; Outer Space Treaty, *supra* note 1, at art. XVI. However, language limiting withdrawal to "States" is also contained in the Liability Convention at Article XXVII, the Registration Convention at Article XI, and the Moon Treaty at Article 20. See Registration Convention, *supra* note 4, at art. XI (providing only for "State Party" withdrawal); Moon Treaty, *supra* note 5, at art. 20 (containing withdrawal provision similar to Registration Convention's); Liability Convention, *supra* note 2, at art. XXVII (containing withdrawal provision similar to Registration Convention's).

status of these organizations is the language of the Outer Space Treaty, which states that “practical questions arising in connection with activities carried on by international intergovernmental organizations . . . shall be resolved by . . . States Parties . . . either with the appropriate international organization or with one or more States members of that international organization, which are Parties to this Treaty.”⁴⁵ The debate regarding the status of international intergovernmental organizations is further complicated by the apparent devolution of certain space international intergovernmental organizations, like *Intelsat*, in the post-Cold War era.

While the first four treaties were drafted, ratified, and entered into force with considerable speed from 1967 to 1974,⁴⁶ the last one, the Moon Treaty, adopted in 1979,⁴⁷ has met with minimal support and maximum controversy.⁴⁸ The debate surrounding its provisions for obtaining, using, and governing lunar resources incorporates the Earthbound conflict regarding wealth accumulation and distribution between the world’s rich, technologically advanced nations and its poor, technologically disadvantaged nations. The east-west adversarialism of the Cold War has given way to north-south resource disparity as the centerpiece of space law dialectic. Moon Treaty issues will continue to evolve as events between the developed and developing nations unfold. These issues, and the principles that implement their resolution, will likely have influence on the Moon Treaty’s future. In developed nations from the 1970s through the 1990s, the likelihood of a near-term return to the Moon diminished along with the political will needed to support such a mission. Recently, however, the Chinese became the third nation to place a human in space.⁴⁹ More successful Chinese missions could ignite the kind of rivalry and race for national prestige that has driven national missions since *Sputnik*. President George W. Bush has

45. Outer Space Treaty, *supra* note 1, at art. XIII.

46. The Outer Space Treaty was adopted on December 19, 1966 in General Assembly resolution 2222 (XXI), opened for signature on January 27, 1967, and entered into force on October 10, 1967. See Outer Space Treaty, *supra* note 1, at pmb1. The Rescue and Return Agreement was adopted on December 19, 1967 in General Assembly resolution 2345 (XXII), opened for signature on April 22, 1968, and entered into force on December 2, 1968. Rescue and Return Agreement, *supra* note 3, at pmb1. The Liability Convention was adopted on November 29, 1971 in General Assembly resolution 2777 (XXVI), opened for signature on March 29, 1972, and entered into force on September 1, 1972. Liability Convention, *supra* note 2, at pmb1. The Registration Convention was adopted on November 12, 1974 in General Assembly resolution 3235 (XXIX), opened for signature on January 14, 1975, and entered into force on September 15, 1976. Registration Convention, *supra* note 4, at pmb1.

47. The Moon Treaty was adopted on December 5, 1979, in General Assembly resolution 38/68, opened for signature on December 18 1979, and entered into force on 11 July 1984. See Moon Treaty, *supra* note 5, at pmb1.

48. See Eileen Galloway, *Space Law in the 21st Century*, 26 J. SPACE L. 187, 191 (1998).

49. *China Seeks Prestige of the Elite Man-in-Space Club, Say Experts*, at <http://www.spacedaily.com/2003/031002120836.8vr4hchu.html> (last visited Oct. 3, 2003); *Shenzhou-5 Single-Day Mission to Launch Near Oct. 15*, at <http://www.spacedaily.com/news/china-03ze.html> (last visited Oct. 3, 2003); *Shenzhou—Divine Military Vessel*, at <http://www.spacedaily.com/news/china-03zd.html> (last visited Oct. 3, 2003).

announced his Administration's plans for a United States return to the Moon,⁵⁰ although as of this writing, it is too soon to tell if these plans will succeed.

Overall, international space law has completed its first phase. Important general principles—some of them, historic—were articulated and agreed upon by a majority of nations. The next generation of space law involves agreeing on specific norms. Is sovereignty necessary to establish property rights? Are space resources, as well as space itself, the province of all humankind? If so, how are they to be allocated? If not, why? How can non-spacefaring nations be assured use of outer space? How will the investments of spacefaring nations be honored? What is the appropriate relationship between the public and private sectors in space? How will private space activities be regulated? These questions, and more, are yet to be answered.

B. United States Domestic Law

As a major spacefarer, the domestic legislation of the United States has persuasive authority for the development of international space law, much as the practices of strong maritime nations influenced the development of international maritime law.⁵¹ The United States Constitution mandates that a properly ratified treaty is the “supreme law of the land,” creating an interface between United States domestic law and international space treaties.⁵²

The *National Aeronautics and Space Act of 1958* (NAS Act) established the United States civil space program and NASA.⁵³ Among the purposes of the NAS Act are the expansion of human knowledge of space and atmospheric phenomena, the development of aeronautical and space vehicles, the establishment of long-term studies of potential benefits from the peaceful use of space, and the promotion of international cooperation. The most controversial aspect of the law when it was passed was the stark separation of military and civilian space activities. Adamant that the U.S. space program should stand in sharp contrast to the overtly military Soviet program and determined that space activities would not create a national deficit, President Eisenhower placed the national space program under civil control, resisting both popular sentiment and military pressure. By executive order, he transferred from the Defense Department to NASA all space-related civilian personnel, functions, facilities, equipment, records, property, and funds not primarily related to military operations and weapon system development. \$117

50. Frank Sietzen Jr. & Keith L. Cowing, *Bush OKs New Moon Missions*, UNITED PRESS INT'L, Jan. 8, 2004, at <http://www.spaceref.com/news/viewnews.html?id=913> (last visited January 20, 2004).

51. See Hamilton DeSaussure, *Remote Sensing Satellite Regulation by National and International Law*, 15 RUTGERS COMPUTER & TECH. L.J. 352, 375 (1989) (recognizing technology's pace requires more rapid space law development than centuries used for maritime law).

52. See U.S. CONST. art. VI.

53. National Aeronautics and Space Act of 1958, 42 U.S.C. § 2451 (2003) [hereinafter NAS Act].

million was provided to facilitate these transfers.⁵⁴ Reflecting the importance of NASA in waging the Cold War, the NAS Act gives NASA broad authority that is generally not available to other civil federal agencies.

Without specifically changing the NAS Act, economic and strategic pressures have blurred the legal distinction between military and civil space activities. Other pressures, like the energy crisis of the 1970s, prompted Congress to amend the NAS Act to make NASA responsible for questionable missions, including the development of advanced automobile propulsion systems.⁵⁵ While the NAS Act is still valid law, over the years it has been amended or ignored in piecemeal fashion, thus justifying its reconsideration as a whole in today's era of globalization.⁵⁶

Specific space laws passed by Congress include the 1962 *Comsat Act*,⁵⁷ the *Commercial Space Launch Act*, as amended,⁵⁸ and the *Land Remote Sensing Policy Act of 1992*.⁵⁹ As their names indicate, these acts govern public and private satellite communications, launch services and products, and remote sensing systems.

