THE GROWTH OF DOMESTIC SPACE LAW: A U.S. EXAMPLE

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Introduction

More than three decades have passed since the beginning of the Space Age, during which time the United States has not only contributed to the scientific and technological achievements but has also played a leading role in the establishment of rules and regulations governing the activities associated with the exploration and use of outer space. While the international community focused its attention on the world-wide implications of the emerging activities in outer space, and drafted a number of major international agreements, in the domestic field the United States took the leadership in passing several important legislative enactments and in promulgating hundreds of rules and regulations, thereby underscoring the unique role that it has played in charting new pathways in a hitherto unknown field of national space legislation.

The NASAct

The first landmark of this unparalleled domestic track record was laid by the United States Congress a year after the launch of Sputnik, and is known as the National Aeronautics and Space Act (NASAct) of 1958,[1] in which the United States pledged that its activities in space would be devoted to peaceful purposes and for the benefit for all mankind.[2] In the same enactment, Congress further declared that space activities were to be the responsibility of a civilian agency exercising control over such activities sponsored by the United States, except that activities associated with the development of weapons systems, military operations, or national defense would be the responsibility of the Department of Defense.[3]

The assigned task of the new agency, known as the National Aeronautics and Space Administration (NASA), has been, *inter alia*, to plan, direct and conduct space activities, arrange for the scientific community's participation and provide for the widest practicable and

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1. Pub. L. No. 85-568, 72 Stat. 426, 42 U.S.C. sec. 2451 *et seq.* (1988)[hereinafter NASAct].
2. *Id.* sec. 102(a).
3. *Id.* sec.102(b).

appropriate dissemination of information concerning its activities and the results thereof.[4]

(a) International Aspects

Apart from its day-to-day functions, NASA has been authorized to engage, under the foreign policy guidance of the President, in a program of international cooperation subject to agreements made by the President with the advice and consent of the Senate.[5]

While our focus is on U.S. domestic law, in order to foreclose any possibly erroneous impression, it should be stressed that the preceding provision, as interpreted by President Eisenhower at the time of his signing of the NASAct, merely recognized that international treaties may be made in the space field and did not preclude, in appropriate cases, less formal arrangements for cooperation.[6] Entirely in line with this clear constitutional understanding which corresponded to longstanding historical practice in other areas, the United States has entered into a series of major international multilateral agreements having relevance to space. Among them are the Limited Test Ban Treaty,[7] the Outer Space Treaty,[8] the Agreement on the Rescue and Return of Astronauts,[9] the Liability Convention,[10] the Registration Convention,[11] the ENMOD

4. *Id.* sec. 203(a).

5. *Id.* sec. 205.

6. 1 UNITED STATES SPACE LAW - NATIONAL AND INTERNATIONAL REGULATION (S. Gorove ed. 1982-1990), sec. I.A.1., at 17 [hereinafter "UNITED STATES SPACE LAW"].

7. Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water, *done* Aug. 5, 1963, 14 U.S.T. 1313, T.I.A.S. No. 5433, 480 U.N.T.S. 43 [herein "Limited Test Ban Treaty"].

8. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, *done* Jan. 27, 1967, 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205 *(entered into force for the United States* Oct. 10, 1967) [hereinafter "Outer Space Treaty"].

9. Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, *done* Apr. 22, 1968, 19 U.S.T. 7570, T.I.A.S. No. 6599, 672 U.N.T.S. 119 *(entered into force for the United States* Dec. 3, 1968) [herein "Agreement on the Rescue and Return of Astronauts"].

10. Convention on International Liability for Damage Caused by Space Objects, Oct. 9, 1973, 2424 U.S.T. 2389, T.I.A.S. No. 7762, 961 U.N.T.S. 187 *(entered into force for the United States* Oct. 9, 1973) [hereinafter "Liability Convention"].

11. Convention on the Registration of Objects Launched into Outer Space, *opened for signature* Jan. 14, 1975, 28 U.S.T. 695, T.I.A.S. No. 8480, 1023 U.N.T.S. 15 *(entered into force for the United States* Sept. 15, 1976) [herein "Registration Convention"].

