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A journal devoted to the legal problems arising
out of human activities in outer space

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CONTENTS

The GROWTH OF SPACE LAW THROUGH THE CASES

Stephen Gorove*

Introduction

During its short-lived existence in the latter part of the twentieth century, space law has witnessed an unparalleled growth in authoritative doctrines and institutional practices. Within a narrow span of less than four decades, laws and regulations, both national and international, together with scholarly writings, have grown into an ever-expanding collection. Apart from the large number of multilateral and bilateral agreements, U.N. resolutions and other international instruments, as well as an equally substantial body of domestic laws and administrative regulations, there has also been a not entirely negligible array of judicial decisions, most of them arising in the United States though some of them also surfacing in foreign countries.[1]

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The author wishes to express his appreciation to Michael A. Gorove, Attorney at Law, for assistance provided in the preparation of this article.

1 The first separate collection of significant judicial decisions, both domestic and foreign, in the field of space law appeared in STEPHEN GOROVE, CASES ON SPACE LAW - TEXTS, COMMENTS AND REFERENCES (1996).

Few space law treatises make mention of court decisions. For brief discussions of some cases, see Karl-Heinz Böckstiegel, *Case Law on Space Activities, in* SPACE LAW - DEVELOPMENT AND SCOPE 205 (Nandasiri Jasentuliyana ed., 1992); I.H.PH. DIEDERIKS-VERSCHOOR, AN INTRODUCTION TO SPACE LAW (1993); STEPHEN GOROVE, DEVELOPMENTS IN SPACE LAW - ISSUES AND POLICIES (1991); PAMELA L. MEREDITH & GEORGE S. ROBINSON, SPACE LAW: A CASE STUDY FOR THE PRACTICIONER (1992).

Selected space law cases have also been discussed in papers presented at several national and international conferences as well as in the periodical literature. *See, for example,* Phillip D. Bostwick, *Star Trek: Litigating Commercial Space Issues Through the Courts*, paper presented at the Fourth Annual

Court cases involving judicial decisions can arise out of disputes among individuals and organizations in any area of the law and space law is no exception. Space law in the broadest sense refers to a branch of the law that deals with legal problems arising out of human activities in outer space. The legal issues can be related to the internal laws of particular countries or to disputes involving international space law.

The fact that to date most court cases occurred in the United States and revolved around the application of domestic laws should be no surprise. Until relatively recently, few foreign countries had on their statute books national space laws and, apart from the spacefaring nations, few had direct connections with space activities.

In the field of international space law, the major dispute arising out of the Cosmos 954 incident, which involved the fall and disintegration of parts of a Soviet nuclear powered spacecraft on Canadian territory,[2] could have been settled by a claims commission or international adjudication by mutual agreement of the parties. However, the parties chose the traditional route of diplomatic negotiations which in this case did eventually lead to an acceptable resolution of the matter.

The purpose of this presentation is to trace the development of space law through leading court decisions conveniently arranged under the broad subject headings of sovereignty/jurisdiction, torts/contracts, environment, antitrust, taxation, intellectual property, satellite communications, trust and insurance. This is followed by a brief discussion of some important foreign and international judicial decisions. The conclusion notices some basic similarities to nonspace related adjudications. It stresses the close interrelationships between law and other sciences, points to some lessons learnt and assesses discernible trends and reasonable expectations.

Symposium on the Law and Outer Space, Georgetown Univ. Law Center, Oct. 16-17, 1992, pp. 2-12, 16-33; *idem, AT&T v. Martin Marietta: Further Reallocation of the Risk of Loss in Commercial Space Agreements,* 23 J. SPACE L. 177 (1995);*idem, Liability of Aerospace Manufacturers: MacPherson v. Buick Sputters into the Space Age,* 22 J. SPACE L. 75 (1994); Stephen Gorove, *Recent Litigation Involving the Launch of Spacecraft with NPS on Board,* 36 PROC. COLLOQ. L OUTER SPACE 298 (1994); Robert F. Scoular, *The Commercialization of Space: Domestic and International Law*, paper presented before the ABA Section on Tort and Insurance Practice, Aug. 11, 1992, pp. 47-48, 50-51; Rachel B. Trinder, *Recent Developments in Litigation,* 5 J. L & TECH. 45, 52, 55-58 (1990); *idem, U.S. Space Law: The Practical Implications of Recent Case Law Developments on Minimization of Litigation, in* THE USE OF AIRSPACE AND OUTER SPACE FOR ALL MANKIND IN THE 21ST CENTURY 69 (Chia-Jui Cheng ed., Kluwer 1995); Stephen Tucker, *Some Strategic Defense Initiatives Toward Preventing U.S. Space Insurance Related Disputes and Litigation,* 21 J. SPACE L. 123 (1993).