The *Comsat Act* authorized United States participation in the development and operation of *Intelsat*, an international communications satellite system. *Intelsat* members had agreed to make effective and equitable use of space radiocommunication. Under this agreement, the spectrum was considered a scarce resource that should be available to all nations on a global and nondiscriminatory basis. Member nations also agreed not to compete with *Intelsat*. Like the space treaties, the *Comsat Act* embodied both Cold War political and humanitarian motives. To influence what President John F. Kennedy called "the lands of the rising peoples,"⁶⁰ the *Comsat Act* directed that services to less economically developed countries should be provided. However, since satellite communications became a highly commercial success, *Intelsat* was restructured with private profit-making and public oversight components. Controversy currently exists over whether this new form is a viable one.

The *National Space Launch Act* (Launch Act) was passed in 1984. Its purposes were to promote economic growth and entrepreneurial activity by using space for peaceful purposes and to authorize the Department of

54. Exec. Order No. 10,783, 23 Fed. Reg. 7,643 (Oct. 1, 1958); Exec. Order 10,793, 23 Fed. Reg. 9,405 (Dec. 3, 1958).

55. NAS Act, *supra* note 53, § 2451(e).

56. When NASA's current General Counsel, Mr. Paul G. Pastorek, was appointed, one of the first projects instituted by his office was a review of the NAS Act as a whole.

57. 47 U.S.C. § 701 (1998).

58. 49 U.S.C. § 70104 (2003).

59. 15 U.S.C. § 5601 (2003).

60. President John F. Kennedy, Special Message to the Congress on Urgent National Needs (May 25, 1961) (delivered in person before a joint session), *reprinted in* PUBLIC PAPERS OF THE PRESIDENTS 396-406 (1961).

Transportation to regulate commercial launches. It was not until 1988, when the Launch Act was significantly amended, that it had any real impact on the launch industry. The *Challenger* accident prompted the Reagan Administration to change the national policy of using only space shuttles for all civil, military, and commercial launches. *Challenger* placed the state of the domestic launch industry under the congressional spotlight, leading to the 1988 amendments. Congress found that the biggest problem facing the industry was the risk of liability. Previously, NASA patterned launch agreements after an Air Force model agreement, which held the government harmless and exposed the launch provider to unlimited third party liability. The amended law requires a launch provider insure against damage to government property and third party liability. In turn, the government agrees to waive claims and indemnifies third party claims over insured amounts.⁶¹

The validity of the waivers was tested in federal court in *Martin Marietta v. Int'l Telecomm. Satellite Org.*⁶² Although the case did not involve the government or the Launch Act directly, the court held that it was the intent of Congress to provide broad protection for United States launch providers.⁶³ Therefore, waivers similar to those prescribed by the Act and used by Martin, the launch provider, and *Intelsat*, the satellite owner, were enforceable.⁶⁴ On appeal, however, a higher court reversed and remanded the case for further consideration, stating that the lower court had gone too far.⁶⁵ A corporate merger in which the plaintiff and defendant joined as one corporate entity pushed the issue into the future for other litigants to address. In the mid-1990s, the Launch Act and its amendments were incorporated into general transportation law and later augmented with specific legislation like the *Commercial Space Act of 1998*⁶⁶ and the *Thurmond National Defense Authorization Act*,⁶⁷ which addresses post Cold War national security issues.

As of this writing, space transportation law is once again being changed to incorporate the “emerging commercial human space flight industry,”⁶⁸ which is expected to be the foundation for space tourism. The first license is expected to be issued in the first half of 2004.⁶⁹

After nearly a decade of attempting to guide the complex process of land remote sensing, Congress amended the *1984 Land Remote Sensing Commercialization Act* (1984 Act) with the *Land Remote Sensing Policy Act of*

61. See 1984 Commercial Space Launch Act, 49 U.S.C. 70101-70305 (1988) (incorporating Act and its amendments into transportation law).

62. 763 F. Supp. 1327 (D. Md. 1991).

63. See *id.* at 1329-30.

64. See *id.*

65. See *Martin Marietta v. Int'l Telecomm. Satellite Org.*, 978 F.2d 140, 146 (4th Cir. 1992).

66. 42 U.S.C. § 14701 (2003).

67. 49 U.S.C. §§ 5601-5602 (2003).

68. See H.R. 3752, 108th Cong. (2d Sess. 2004).

69. H.R. 3752, 108th Cong. (2d Sess. 2004); S. 1260, 108th Cong. (2d Sess. 2004).

1992 (1992 Act).⁷⁰ This action was prompted by what many consider a failed attempt at commercialization and the 1984 Act's inability to meet the compelling needs of scientific research and the environment. The 1992 Act attempts to address these failures and, in many respects, is successful. Nonetheless, the 1992 Act still embodies some of the problems associated with the earlier law.

A central issue addressed in both laws is nondiscriminatory access to satellite data. Originally foreign policy, nondiscriminatory access applied to the government funded and operated *Landsat* system. The policy was intended to assuage non-spacefaring nations' fears of economic and military espionage. The 1984 Act attempted to commercialize the *Landsat* system, but provided inadequate subsidies to do so and subjected the private operator to the nondiscriminatory access policy. In practice, equal access under the *Landsat* operator resulted in equally high prices charged to all users. This consequence placed raw data beyond the means of many small companies, academics, developing nations, and scientific researchers. The old law also required all private, nonsubsidized, commercial remote sensing data providers to abide by the nondiscriminatory access policy. Unable to control their own pricing mechanisms, no other data providers applied for operating licenses under the old law.

The 1992 Act's most important advance for private system operators—and the reason why three private companies applied for licenses almost immediately after its passage—is that they now have more control over building a clientele. In order to reconcile United States domestic law with the *U.N. Principles on Remote Sensing*⁷¹ (U.N. Principles), the 1992 Act requires private companies to make unenhanced data available only to the governments of sensed states.⁷² In contrast, the 1984 Act required private companies to make raw data available to all potential users on the same terms.⁷³ The 1992 Act, however, does continue to place tax-funded government remote sensing systems under the nondiscriminatory access policy.⁷⁴ The *1998 Commercial Space Act*,⁷⁵ the NOAA private systems licensing regulations,⁷⁶ and the *NASA Authorization Act of 2000* amended and augmented the 1992 Act.⁷⁷ Together, they further define and regulate public and private remote sensing activities.

The United States' body of domestic space law reflects the maturity of

70. 15 U.S.C. §§ 5601-5642 (1992).

71. G.A. Res. 41/65, U.N. GAOR, 41st Sess., 95th plen. mtg. at 2, U.N. Doc A/RES/41/65 (1986) [hereinafter U.N. Principles].

72. 15 U.S.C. § 5622(a)(2) (1998).

73. 15 U.S.C. § 4201 (1984).

74. 15 U.S.C. § 5601(13) (1992).