Convention,[12] the ITU Conventions,[13] the INTELSAT[14] and INMARSAT Agreements,[15] the Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite,[16] and the U.S./International Space Station Agreement.[17]

In addition to these major international treaties, the United States is also a party to well over a thousand, mostly bilateral international agreements, memoranda of understanding and exchanges of notes dealing with cooperative projects, reimbursable launchings, tracking and data acquisition facilities, personnel exchanges, defense and other matters. The bulk of these bilaterals do not entail the more formal treaty-making process which requires an affirmative two-thirds majority vote in the U.S. Senate. It should be emphasized that international customary law as well as international treaty law concluded by the United States, is a part of United States law. Under the federal constitution, treaties are the supreme law of the land and no less binding on the courts than federal statutes. Apart from treaty law, the United States has also voted in support of many U.N. resolutions pertaining to outer space and other relevant statements or

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12. Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques, *done* May 18, 1977; T.I.A.S. No. 9614, 1108 U.N.T.S. 151 *(entered into force for the United States* Jan. 17, 1980) [herein "ENMOD Convention"].

13. International Telecommunications Convention (Malaga-Torremolinos), *done* Oct. 25, 1973, 28 U.S.T. 2495, T.I.A.S. No. 8572 *(entered into force for the United States* Apr. 7, 1976); International Telecommunications Convention (Nairobi), *done* Nov. 6, 1982 *(entered into force for the United States* Jan. 10, 1986) [herein "I.T.U. Conventions"].

14. International Telecommunications Satellite Organization (INTELSAT) Agreement, with Annexes, *done* Aug. 20, 1971, 23 U.S.T. 3813, T.I.A.S. No. 7532 *(entered into force for the United States* Feb. 12, 1973); Operating Agreement relating to the International Telecommunications Satellite Organization (INTELSAT) Aug. 20, 1971, 23 U.S.T. 4091, T.I.A.S. No. 7532 *(entered into force for the United States* Feb. 12, 1973) [hereinafter "INTELSAT Agreements"].

15. Convention on the International Maritime Satellite Organization (INMARSAT), Sept. 3, 1976, 51 U.S.T. 135, T.I.A.S. No. 9605 (*entered into force for the United States* July 16, 1979); Operating Agreement on the International Maritime Satellite Organization (INMARSAT), Sept. 3, 1976, 31 U.S.T. 135, T.I.A.S. No. 9605 (*entered into force for the United States* July 16, 1979) [hereinafter "INMARSAT Conventions"].

16. Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite, *done* May 21, 1974, 1144 U.N.T.S. 3 *(entered into force for the United States* Mar. 7, 1985) [no T.I.A.S. number is available at this time].

17. Agreement Among the Government of the United States of America, Governments of Member States of the European Space Agency, the Government of Japan, and the Government of Canada on Cooperation in the Detailed Design, Development, Operation, and Utilization of the Permanently Manned Civil Space Station, *signed* Sept. 29, 1988 *(not in force* as of May 1, 1990).

declarations not having international treaty force such as, for instance, the U.N. Principles on Remote Sensing.[18]

(b) Some Definitions

In 1958 the Space Age was only a year old and the time was hardly ripe for laying down definitions or detailed sets of rules pertaining to the novel activities. However, the NASAct described, for instance, "aeronautical and space vehicles" to mean "aircraft, missiles, satellites, and other space vehicles, manned and unmanned, together with related equipment, devices, components, and parts."[19] The NASAct also addressed issues of property rights in inventions and over the years several additions and amendments were made to the original law. For example, in subsequent legislation "aeronautical and space activities" were defined to mean:

> (A) research into, and the solution of, problems of flight within and outside the earth's atmosphere, (B) the development, construction, testing, and operation for research purposes of aeronautical and space vehicles, (C) the operation of a space transportation system, including the Space Shuttle, upper stages, space platforms, and related equipment, and (D) such other activities as may be required for the exploration of space.[21]