2 Details of the legal and policy issues associated with the Cosmos 954 accident may be found in STEPHEN GOROVE, DEVELOPMENTS IN SPACE LAW - ISSUES AND POLICIES 239 *et seq.* (1991).

Sovereignty/Jurisdiction

It may appear surprising if not strange, to start an overview of space law cases with a couple of judicial decisions that predate the start of the space age. Admittedly, the holding of the court in the first case to which reference is made did not involve an issue of space law. In the *United States v. Causby*[3] case, a 1946 decision, the Supreme Court permitted recovery on the ground that frequent and regular flights of army and navy aircraft over landowners' property were a taking of property under the Fifth Amendment.[4]

While the case dates back prior to the beginning of the space age, its relative significance for space law arises from the fact that the court touched upon the ancient doctrine of "*cujus est solum, ejus est usque ad coelum*" (he who owns the land, owns it to the skies), under which ownership of the land extended to the periphery of the universe.[5] The court observed that the doctrine "had no place in the modern world." The court also noted that under federal law the United States has "complete and exclusive national sovereignty in the air space" above its territory. This has been consistent with firmly embedded principles of both international and internal law.[6] However, none of the international conventions or domestic statutes has defined the meaning of the word "air space." At least on one occasion, "navigable air space" has been defined as the "air space above the minimum safe altitudes of flight" prescribed by the government.[7] Thus it was left to the space age to come to grips with the issue of the upward extent of national sovereignty and the physical extent of airspace over which the underlying state's complete and exclusive jurisdiction would apply. While many years of space law developments have made it clear that outer space is free for exploration and use and that outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means,[8] and that the area where

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3 328 U.S. 256, 66 S. Ct. 1062 (1946).

4 Dissenting Justices Black and Burton would have denied recovery.

5 On the background of the Latin adage *"cujus est solum, ejus est usque ad coelum,"* referred to in *United States v. Causby*, *see* J. C. Cooper, *Roman Law and the Maxim Cujus est Solum In International Air Law*, 1 MCGILL L. J. 38 (1952).

6 *See* STEPHEN GOROVE, SPACE LAW: ITS CHALLENGES AND PROSPECTS 7 *et seq.* (1977) which includes a brief overview of international multilateral and bilateral aerial agreements as well as domestic laws proclaiming complete and exclusive jurisdiction of states in the airspace above their territories.

7 *Id.* at 13 (1977).

8 For an analysis of the ban of national appropriation under Article II of the Outer Space Treaty of 1967, see Stephen Gorove, *Interpreting Article II of the Outer Space Treaty*, 37 FORDHAM L. REV. 349 (1969); *see also* Carl Q. Christol, *Article 2 of the Principles Treaty Revisited*, 9 ANNALS AIR & SPACE L. 217 (1984).

satellites are in orbit around the earth and beyond is outer space, the question of the precise boundary line between airspace and outer space has so far eluded any internationally acceptable determination.[9]

The recent focusing on the notion of "aerospace objects" by the United Nations Committee on the Peaceful Uses of Outer Space[10] appears to be an attempt to bridge the longstanding difference between countries advocating a definite demarcation of the lower boundary of outer space at a specific height (110km or so) and those countries which oppose such determination because, in their view, it lacks a specific need and might impede progress in the peaceful exploration and use of outer space.