75. Commercial Space Act of 1998, Pub. L. No. 105-303, § 102, 112 Stat. 2843, 2846-2851 (1998).

76. Licensing of Private Remote Sensing Systems, 15 C.F.R. § 960 (2000).

77. National Aeronautics and Space Administration Authorization Act of 2000, Pub. L. No. 106-391, 114 Stat. 1577 (2000).

United States' space activities and addresses general national interests and specific space technologies and applications. Some other spacefaring nations have also promulgated domestic space law. For example, reflecting the economic and strategic importance of Soviet space assets, among the first actions taken by the newly-independent C.I.S republics after the legal dissolution of the former Soviet Union was the drafting and ratifying of space laws.⁷⁸ A number of other nations, however, have only just begun to address the need for domestic legislation to administer national interests and to implement the treaty regime to which they are parties.⁷⁹ This has raised the first of a number of challenges space law currently faces. Others include determining the durability of the international space law regime, recognizing the increasingly hybrid public-private environment; integrating military and civil missions; and accommodating emerging global systems that require national action and global operation.

III. CHALLENGES FOR SPACE LAW IN THE ERA OF GLOBALIZATION

A. Domestic Space Law Development in Emerging Spacefaring Nations

The first era of space law, from the 1960s to the 1980s, was characterized by the establishment of a major international treaty regime for the exploration, use and governance of space by nation-states. Since then, the focus has expanded to include the evolution of commercial space activities and the development of national law. In the first years of the 21st century, the world witnessed the launch of Nigeria's *NigeriaSat1*, a small remote sensing satellite and a 14-orbit, 21-hour mission of the *ShengZhou-5*, which carried the first Chinese Taikonaut into space, making China only the third nation to place a human in space. These missions exemplify the emergence of the next generation of spacefaring nations. The space community has recognized that newly-active and recently-advancing space nations require expertise and guidance to develop their domestic space law and legal institutions.

The UN has noted:

The need for effective laws and policies on space activities, not just on an international level but also on the national level, is becoming clear to the increasing number of States now actively involved in the field of space. The successful operation of space law, policies and institutions in a country relies

78. See Elena Kamenetskaya, *Space Activities of Russia and Member States of the Commonwealth of Independent States: Features of the post-Soviet Legal Regime*, BULLETIN OF THE EUROPEAN CENTRE FOR SPACE LAW, at 2 (on file with author)

79. See UNITED NATIONS, OFFICE FOR OUTER SPACE AFFAIRS, REPORT ON THE UNITED NATIONS/INTERNATIONAL INSTITUTE OF AIR AND SPACE LAW WORKSHOP ON CAPACITY-BUILDING IN SPACE LAW, U.N. Doc. ST/SPACE/14 (2003) (urging such states to ratify outer space treaties).

on the presence of suitable professionals.⁸⁰

In 2001, the American Astronautical Society (AAS) concluded that,

The accessibility to and integration into our daily lives of numerous commercial applications in space, including satellite telephony, direct-to-home television, high-speed Internet connectivity, telemedicine, distance learning, remote sensing of the Earth, global positioning and navigation and materials processing, are a testament to that fact. Yet for private entities and investors to expand their business models and to reach for the next new application, they will need to see predictable, transparent and flexible international and domestic legal frameworks within which they may operate their businesses and protect their investments.⁸¹

Nigeria typifies the situation recognized by the United Nations and the AAS. With its placement of a small, remote sensing satellite into space, Nigeria decided the time had come to ratify the Outer Space Treaty and the Liability Convention. Prior to ratification, however, it requires further clarification regarding its obligations under the treaties.⁸² Domestically, the Nigerian government has just begun to grapple with concomitant legal issue of data access, national security, intellectual property, and others. Among the first measures it has taken is to seek external space law expertise in order to support and develop an internal domestic capability.

A review of interests among nations that have not yet ratified the space treaties,⁸³ and the large number of developing nations that attended two space law capacity-building workshops sponsored by the United Nations Office of Outer Space Affairs indicates that Nigeria is just one of many states that are similarly situated.⁸⁴ Integrating the “needs of developing nations”⁸⁵ into the

80. *United Nations Treaties on Outer Space: Actions at the National Level*, United Nations/Republic of Korea Workshop on Space Law (2003) (on file with author), available at <http://www.oosa.unvienna.org/SAP/act2003/repkorea/index.html> (last visited Jan. 10, 2004).

81. *Final Report, American Astronautical Society International Programs Committee Workshop on International Legal Regimes Governing Space Activities*, American Astronautical Society, at 1 (2001) [hereinafter *AASI Report*] (on file with author).

82. See U.N. COPUOS, 40th Sess., 641st mtg., at 10, U.N. Doc. COPUOS/LEGAL/T.641 (2001) [hereinafter COPUOS 641], available at <http://www.oosa.unvienna.org/COPUOS/Legal/transcripts/index.html> (last visited Mar. 11, 2004).

83. See *Report of the Committee on the Peaceful Uses of Outer Space*, U.N. GAOR 55th Sess., Supp. No. 20, ¶ 143, U.N. Doc. A/55/20 (2000) (indicating nations yet to ratify treaties), available at http://www.oosa.unvienna.org/Reports/gadocs/pdf/A_55_20E.pdf (last visited Jan. 10, 2004).

84. See United Nations/Int'l Inst. of Air and Space Law, The Hague, Netherlands, 19-21 (2002), available at <http://www.oosa.unvienna.org/SpaceLaw/workshops/index.html> (last visited Jan. 10, 2004).

85. G.A. Res. 51/122, U.N. GAOR, 51st Sess., Supp. No. 20, U.N. Doc. A/RES/51/122 (1996), available at http://www.oosa.unvienna.org/SpaceLaw/gares/pdf/ARES_51_122E.pdf (last visited Mar. 10, 2004). “Taking into particular account the needs of developing countries” is a space law term of art that has evolved in the language of the five space treaties and approximately 72 space related resolutions. *Id.* It is an attempt to acknowledge and address the economic and technological disparity between developed and developing nations which is distinctively evident in space activities. *Id.* The most extensive attempt at clarification was made in *The Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in*

existing body of space law will affirm and expand relevant existing legal principles, as well create new ones in the 21st century.

B. Durability and Evolution of the International Space Law Regime

Both established and newly-active spacefaring nations recognize the beginning of a new stage of space law development. However, there are differing opinions as to how best to direct the development process.

Process and substance have become intertwined, giving rise to a debate about the efficacy and adequacy of the existing treaty regime. Those nations that believe the regime is lacking and also beyond development through strengthening and amending the existing instruments suggest the negotiation of a new, comprehensive treaty.⁸⁶ Such nations see a new treaty as the only logical way to successfully meet the changing needs of space activities. They argue that nations are not participating in the existing treaties due to the uncertain and changing interpretations of the treaties' terms.⁸⁷ A comprehensive treaty would, they contend, affirm the current space law regime.⁸⁸ They further argue that a comprehensive treaty is necessary to address these problems because the five existing treaties are intentionally interrelated and require a holistic approach.⁸⁹

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.⁹⁰ Nations holding this view also raise related procedural issues, including the argument that consideration of a comprehensive treaty is beyond the competency of COPUOS and its Legal Subcommittee.⁹¹ They further argue that both the demonstrated difficulty in having a comprehensive treaty accepted as a formal agenda item, and the lack of consensus as to whether or not consideration of one is appropriate under

the Interest of All States, Taking into Particular Account the Needs of Developing Countries, adopted on 13 December 1996 (resolution 51/122). *Id.*

86. See *Report of the Legal Subcommittee*, U.N. COPUOS, 40th Sess., ¶ 3, U.N. Doc. AC105/763 (2001), available at http://www.oosa.unvienna.org/Reports/AC105_763E.pdf (last visited Mar. 10, 2004).