The NASAct, in its amended form, also stipulates that the aeronautical and space activities of the United States are to be conducted so as to contribute materially to one or more of the following objectives:

> (1) The expansion of human knowledge of the Earth and of phenomena in the atmosphere and space;
> (2) The improvement of the usefulness, performance, speed, safety, and efficiency of aeronautical and space vehicles;
> (3) The development and operation of vehicles capable of carrying instruments, equipment, supplies, and living organisms through space;
> (4) The establishment of long-range studies of the potential benefits to be gained from, the opportunities for, and the problems involved in the utilization of aeronautical and space activities for peaceful and scientific purposes;
> (5) The preservation of the role of the United States as a leader in aeronautical and space science and technology and

18. U.N. Doc. A/AC.105/370, at 12-15 (1986).
19. NASAct, *supra* note 1, sec. 103(2), 42 U.S.C. sec. 2452 (1982).
20. *Id.* sec. 305, 42 U.S.C. sec. 2457 (1982).
21. *Id.* sec. 103(1), 42 U.S.C. sec. 2452 (1982).

> in the application thereof to the conduct of peaceful activities within and outside the atmosphere;
> (6) The making available to agencies directly concerned with national defense of discoveries that have military value or significance, and the furnishing by such agencies, to the civilian agency established to direct and control nonmilitary aeronautical and space activities, of information as to discoveries which have value or significance to that agency;
> (7) Cooperation by the United States with other nations and groups of nations in work done pursuant to this Act and in the peaceful application of the results thereof.
> (8) The most effective utilization of the scientific and engineering resources of the United States, with close cooperation among all interested agencies of the United States in order to avoid unnecessary duplication of effort, facilities, and equipment; and;
> (9) The preservation of the United States pre-eminent position in aeronautics and space through research and technology development related to associated manufacturing processes.[22]

Additional legislative enactments dealt with liability insurance and indemnification,[23] administrative claims and litigation,[24] NASA's relationship with other federal agencies[25] and many other issues. Limitations of space do not permit even a perfunctory overview of the many important provisions but by way of an example the term "space vehicle" may be singled out which was defined to mean "an object intended for launch, launched or assembled in outer space, including the Space Shuttle and other components of a space transportation system, together with related equipment, devices, components and parts."[26]

Amendments to Older Laws

Some of the already existing laws such as, for instance, the Communications Act of 1934, and its provisions relating to radio, were

22. *Id.* sec. 102 (d), 42 U.S.C. Sec. 2451 (1982). The clause, "of the Earth" was added by the "National Aeronautics and Space Administration Authorization Act, 1985." Pub. L. No. 98-361, sec. 110 (b), 98 Stat. 426, 42 U.S.C. 2451 (1990).
23. *Id.* sec. 308, 42 U.S.C. sec. 2458(b) (1982).
24. 28 U.S.C. sec. 1346 (1982).
25. *See e.g.*, 22 U.S.C. secs. 2575, 2585(c) (1988); 42 U.S.C. sec. 1505,;49 U.S.C. sec. 1349 (1982).
26. NASAct, *supra* note 1, sec. 308(f)(1), 42 U.S.C. sec. 2458(b) (1982).

amended and applied to space telecommunications,[27] much as the Crimes and Criminal Procedure Act of 1948 in an amended form was made applicable, by extension of the special maritime and territorial jurisdiction of the United States,

> to any vehicle used or designed for flight or navigation in space and registered by the United States while that vehicle is in flight, which is from the moment when all external doors are closed on Earth following embarkation until the moment when one such door is opened on Earth for disembarkation or in the case of a forced landing, until the competent authorities take over the responsibility for the vehicle and for persons and property aboard.[28]

In addition, a number of other terrestrially applied laws, such as, for instance, the Uniform Code of Military Justice,[29] are also applicable without specific amendments to outer space since the law in its original form is to apply "in all places."[30]