87. See generally U.N. COPUOS, 40th Sess., 640th mtg., U.N. Doc. COPUOS/LEGAL/T.640 (2001) [hereinafter COPUOS 640], available at http://www.oosa.unvienna.org/Reports/transcripts/lsc/2001/LEGAL_T_640E.pdf (last visited Mar. 10, 2004).

88. See *Report of the Legal Subcommittee*, U.N. COPUOS, 42nd Sess., ¶ 50, U.N. Doc. AC105/805 (2003), available at http://www.oosa.unvienna.org/Reports/AC105_805E.pdf (last visited on Mar. 10, 2004).

89. See *Report of the Legal Subcommittee*, U.N. COPUOS, 40th Sess., ¶ 33, U.N. Doc. AC105/763 (2001) [hereinafter COPUOS Legal 40], available at http://www.oosa.unvienna.org/Reports/AC105_763E.pdf (last visited Mar. 10, 2004).

90. See U.N. COPUOS, 57th Sess., Supp. No. 20, at 23, U.N. Doc. A/57/20 (2002), available at http://www.oosa.unvienna.org/Reports/gadocs/pdf/A_57_20E.pdf (last visited Mar. 10, 2004).

91. See *Report of the Legal Subcommittee*, U.N. COPUOS, 40th Sess., ¶ 34, U.N. Doc. AC105/763 (2001), available at http://www.oosa.unvienna.org/Reports/AC105_763E.pdf (last visited Mar. 10, 2004).

already existing items, manifest sentiments against a comprehensive treaty.⁹² Finally, they contend that because nations continue to join to the existing treaties,⁹³ the current regime is a viable one.

A still-evolving, incomplete but informative tally of nations on each side of the debate shows that, generally, and with one important exception, the more established spacefarers are against a new, comprehensive treaty, support the existing regime, and consider it a basis for further legal development. India,⁹⁴ Japan,⁹⁵ and the United States are included in this group.⁹⁶ On the other side of the issue are primarily nations with no, few, or recently developed space capabilities: Bulgaria, Colombia, China, Iran, and Greece.⁹⁷ 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, are concerned about the uncertainty in some of the treaties, but only go so far as supporting a review and clarification of the treaties themselves.⁹⁸

An interesting dichotomy worth noting is the opposing positions taken by Russia, on behalf of the Russian Federation,⁹⁹ and Ukraine. Russia, one of the two oldest, most successful spacefarers in the world—and the important exception to the line-up of established spacefarers noted above—is the originator and champion of the idea of a comprehensive, universal space treaty.¹⁰⁰ In contrast, Ukraine's position is that

[w]e proceed from the understanding that most outer space treaties have served us well for more than 30 years and they continue to serve as a good foundation for regulating States' activities in space exploration and peaceful uses of outer space. Today, these treaties continue to play an active role in regulating States' space activities. Therefore, in our view, it is necessary to continue hard work towards making sure that these treaties are ratified by the States that have failed to do so to date.¹⁰¹

92. See generally COPUOS 641, *supra* note 82; U.N. COPUOS, 40th Sess., 643rd mtg., U.N. Doc. COPUOS/LEGAL/T.643 (2001) [hereinafter COPUOS 643], available at http://www.oosa.unvienna.org/Reports/transcripts/lsc/2001/LEGALT_643E.pdf (last visited Mar. 11, 2004).

93. See generally U.N. COPUOS, 40th Sess. 642nd mtg., U.N. Doc. COPUOS/LEGAL/T.642 (2001) [hereinafter COPUOS 642], available at http://www.oosa.unvienna.org/Reports/transcripts/lsc/2001/LEGALT_642E.pdf (last visited Mar. 11, 2004).

94. See generally COPUOS 641, *supra* note 82.

95. See generally U.N. COPUOS, 41st Sess., 657th mtg., U.N. Doc. COPUOS/LEGAL/T.657 (2002) [hereinafter COPUOS 657], available at http://www.oosa.unvienna.org/Reports/transcripts/lsc/2002/LEGALT_657E.pdf (last visited Mar. 11, 2004).

96. See generally COPUOS 641, *supra* note 82.

97. See generally COPUOS 657, *supra* note 95.

98. See generally COPUOS 641, *supra* note 82.

99. See generally COPUOS 657, *supra* note 95.

100. A/AC.105/C.2/L.213 and A/AC.105/L.225 (on file with author).

101. U.N. COPUOS, 41st Sess., 657th mtg., at 2, U.N. Doc. COPUOS/LEGAL/T.660 (2002), available at http://www.oosa.unvienna.org/Reports/transcripts/lsc/2002/LEGALT_660E.pdf (last visited Mar. 11, 2004).

Russia's space activities have deep Cold War roots, and it continues to be a leader in space activities worldwide. Ukraine only participates in newer, commercial space activities more consistent with the era of globalization. Along with counterparts in Moscow and Seattle, Ukraine manufactures the Zenit-3SL rocket components that are the mainstay of the Sea Launch Limited Liability Corporation, of which it is the partner with the smallest holdings.

One outcome of the comprehensive treaty debate was a compromise. While one group of nations wanted an ad hoc, open-ended working group to consider a comprehensive treaty, another group questioned whether the forum was competent to do so. A working group was eventually convened, but it was limited to investigating the status of the existing treaties. The purpose of formulating a new treaty was beyond its assigned task.¹⁰²

The comprehensive treaty debate has extended beyond the COPUOS and its Legal Subcommittee to the space law community at large. A number of meetings have been held to address the adequacy of the international space law regime as it relates to specific activities, including numerous commercial applications¹⁰³ and multilateral environmental agreements.¹⁰⁴ Participants in these meetings have generally found that the legal regime is "adequate and appropriate"¹⁰⁵ and provides a "strong foundation in law"¹⁰⁶ for the specific space activities under consideration. In one workshop, the first finding of the Working Group on the Contribution of Space Systems to the Development and Implementation of Multilateral Environmental Agreements was that

[t]here is a strong foundation in law supporting the use of data and information from [Earth Observations] systems in [Multilateral Environmental Agreements]. The basis for this international legal status includes international space law as well as national laws, customary law, and the application of equity principles. This body of law permits and encourages the peaceful uses of outer space by governments, intergovernmental organizations, and nongovernmental entities.¹⁰⁷

Despite lack of agreement on an approach to space law development, all of the groups engaged in the current debate acknowledge that there is, in fact, a need for "elaborat[ion of] common legal rules or standards."¹⁰⁸ There is also considerable agreement on the reasons why further development is necessary, chiefly technological change and the increased commercialization of space.¹⁰⁹

102. See generally COPUOS Legal 40, *supra* note 89.

103. See generally *AASI Report*, *supra* note 81.

104. See generally *International Activities Committee: Addressing Challenges of the New Millennium*, American Institute of Aeronautics and Astronautics (2001) [hereinafter *AIAA Report*] (on file with author).

105. *AASI Report*, *supra* note 81, at 1.

106. *AIAA Report*, *supra* note 104.

107. *AIAA Report*, *supra* note 104, at 39.

108. *AASI Report*, *supra* note 81, at 1.

109. See generally COPUOS 641, *supra* note 82; see also *AASI Report*, *supra* note 81, at 1.

Like concentric circles, however, commercialization itself is changing within space activities, assuring that the questions of what needs to change in space law and how to develop it will be debated for the foreseeable future.

C. *The Increasingly Hybrid Public-Private Environment*

The moves toward commercialization and the integration of government space systems are premised on a patchwork of international and domestic legal regimes.¹¹⁰ Space law's clarity is particularly challenged by the expanding context of a hybrid public-private, international commercial space segment environment. The worldwide aerospace industry has long been mired in controversies over different national philosophies regarding the necessity or desirability of public-private separation, direct and indirect subsidies, and trade practices. Remote sensing, the application widely believed to be the next major commercial use of space, illustrates the problem well. Leading remote sensing nations, including France, Canada, India, and Japan, operate remote sensing systems based on mixed public-private institutions and principles. Other leading remote sensing nations have commercial technology applications that are clearly emerging from a government-funded, military heritage. Post-Cold War national budgets have created pressure to forge public-private partnerships even in nations historically committed to the separation of these sectors.¹¹¹ Even in the United States, where separation of public and private institutions is the standard approach, government-owned space corporations are considered cost-saving measures,¹¹² and major government contracts have been awarded with the express purpose of achieving parity between United States companies.¹¹³ Indeed, some observers opine that private companies that have already committed hundreds of millions of dollars to development will only survive if governments are reliable customers.¹¹⁴ Further, existing public systems face uncertain futures. Even though a statutory preference exists for a private *Landsat* follow-on option, its future also holds the potential for hybrid

110. See MICHAEL HARR & RAJIV KOHLI, COMMERCIAL UTILIZATION OF SPACE—AN INTERNATIONAL COMPARISON OF FRAMEWORK CONDITIONS 69-71 (1990) (summarizing framework conditions of United States and five other nations).

111. See Commercial Space Act of 1998, Pub. L. No. 105-303, § 102, 112 Stat. 2843, 2846-2851 (1998). Programs include Earth Observations Commercial Applications Program and the data buy program at NASA Stennis Space Center. See *id.*

112. See *NASA Considers Forming Government Corporation*, SPACE NEWS, Apr. 5, 1999, at 1.

113. See Jeremy Singer, *NIMA Contract Will Help Keep Space Imaging On Track*, SPACE NEWS, Oct. 28, 2003, at http://dev.space.com/spacenews/satellitecomm/nima_102803.html (last visited Mar. 15, 2004). “[U.S. National Imagery and Mapping Agency] Director James Clapper . . . said . . . that the near-term contract is ‘essentially designed to keep [Space Imaging] in the game’ following the agency’s Sept. 30 \$500 million award to Digital Globe to build and operate its next generation satellite.” *Id.*

114. *DoD Needs To Back Commercial Imagery Efforts*, DEFENSE INFORMATION & ELECTRONICS REPORT, May 7, 1999, at 1.

public-private operations.¹¹⁵

Finally, the particular remote sensing activities recognized in the corpus of space law—"improving natural resources management, land use and the protection of the environment"¹¹⁶—are increasingly identified among the potential markets for private and government space-based systems¹¹⁷ and have become the economic rationale for aggressive, commercial-like cost recovery policies for some public systems. Indeed, the commercialization of the European Meteorological Operational (METOP) system and the adoption by the World Meteorological Organization (WMO) of a precedent-shattering tiered-data access practice¹¹⁸ to protect the commercial value of certain weather data, dramatically demonstrate how commercial and environmental issues are merging. The intertwining of public and private functions in space activities is a space law subject that will continue to require further development.

D. Integration of Military and Civil Missions

A special case of hybrid space activities is the increased integration of military and civil missions. Although the separation of military and civil space activities is a fundamental tenet of the domestic law of a number of spacefaring nations,¹¹⁹ the integration of the two sectors has long been a reality for some nations and a more recent trend for others. The end of the Cold War, rising national deficits, and reduced need for systems duplication have created stronger pressures to merge the two sectors.

The United States and Europe provide the most prominent examples of this trend. At the national level, the United States is merging its civil Polar-Orbiting Operational Environmental Satellite (POES) program, operated by the National Oceanographic and Atmospheric Administration (NOAA) within the

115. See 15 U.S.C. § 5641(a)(4) (1992) (requesting assessment potential hybrid public-private operation of land remote sensing system).

116. U.N. Principles, *supra* note 71, at princ. I(a).

117. See Amnon Barzilai, *Outer Space—Clean Up Your Act*, HA'ARETZ, July 28, 1998, at B3 (discussing marketability of Israeli government-built satellite technology). "Today, the talk is of a 'niche' for commercial photography satellites for mapping, supplying weather information, preserving the environment and monitoring forests against fires. In fact, two huge companies, in the United States and Europe, are showing great interest in the small satellites that [Israeli Aircraft Industries] has developed." *Id.*

118. *WMO Policy and Practice for the Exchange of Meteorological and Related Data and Products Including Guidelines on Relationships in Commercial Meteorological Activities*, W.M.O. Res. 40, World Meteorological Congress, 12th mtg. (1995) [hereinafter W.M.O. 40] (addressing data exchange between national weather services and data provision to third parties), available at <http://www.nws.noaa.gov/im/wmor40.htm> (last visited Mar. 15, 2004).

119. See NAS Act, *supra* note 53, § 2451(b) (establishing NASA to provide civilian oversight of United States space program); ESA Convention, *supra* note 10, at art. II (establishing agency for European civilian space activity). The national laws of many European nations lack a specific delineation between "military" and "civil" in a manner analogous to U.S. law. However, the purpose of the European Space Agency is legally limited to "exclusively peaceful purposes" by the convention, which has generally been interpreted to prohibit military activity. Compare Japan: 1969 Diet Resolutions (on file with author), with NAS Act, *supra* note 53, § 2451(b), and ESA Convention, *supra* note 10, at art. II.

Commerce Department, and the U.S. military's Defense Meteorological Satellite Program (DMSP), operated by the Department of Defense (DoD), into a merged United States national system, the National Polar-orbiting Operational Environmental Satellite System (NPOESS). This merger is referred to as "convergence."¹²⁰ At the same time, the United States POES system is being coordinated with the European METOP 1 and 2 satellites to form the Initial Joint Polar System (IJPS).¹²¹ The NPOESS is being coordinated further with the European Organization for the Exploitation of Meteorological Satellites' (EUMETSAT) METOP 3 to create the Joint Polar System (JPS).¹²² The guiding principles of the United States process are the recognized importance of operational environmental data, assured data access, the ability to selectively deny critical environmental data to an adversary during crisis or war, and ensured data use by the United States and its allies. Implementation is occurring within the Executive Branch.¹²³ Negotiations and agreements are developing the guiding principles of the merged United States and European systems.¹²⁴

The potential success of convergence in the United States and coordinated systems between the United States and Europe raises a number of legal issues. Among them are the legal definitions of "crisis or war," "adversary," and "critical data," and the legal separation of the military and civil space programs under United States law, European law, and, perhaps, the individual national laws of certain European nations.