The Communications Satellite Act of 1962

Because of the recognition of the increasing importance and vital role of space telecommunications, the U.S. Congress took an important step by passing the Communications Satellite Act of 1962.[31] The law defined telecommunications to mean "any transmission, emission or reception of signs, signals, writings, images, and sound or intelligence of any nature by wire, radio, optical, or other electromagnetic systems."[32] The purpose of the law was to establish, as expeditiously as practicable, a commercial communications satellite system as part of an improved global communications network. Such a system was to be responsive to public needs and national objectives, was to serve the communication needs of the United States and other countries and contribute to world peace and understanding. The United States participation in the global system was to be in the form of a private corporation, subject to appropriate governmental regulation. This entity, known as the Communications Satellite Corporation, was deemed to be a common carrier within the meaning of the

27. Communications Act of 1934, as amended, 47 U.S.C. secs. 151, 214 (1982).
28. 18 U.S.C. sec. 7(6) (1988).
29. 10 U.S.C. sec. 802 *et seq.* (1988).
30. *Id.* sec. 805.
31. Pub. L. No. 87-624, 76 Stat. 419, 47 U.S.C. sec. 701 (1982).
32. *Id.* sec. 103(6). This definition is identical with that in Annex II of the International Telecommunication Convention (Malaga-Torremolinos), *supra* note 13.

Communications Act of 1934, as amended.[33] Through the Communications Satellite Corporation, as its sole operating entity, the United States participates in both the INTELSAT[34] and INMARSAT[35] systems.

In recognition of the profound impact of science and technology on society, and the interrelations of scientific, technological, economic, social, political, and institutional factors, Congress enacted the National Science and Technology Policy Organization and Priorities Act of 1976.[36]

Patent and Trademark Laws

Several years later, because of the importance of inventions made in outer space and the issues arising from federally supported research for development and for the purpose of insuring both that the government obtains sufficient rights in federally supported inventions to meet the needs of the government and protect the public against nonuse or unreasonable use of inventions, early in the 1980's, Congress took action by amending extant patent and trademark laws.[37] Most recently, an "inventions in outer space" legislation was passed by Congress dealing with issues associated with the U.S./International Space Station project.[38]

The Land Remote Sensing Commercialization Act of 1984 and the Commercial Space Launch Act of 1984 and its 1988 Amendments

Congress also passed legislation to encourage proper involvement of the private sector by creating a framework for phased commercialization of land remote sensing and assuring continuous data availability to the federal government. To provide for such a transition, from government operation to private, commercial operation, the Land Remote-Sensing Commercialization Act of 1984 was enacted.[39] In so doing Congress acknowledged that land remote-sensing, by the government or private parties of the United States, affects both international commitments and policies as well as national security concerns of the United States.[40]

In recognition of the fact that private applications of space technology have achieved a significant level of commercial and economic

33. Communications Act of 1934, *supra* note 26.
34. INTELSAT Agreements, *supra* note 14.
35. INMARSAT Conventions, *supra* note 15.
36. Pub. L. No. 94-282, 90 Stat. 459, 42 U.S.C. 6601 *et seq.* (1982).
38. H.R. 2946 (S.459) passed the House of Representatives. 136 Cong. Rec. D1427-01 (Oct. 26, 1990). When it becomes law, the "Inventions in Outer Space" legislation will be placed in the U.S. Code at 35 U.S.C. sec. 105.
39. Pub. L. No. 98-365, 98 Stat. 451, 15 U.S.C. sec. 4201; *amended in 1988 by* Pub. L. No. 100-147, 101 Stat. 876, 15 U.S.C. sec. 4201 (1988).
40. 15 U.S.C. sec. 101(4) (1988).

activity and that the private sector in the United States has achieved the capability of developing and providing private satellite launching and associated services, Congress also enacted the Commercial Space Launch Act of 1984,[41] and the Secretary of Transportation was given the responsibility to carry out its provisions.[42] As a follow-up, in order to facilitate the private acquisition of government property and services, further legislation was passed under the title of the Commercial Space Launch Act Amendments of 1988.[43]

Federal Regulations

In pursuance of the foregoing enactments, the respectively authorized departments and agencies of the federal government, including the Department of Transportation, NASA, Department of State, the Federal Communications Commission and others, issue regulations. There are more than 18 federal agencies involved in space-related activities. The rules governing such activities are published in the Code of Federal Regulations and revised from time to time. Among the most notables are NASA's regulations[44] and the Licensing Regulations on Commercial Space Transportation[45] issued by the Department of Transportation.