The NOAA-EUMETSAT IJPS agreement (IJPS Agreement) sets out

120. *Convergence of U.S.-Polar-Orbiting Operation Environmental Satellite Systems*, Presidential Decision Directive NSTC-2 (May 5, 1994) [hereinafter NSTC-2] (establishing National Polar-orbiting Operational Environmental Satellite System (NPOESS)), available at <http://www.ipn.noaa.gov/About/NSTC-2.html> (last visited Mar. 15, 2004). Managed by the Integrated Program Office (IPO), the NPOESS is staffed by personnel from the Department of Defense, which provides the NPOESS Deputy Director, NOAA, which provides the NPOESS System Program Director, and NASA. See *id.* As a tri-agency program, three senior positions exist: the Associate Director for Acquisition from the Air Force; the Associate Director for Technology Transition from NASA; and the Associate Director for Operations from NOAA. See *id.* These individuals form a tri-agency Executive Committee consisting of the Undersecretary of Commerce for Oceans and Atmosphere, the Undersecretary of DoD for Acquisition and Technology, and the Deputy Administrator of NASA, which has responsibility to coordinate program plans, budgets, and policies and to ensure agency funding commitments are equitable and sustained. See *Fact Sheet: Convergence of U.S.-Polar-Orbiting Operation Environmental Satellite Systems*, Attachment to Letter from John H. Gibbons, Assistant to President for Science and Technology, to Hon. George E. Brown, Jr., Chairman, Committee on Science, Space, & Technology, U.S. House of Representatives 2 (May 19, 1994) (on file with author).

121. See generally Agreement Between the U.S. National Oceanic and Atmospheric Administration and the European Organisation for the Exploitation of Meteorological Satellites on an Initial Joint Polar-orbiting Operational System, Nov. 19, 1998, U.S.-Eur. [hereinafter IJPS Agreement] (on file with author).

122. See generally Agreement Between the United States National Oceanic and Atmospheric Administration and the European Organisation for the Exploitation of Meteorological Satellites on Joint Transition Activities Regarding Polar-orbiting Operational Environmental Satellite Systems, June 24, 2003, U.S.-Eur., 2003 U.S.T. LEXIS 49 [hereinafter JPS Agreement] (providing for transition from IJPS Agreement).

123. See generally NSTC-2, *supra* note 120.

124. See generally IJPS Agreement, *supra* note 121.

definitions critical to the system's implementation, defining "crisis or war,"¹²⁵ "critical data,"¹²⁶ and "adversary."¹²⁷ These definitions will be invoked for "[d]ata denial of critical IJPS data for military purposes"¹²⁸ from ten United States instruments flying on NOAA and EUMETSAT spacecraft.¹²⁹ Two United States instruments are explicitly excluded from the data denial provisions.¹³⁰ "Data denial" is undefined, but criteria for determining when denial is implemented are set out, including the requirement for United States Cabinet level authority.¹³¹

125. IJPS Agreement, *supra* note 121, at annex.

Crisis or war is an international situation involving U.S. and/or Allied operations which could range across the spectrum of military operations. This spectrum would include:

- a major regional conflict;
- a peacemaking or peacekeeping operation involving U.S. and Allied personnel and resources;
- a humanitarian operation involving U.S. and Allied personnel and resources; or
- a show of force operation (such as deploying naval or ground forces to reflect international disapproval) involving U.S. and Allied personnel and resources.

Id.

126. IJPS Agreement, *supra* note 121, at annex. "Data denial may be applied to data which an adversary might use to support or enhance military planning and operations. For example, satellite visual, infrared or microwave imagery and infrared or microwave atmospheric sounding information have offensive and defensive military applications and are considered critical environmental data." *Id.*

127. IJPS Agreement, *supra* note 121, at annex 1. "Adversary" is defined as "[a] state or group of states or a politically unrecognized force within a state or group of states which pose a distinct threat to the U.S. or its Allies, especially regarding military operations." *Id.*

128. IJPS Agreement, *supra* note 121, at art. 8.4.

129. *See* IJPS Agreement, *supra* note 121, at art. 8.4 (noting data denial provisions contained in IJPS Agreement apply to both NOAA and EUMETSAT spacecraft). Instruments subjected to the data denial provision are the Visible/Infrared Imager Radiometer Suite (VIIRS), the Cross-track Infrared Sounder (CrIS), the Advanced Technology Microwave Sounder (ATMS), the Conical-scanning Microwave Imager/Sounder (CMIS), the Ozone Mapper and Profiling Suite (OMPS), the GPS Occultation Sensor (GPSOS), the Space Environmental Sensor Suite (SESS), the Earth Radiation Budget Sensor (ERBS), the Total Solar Irradiance Sensor (TSIS), the Radar Altimeter (ALT), which produces data including Precision Orbit Determination (POD) information, and the Aerosol Polarimeter Sensor (APS). *Id.* at art. 3.2.

130. *See* IJPS Agreement, *supra* note 121, at art. 8.5 (listing instruments excluded from data denial provision). The instruments excluded are the Satellite-Aided Search and Rescue (SARSAT) and the Data Collection and Location System (ARGOS). *Id.*

131. *See* IJPS Agreement, *supra* note 121, at annex 3 (noting cabinet level authority makes assessment whether data denial provision invoked and listing criteria).

Criteria for determination:

- Whether a condition of crisis or war exists or is developing and whether the crisis or war poses an immediate and serious threat to U.S.-Allied national security objectives such as whether it affects the lives of U.S. or Allied personnel and resources;
- An adversary's ability to receive and exploit environmental data from U.S. sensors for military purposes;
- An adversary's ability to receive and exploit similar environmental data from other sources for military purposes;
- What advantage the data from U.S. instruments would provide an adversary, given that similar data may be available from other sources;
- The impact of denying data to non-adversaries who may also be affected by data denial;
- The U.S. would consider its international obligations, including those with EUMETSAT and its members, in making a decision on data denial.

Id. at 28-29.

The data denial provisions raise the need to define the IJPS in legal terms.¹³² Under the World Meteorological Organization's Resolution 40, certain data from various IJPS instruments will fall under the "fundamental principle" of "broadening and enhancing the free and unrestricted exchange of meteorological and related data and products."¹³³ The U.N. Principles define "remote sensing" as "the sensing of the Earth's surface," placing the IJPS outside of their scope.¹³⁴ However, the IJPS Agreement recognizes "the essential role [of] environmental satellite data . . . [for] . . . other sectors of the global Earth observation and science user communities,"¹³⁵ and states that the parties are cooperating "to continue and improve the operational meteorological and environmental forecasting and global climate monitoring services."¹³⁶ To the extent the U.N. Principles require remote sensing to "promote the protection of the Earth's natural environment," the use of IJPS data under certain circumstances, such as those requiring an interdisciplinary scientific approach, could conceivably place the data within some limited application of the U.N. Principles.¹³⁷ However, if and when the IJPS is operated for military purposes, then it arguably becomes a military system, removing IJPS data from the scope of the U.N. Principles and presumably enabling data denial to occur. The question then becomes, as a matter of law, what must happen for the system to transition from a civil environmental/meteorological monitoring system to one used for military purposes? The IJPS Agreement begins to answer this question by stating that instances of "crisis or war" trigger such a transition.¹³⁸

The broad definition of "crisis or war" used in the IJPS Agreement covers activities "which could range across the spectrum of military operations," including regional conflicts, peacemaking or peacekeeping, humanitarian operations, and shows of force "to reflect international disapproval."¹³⁹ Wars are threats to a nation's supreme interests and ultimately every State that participates in merged systems, either directly or through intergovernmental organizations, has a national legal definition of "war." Furthermore, although the data denial provisions only apply to some United States instruments, the definitions of "data denial" and "crisis or war" may or may not be compatible

132. See IJPS Agreement, *supra* note 121, at art. 3 (containing "General System Description" describing spacecraft, instrumentation, and ground segment). "The IJP System consists of the following major elements: EUMETSAT and NOAA spacecraft, instrumentation, and ground segments. The spacecraft and instrumentation together are referred to as the satellite." *Id.*

133. W.M.O. 40, *supra* note 118, at 2.

134. U.N. Principles, *supra* note 71, at princ. I.

135. IJPS Agreement, *supra* note 121, at pmb1.

136. IJPS Agreement, *supra* note 121, at art. 1.

137. See U.N. Principles, *supra* note 71, at princ. X (regarding "averting any phenomenon harmful to the Earth's natural environment").

138. See IJPS Agreement, *supra* note 121, at annex 1.

139. IJPS Agreement, *supra* note 121, at annex 1.

and could lead to political and legal differences when data denial is invoked for military purposes. As with the evolving nature of warfare itself in the age of global terrorism, these definitions will continue to evolve as the relevant technologies change.¹⁴⁰

E. The Emergence of Private Law for Space: UNIDROIT

The first era of space law produced almost exclusively international public law. However, the increased interest in and fragility of space commercialization has encouraged the development of international private law. The most striking example of this is the *Convention on International Interests in Mobile Equipment* (Convention) and its Preliminary Draft Protocol on Matters Specific to Space Assets (Draft Space Protocol).¹⁴¹ The Convention recognizes that the modern world relies on expensive moving objects for transportation. It addresses the financing of these objects and the concomitant rights of the debtors and creditors. The Convention has three protocols, each in a different stage of development: the Protocol on Matters Specific to Aircraft Equipment; the Protocol on Matters Specific to Railway Rolling Stock; and the Draft Protocol on Matters Specific to Space Assets.¹⁴²

While all three protocols address similar subjects, the Draft Space Protocol is particularly challenging. The satellite industry, compared to the aircraft and rolling stock industries, is still young, meaning financing risks are greater. Additionally, the inherent nature of the financed asset, a satellite, poses unique problems that do not apply to aircraft and rolling stock. For example, in the event of default an object in space cannot be physically repossessed. Even after default a satellite must be maintained in order to prevent dangerous or environmentally unsound on-orbit conditions.

It is reasonable to expect that clarifying, drafting, and negotiating the Draft Space Protocol will continue for a number of years. The most important issues have already been articulated and resolutions for a number of them have begun to take shape.¹⁴³ Among these issues are the relationship between international

140. See European Organization for the Exploitation of Meteorological Satellites Agreement on Joint Transition Activities Regarding Polar-orbiting Operational Environmental Satellite Systems, June 24, 2003, 2003 U.S.T. LEXIS 49, at *1-5 (restating data denial related definitions). The Preamble of this follow-on agreement to the IJPS Agreement also notes that future joint systems are intended and "additional agreements are necessary" to ensure data continuity. *Id.* at *4.

141. Convention on International Interests in Mobile Equipment, International Institute for the Unification of Private Law (UNIDROIT), Nov. 16, 2001 [hereinafter Convention], at <http://www.unidroit.org/english/conventions/mobile-equipment/mobile-equipment.pdf> (last visited Mar. 16, 2004).

142. See generally Convention, *supra* note 141.

143. See generally UNIDROIT Committee of Governmental Experts for the Preparation of a Draft Protocol to the Convention on International Interests in Mobile Equipment on Matters specific to Space Property, 1st Sess., Dec. 15-19, 2003, at <http://www.unidroit.org/english/internationalinterests/history.htm> (last visited Mar. 16, 2004).

space law and the eventual final Space Protocol,¹⁴⁴ the efficacy of available remedies,¹⁴⁵ and the nature of the creditor and debtor relationship.¹⁴⁶

The emerging consensus appears to be that the Draft Space Protocol, when adopted, will be an international law instrument regarding private law matters. The question of whether or not a conflict exists between international space law and the Draft Space Protocol was formally addressed twice by expert groups and no conflict was found.¹⁴⁷ However, discussion about the proper relationship between the space treaties and the Draft Space Protocol continues.¹⁴⁸

With respect to the creditor-debtor relationship, the efficacy of available remedies in the case of default is complicated by the fact that, generally, space assets are not easily repossessed and most creditors will have to resort to constructive repossession. With satellites, however, the right to use and control is as important as taking physical control. To facilitate constructive repossession, the computer codes that control the satellite can be placed in escrow. The creditor then uses the codes to take over satellite operations. Code escrow expedites repossession. Repossession is further complicated by the fact that many satellites are high value assets that serve critical commercial and/or public good functions. Time becomes of the essence when transfer of use and control is necessary. For example, television and radio users have low tolerance for failed reception. Moreover, many satellites have highly sophisticated technical elements with sensitive national security implications. The export of these elements is highly controlled as a matter of domestic law. Finally, the code itself is software that is also subject to export controls. So while code escrow facilitates financing, it also introduces sensitive national interests into a private transaction, which may invite State action. A tension is created between promoting debtor-creditor autonomy and State responsibility for public health and safety. An emerging response appears to be identifying an appropriate legal personality to serve as escrow agent with which data and materials are placed subject to laws of the relevant State.¹⁴⁹

As is expected with a protocol that deals with financing space assets, the

144. See Joanne I. Gabrynowicz, Notes on the UNIDROIT Committee of Governmental Experts for the Preparation of a Draft Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Space Assets, 49 (December 15-19, 2003) (unpublished manuscript, on file with the author) (examining whether conflict exists between UNIDROIT and treaties).

145. See *id.* at 1 (providing default remedies).

146. See *id.* at 52-53 (addressing competing interests in same asset).

147. See *Draft Convention of the International Institute for the Unification of Private Law on International Interests in Mobile Equipment and the Preliminary Draft Protocol Thereto on Matters Specific to Space Property*, U.N. COPUOS, 40th Sess., Agenda Item 8, at 7, U.N. Doc. A/AC.105/C.2/L.225 (2002), available at http://www.oosa.unvienna.org/Reports/AC105_C2_L225E.pdf (last visited Mar. 28, 2004).

148. See Gabrynowicz, *supra* note 144, at 50 (recommending consideration at future meeting).

149. See Gabrynowicz, *supra* note 144, at 21 (noting issue of whether supervisory body subject to national authority).

debtor-creditor relationship is its heart and soul. Issues regarding that relationship manifest in numerous ways. While some issues predictably reflect the relative positions based on financing and contract concepts, there are also those that reflect history and geopolitics.