Also, there are many presidential executive orders, pronouncements, policy statements, directives, and determinations by the President. They include, for instance, the Launch Assurance Policy announced by the President on October 9, 1972, which declared that the United States will provide launch assistance to other countries and international organizations, on a nondiscriminatory, reimbursable basis, for satellite projects which are for peaceful purposes and are consistent with obligations under relevant international arrangements.[46] The Presidential Directive on National Space Policy, dated on June 20, 1978, provided for the establishment of a National Security Council Policy Review Committee to review existing space policy and formulate overall principles to guide space activities.[47] On January 5, 1988, the President approved a revised national space policy[48] and, on February 11, 1988, the President

41. Pub. L. No. 98-575, 98 Stat. 3055, 49 U.S.C. app. sec. 2601 (1982).
42. Sec. 5(a).
43. Pub. L. No. 100-657, 102 Stat. 3900, 49 U.S.C. app. sec. 2601 (1982).
44. 14 C.F.R. ch. V, pts. 1200 to End (1989).
45. *Id.* ch. III.
46. For a text of the President's announcement, see I UNITED STATES SPACE LAW - NATIONAL AND INTERNATIONAL REGULATION, *Supra* note 6, sec. I.A.4., at 5.
47. *Id.* at 5-6.
48. *Id.* at 26.

also announced a comprehensive "Space Policy and Commercial Space Initiative to Begin the Next Century."[49] As recently as September 5, 1990, the President - supplementing the National Space Policy that he approved on November 2, 1989 - also issued a New Space Policy Directive which is to further encourage the growth of U.S. private sector activities.[50]

Cases

Apart from Congressional legislation, including an occasional joint resolution,[51] the executive domain, and the international legal field, there is a growing area involving domestic cases which has increasing importance for the development of space law. A large number of these cases cover proceedings before administrative bodies, such as the Federal Communications Commission, where they most frequently result in memoranda of opinion, reports, orders and authorizations by the Commission with respect to regulatory policies, the establishment of technical standards, as well as licensing and procedural requirements.[52] Occasionally, the Commission may also issue notices of proposed rule making, a procedure which is also followed by other agencies of the federal government. Actual court cases may be brought to the federal judiciary by an appeal from FCC rulings. Also, there have been a handful of cases which touch upon various other issues of space law.

While most of the laws, regulations and cases discussed thus far fall within the federal domain, the possibility of state laws and state court cases having relevance to space activities should not be overlooked. For instance, an early Mississsippi case dealt with issues of liability arising out of damage to nearby land-owners caused by rocket explosion at a Mississippi test facility.[53] In a more recent California case the insurers of the owner of a communications satellite who was the buyer of an upperstage rocket used to boost satellites into orbit sued the seller of the rocket and certain of seller's subcontractors.[54] The insurers sought recovery of payments made to the buyer when the rocket malfunctioned and the satellite did not go into proper orbit. The court barred their recovery from subcontractors of seller of the upperstage rocket for payments made with respect to the lost satellite. The seller and the buyer had executed mutual waivers of liability under which the buyer had waived its rights to

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49. *Id.* at 39.
50. *See* White House, Office of the Press Secretary, Press Release, September 5, 1990. Reproduced in CURRENT DOCUMENTS in this issue of the Journal.
51. *See e.g.*, Joint Resolution of July 17, 1979, Pub. L. No. 96-34, 93 Stat. 38.
52. For a selective compilation of these cases, see 1 UNITED STATES SPACE LAW, *supra* note 6, sec. I.A.5.
53. Pigott v. Boeing Co., 240 So. 2d 63 (Miss. 1970).
54. Appalachian Insurance Co. v. McDonnell Douglas Corp., 214 Cal. App. 3d 1, 2, 262 Cal. Rep. 716, 718 (Cal. App. 4 Dist., Aug. 29, 1989).

proceed against the subcontractors and the insurers were bound by the buyer's waiver. In the legislative field, mention may be made of the recent creation of a spaceport authority in the State of Florida.[55]

This brief overview of United States space laws with an emphasis on domestic regulations would not be complete without at least a brief reference to a series of joint endeavor agreements and agreements for launch and associated services and spacecraft retrieval between the United States and other parties, including private companies.