Issues in the first category involve making appropriate distinctions between project financing and asset financing, pre-launch financing and post-launch financing, and assets in space and those intended for launch.¹⁵⁰ These distinctions arise through combining the long-term financing needs of a typical satellite operator debtor with project analyses conducted by a typical financial institution creditor. Building and launching a satellite can take years, and a return on a satellite investment occurs only after a successful launch. These distinctions allow phased financing and transfer of collateral, creating a spectrum of relationships in which the relative rights and obligations between the creditor and debtor change over time.¹⁵¹

The category of issues reflecting history involve debates between technologically advanced nations and technologically disadvantaged nations. An example is the question of whether to achieve balance between space asset creditors, typically developed nations, and space asset debtors, typically developing nations, or to encourage creditors to offer credit by limiting conflict in a high-risk endeavor.¹⁵²

Geopolitics break through the legal construct of creditors and debtors in the debate between some socialist and some capitalist nations. The former believe that the final protocol should have limited application to public service satellites. In this view, continuity of services is paramount, even in cases of default. For some nations in this group, this issue has the potential to prevent acceptance of the Draft Space Protocol by their national governments. Other nations do not see the issue in terms of jeopardizing public services, but rather as making financing mechanisms available for public authorities to finance their services. Satellites provide communication, navigation, data transfer, broadcasting, and weather services. Individual satellite components, like a rented transponder, can provide a public service on an otherwise commercial satellite. Satellite function and technology thus have the potential to give nearly every satellite a public aspect.

The globalization of commerce as well as the breadth of functions satellites provide, suggest the Draft Space Protocol will continue to present its drafters with leading edge legal issues.

F. Operating Globally, Acting Nationally: Emerging Global Systems

Since the first weather satellites were deployed in the 1960s, scientists and

150. See Gabrynowicz, *supra* note 144, at 9 (observing distinction between project and asset financing).

151. See Gabrynowicz, *supra* note 144, at 9-10 (discussing contractual and related rights).

152. See Gabrynowicz, *supra* note 144, at 9, 33 (noting relative risk levels).

policymakers have envisioned a coordinated, long-term global space-based system to monitor the Earth.¹⁵³ Politics, economics, and changing scientific priorities made this system an elusive goal. In the last two years, however, the idea has risen to an unprecedented level of political visibility and the world's remote sensing nations have taken clear and decisive action toward establishing such a system.

Establishing the integrated global observation system over ten years was an action item at the 2003 G-8 summit.¹⁵⁴ The Earth Observation Summit, held on June 2, 2003 to address that action item, was attended by Ministers from the G-8 and other nations. As a result, a plan and an intergovernmental organization to carry it out was instituted.¹⁵⁵

Determining which of the proposed system concepts will prevail involves addressing a variety of legal issues. The most advanced agreement to date, the *Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters*¹⁵⁶ (Charter), addresses many of these issues, including governing definitions, cooperative procedures, availability of facilities, accession to the agreement, entry into force, expiration, withdrawal, and agreement implementation. The Charter was activated 42 times since November 2000 for disasters that included floods, earthquakes, oil spills, landslides, hurricanes, and fires.¹⁵⁷

As existing individual satellites become more integrated in their operations and as new interoperational systems are designed, over time the related legal issues may encompass many things. The issues may include the relationship among the Charter, the space treaties,¹⁵⁸ the U.N. Principles,¹⁵⁹ which are specifically referenced in the Charter,¹⁶⁰ and various nations' domestic laws, including the United States' 1992 Act,¹⁶¹ France's *Remote Sensing Legal Framework*,¹⁶² Canada's *Access Control Policy*,¹⁶³ and India's national

153. SPACE STUDIES BOARD, NATIONAL RESEARCH COUNCIL, *EARTH OBSERVATIONS FROM SPACE: HISTORY, PROMISE AND REALITY* 25 (1995).

154. *Science and Technology for Sustainable Development: A G8 Action Plan*, EARTH OBSERVATION SUMMIT (June 2, 2003), at http://www.earthobservationsummit.gov/g8_action.html (last visited Mar. 16, 2004).

155. *GEO Purpose and Functions*, Group on Earth Observation, at <http://earthobservations.org/purpose.asp> (last visited Mar. 27, 2004).

156. Charter On Cooperation To Achieve The Coordinated Use Of Space Facilities In The Event Of Natural Or Technological Disasters, Rev.3 (25/4/2000).2 (2000) [hereinafter Charter], at http://www.disasterscharter.org/charter_e.html (last visited Mar. 16, 2004).

157. *The Charter in Action*, Feb. 2, 2004 (listing specific events that activated Charter), at http://www.disasterscharter.org/disasters_e.html (last visited Mar. 16, 2004).

158. See generally *supra* notes 1-5 and accompanying text.

159. See generally U.N. Principles, *supra* note 71.

160. Charter, *supra* note 156, at pmb1.

161. 15 U.S.C. §§ 5601-5602 (2003).

162. See generally Phillippe Clerc, *The State of Remote Sensing Law: French Regulation and Practice*, in PROCEEDINGS, 1ST INTERNATIONAL CONFERENCE ON THE STATE OF REMOTE SENSING LAW (Joanne I. Gabrynowicz ed., National Remote Sensing and Space Law Center 2002) [hereinafter PROCEEDINGS].

163. See generally Phillip J. Baines, *Balancing Interests: Toward Further Progress in the development of*

policies.¹⁶⁴

As with the IJPS, an integrated system will give rise to definitional questions. In addition to the categories of data definitions found in the U.N. Principles,¹⁶⁵ the Charter adds the new term “space data,” which is defined as “raw data gathered by a space system controlled by one of the parties, or to which that party has access, and transmitted or conveyed to a ground receiving station.”¹⁶⁶ Unlike the data categories in the U.N. Principles, which are characterized by the technological aspects of the data, as well as by the fact that they are gathered by a “space object,” the Charter appears to have the effect of emphasizing the location of the system, space, over data characteristics.

The intended longevity of a global monitoring system also raises the question of whether or not the occupation of the same orbit for many years constitutes an appropriation of space by a satellite’s operating nation, which is banned by the Outer Space Treaty.¹⁶⁷ When faced with a similar issue, the government partners to the International Space Station chose to address it by specifically stating that, even though the station’s purpose necessitates a long-term mission, “[n]othing in this Agreement shall be interpreted as . . . constituting a basis for asserting a claim to national appropriation over outer space or over any portion of outer space.”¹⁶⁸ This may serve as a precedent as the emerging global monitoring systems continue to evolve.

IV. CONCLUSION

Autonomy, separation, and emphasis on individual national space programs were the hallmarks of the activities that gave rise to the international and domestic space law forged during the Cold War. However, competition did co-exist with cooperation and the single-nation spectacles like *Apollo* and *Mir* gave way to post-*Apollo* multinational endeavors like the International Space Station. In the present era of globalization, in-tandem cooperation is transforming into intentional integration. Like so many other human activities at the dawn of the twenty-first century, the space law will be challenged to nurture and guide the transformation. The opportunities to do so will be many and varied.

a Regulatory Regime for Commercial Remote Sensing Space Systems in Canada, in PROCEEDINGS, *supra* note 162.

164. See generally Mukund Rao, et al., *Issues for a Remote Sensing Policy and Perspective of the Indian Remote Sensing Data Programme*, in PROCEEDINGS, *supra* note 162.

165. See U.N. Principles, *supra* note 71, at princ. I.

166. Charter, *supra* note 156, at art. 1.

167. Outer Space Treaty, *supra* note 1, at art. 2.

168. Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation and the Government of the United States of America Concerning Cooperation on the Civil International Space Station, Jan. 29, 1998, 1998 U.S.T. LEXIS 212, at art. 2(2)(c) (entered into force Mar. 27, 2001).