Department of the Air Force Model Agreement

In looking over the more recent highlights of domestic regulations, mention may be made of a Model Agreement prepared by the Department of the Air Force with respect to the commercial utilization of expendable launch vehicles and entered into between the Department and NASA on February 1, 1983.[56] A revision of the Model Agreement was made on February 12, 1988[57] and - because of the close interrelationship between the domestic and international body of space law and the potential impact of one upon the other - certain definitions in the Agreement may be singled out for a brief comparison.

(a) Meaning of "Launch"

One of the definitions in the Model Agreement relates to the word "launch." The major international space treaties do not define the meaning of "launch." The Liability Convention only states that the term "launching" includes "attempted launching."[58] Under the Model Agreement, the verb "launch" means "to place or attempt to place a launch vehicle and payload, if any, in any sub-orbital trajectory, in Earth orbit in outer space, or otherwise in outer space."[59] At the same time, a "launch vehicle" is defined as "any vehicle constructed for the purpose of operating in, or placing a payload in outer space, and any sub-orbital rocket."[60] These definitions, if taken in the strict sense of the word, would appear to apply

55. Spaceport Florida Authority Act, Fla. Stat 331.301 (1989). For a discussion of the law, see 17 J. SPACE L. 167 (1989).
56. *See* Sen. Comm. Commerce, Science and Transportation, Space Law and Related Documents, 101st Cong., 2d Sess. 547 (Comm. Print, 1990).
57. For a text of the Department of the Air Force, Expendable Launch Vehicle Commercialization, Model Agreement (hereinafter "Model Agreement"), see *id.* at 547-63.
58. Liability Convention, *supra* note 10, art. 1 (b).
59. Model Agreement, *supra* note 57, art. III.
60. A "payload" is described as "an object which a person undertakes to launch into space or place in Earth orbit by means of a launch vehicle, including sub-components of the launch vehicle specifically designed or adapted for that object." *Id.*

not just to rocket launches but also to the ascent of any vehicle which is constructed for the purpose of either operating in or placing a payload in outer space. A vehicle, even if placed in a sub-orbital trajectory, would appear to be covered. The future prototype of the aerospace plane is expected to be constructed to operate at least during part of its flight in a sub-orbital trajectory. However, the aerospace plane may not be launched as a rocket but may take off as a conventional airplane and would return to Earth in the same manner.

In connection with airplanes, we do not speak of a launch but of a take-off and the question arises whether it would be sound policy to make the space laws applicable to space objects also applicable to the aerospace plane.[61] If so, the issues which arise in connection with the aerospace plane regarding the launching State's obligations and liabilities could by definition of the "launch" extend to the aerospace plane, unless some exceptions were made. Acceptance of the definition of "launch" and "launch vehicle" in the above indicated sense would serve the purpose inasmuch as the aerospace plane would be a vehicle constructed for the purpose of operating, at least in part, in outer space.

(b) Meaning of "Damage"

Another noteworthy definition in the Model Agreement relates to the concept of "damage." Under the Model Agreement "damage" includes "bodily injury or death of any person, damage to or loss of any property, real or personal, and loss of revenue or profits or other direct, indirect, or consequential damages therefrom."[62] Such "damage" includes that caused by a release of or exposure to a hazardous substance.[63] Even a perfunctory glance at this definition appears to indicate that it is much broader than that in the Liability Convention of 1972[64] which does not cover indirect or consequential damage or loss of revenue or profits. While international law and domestic law may legitimately differ with respect to the type of damage for which recovery may be had, there would appear to be good reason to recognize international responsibility for damage which is caused by the release of a hazardous substance emanating from a space object. Insofar as responsibility for damage caused by harmful radiation from a nuclear power source in space is concerned, this appears to have been acknowledged in the Cosmos 954 incident.[65]

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61. For a discussion of the alternatives that policy makers will face with the advent of the aerospace plane, see S. Gorove, *Legal and Policy Issues of the Aerospace Plane*, 16 J. SPACE L. 147 (1988).
62. Model Agreement, art. IV. B.1.
63. *Id.*
64. Liability Convention, *supra* note 10, art. 1(a).
65. For a discussion of the COSMOS 954 incident, see 6 J. SPACE L. 107-15 (1978).

NASA Regulations and the Meaning of "Personnel on Board"

Another example of a definitional issue of some significance having relevance to both domestic and international space law may be found in the definition of "personnel on board" in NASA regulations. Such personnel is defined as "those astronauts or other persons (actually in the spacecraft) during any flight phase" of a Space Transportation System (STS) flight "(including any persons who may have transferred from another vehicle) and including any persons performing extravehicular activity associated with the mission."[66] The designation "space flight participants" applies to "all persons whose presence aboard an STS flight is authorized in accordance with the NASA regulations."[67]

From the definitions of "personnel on board" and "space flight participants", it appears that the term "personnel" includes not only career astronauts or members of the crew but also all persons, including space flight participants, if any, found in the spacecraft during any flight phase. Thus a passenger falls under the category of "personnel on board" as does any person, whether an astronaut or not, who transfers to the spacecraft from another vehicle and any person who performs extravehicular activity associated with a space flight mission.

The definition of "personnel on board" appears to lend support to the interpretation of Article VIII of the Outer Space Treaty[68] to the effect that the term "personnel," as used therein, should be understood to include "passengers" on board over whom the State of registry would have jurisdiction and control while in outer space or on a celestial body. If the term "personnel" were interpreted, not in the broad sense of covering "persons" in general, but in the strict sense as applying to persons performing some official function, the provisions on jurisdiction and control would not be applicable to them. There is no evidence that the drafters of the Outer Space Treaty have ever intended such a result. Of course, nothing would seem to prevent the international community from creating separate rules for passengers in the future when their space travel will become a routine occurrence.

Concluding Remarks

In the preceding presentation, an attempt has been made to identify briefly some of the highlights of U.S. legislative, regulatory and judicial developments pertaining to activities associated with the exploration and use of outer space. From among countless sources of domestic regulations, a recent court case, certain definitions encountered in the Department of the Air Force Model Agreement, and some NASA regulations have been

66. 14 C.F.R. ch. V, sec. 1214.701(f)) (1990).
67. *Id.* sec. 1214.1703(a).
68. Outer Space Treaty, *supra* note 8, art. VIII.

singled out to provide a few illustrations of the direction in which domestic law is moving.

The presentation, even in a nutshell form, necessitated by the limitations of time and space, substantiates the observation that the United States has played a unique role of leadership in building up a comprehensive body of national space laws which may well serve for other spacefaring nations as useful tools for study and analysis when they consider drafting their own national regulations.

The law is normally slow to react to societal changes. So far, this apparently has not been the case either in the domestic or the international field of space law. While the tempo is likely to diminish in the future and has already shown some signs of this, there is every expectation that the already voluminous domestic space laws, regulations and cases will continue to multiply in the future with the expected increase of human presence and activities in space.

In addition to entirely new laws and regulations called for by space developments, much of the traditional domestic law as applied in different fields will have to be reviewed and scrutinized to determine their possible applicability with or without modification in the spacial context. Finally, attention will have to be focused on the clarification of uncertainties which may give rise to divergent interpretations and thereby undermine legal stability.

While the limited nature of a bird's eye view of U.S. national space laws and regulations does not permit many specific conclusions, our analysis of a few illustrative definitions appears to re-emphasize that lawyers and policy makers must continually bear in mind the close interrelationship between national and international space laws so that the two areas of law will develop in harmony and will not become a source of potential conflict.