While most satellites orbit the earth at a distance of about 100-110 km or beyond, and while international customary law seems to have emerged to the effect that artificial satellites which are in orbits around the earth and beyond are in outer space, the precise lowest altitude of such orbits has not been determined. Equally undetermined is the upward limit of national sovereignty of states in the airspace above their territory and the nature of laws applicable to the area between airspace and outer space if airspace does not extend to outer space. That scientific and technological innovations can affect orbiting capabilities appears to be borne out by a recent application of Sky Station International to the Federal Communication Commission (FCC) to create a new Global Stratospheric Telecommunications Service (GSTS) by using a revolutionary technology that holds each of the proposed 250 Sky Station platforms stationary at a 30 km altitude.[11] This development suggests the necessity of exercising continued caution to avoid premature determination of demarcation lines.

The second pre-space age case, *United States v. Cordova*,[12] also raises jurisdictional issues. The case concerns application of United States

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9 The equatorial countries have unsuccessfully claimed areas of the geostationary orbit lying above their territories to be under their exclusive jurisdiction and sovereignty. For a discussion of these claims and the Bogota Declaration formally enunciating them, see Stephen Gorove, *The Geostationary Orbit: Issues of Law and Policy*, 73 AM. J. INT'L L. 244 (1979); *see also* Aldo Armando Cocca, *Towards an Adequate Legal Regulation of the Geostationary Orbit*, 20 PROC. COLLOQ L. OUTER SPACE 193 (1978); Daniel Goedhuis, *The Changing Legal Regime of Air and Outer Space*, 27 INT'L L. Q. 576 (1978).

10 "Questions concerning the legal regime for aerospace objects" were raised in a working paper by the Russian Federation and a "Questionnaire on possible legal issues with regard to aerospace objects" was submitted by the Chairman of the Working Group in the Legal Subcommittee. *See* U.N. Docs. A/AC.105/C.2/L.189 and A/AC.105/C.2/1995/CRP.3/Rev.3 of Mar. 31, 1995.

11 *See* Request to Establish New GSTS Service, Additional Comments and Petition for Rulemaking, FCC, ET Docket No. 94-124, Mar. 20, 1996.

12 89 F. Supp. 298 (E.D.N.Y. 1950). *United States v. Cordova* is noted in MYRES S. MCDOUGAL, HAROLD D. LASSWELL & IVAN A. VLASIC, LAW AND PUBLIC ORDER IN SPACE 702 (1962). For an analysis of the ban of national appropriation under Article II of the Outer Space Treaty of 1967, see Stephen Gorove, *Interpreting Article II of the*

statutory provisions to a crime committed on a plane flying over the high seas. In line with the restrictive interpretation of the application of criminal laws, federal statutory jurisdiction covering a "vessel" "on" the high seas could not be extended by analogy to an "airplane" flying "over" the high seas. In the same manner, it may be added that jurisdiction over airplanes in the airspace could not be extended to a spacecraft in outer space without specific legislation.[13] In view of this, the United States had to extend its special admiralty and maritime jurisdiction by federal legislation 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 of such doors is opened on Earth for disembarkation...."[14] This proviso is in line with Article VIII of the Outer Space Treaty of 1967 which declares that "the state of registry retains jurisdiction and control over an object launched into outer space and any personnel thereof, while in outer space or a celestial body," except that jurisdiction over personnel engaged in extravehicular activity in space would appear arguable under a strict interpretation of the federal statute. To dispel any doubt, the Code of Federal Regulations stipulates that personnel on board includes "any persons performing extravehicular activity associated with the mission." [15]

Torts/Contracts

The first court case involving space law may have been *United States v. Safety Steel Services Co.*,[16] in which the United States District Court for the Southern District of Texas, in an unpublished opinion, enjoined the defendant, a company in Corpus Christi, Texas, from operating its automotive and electronic equipment which interfered with telemetry data and voice communication between the nearby NASA tracking station and the Gemini 7 spacecraft in orbit above Texas.

Other tort cases raised issues involving damages arising from rocket engine testings conducted by defendants under contract with the

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Outer Space Treaty, 37 FORDHAM L. REV. 349 (1969); *see also* Carl Q. Christol, *Article 2 of the Principles Treaty Revisited*, 9 ANNALS AIR & SPACE L. 217 (1984).

13 The application of criminal jurisdictional principles to activities in outer space is discussed in Stephen Gorove, *Criminal Jurisdiction in Outer Space*, 6 INT'L LAW. 313 (1972).

14 18 U.S.C. sec. 7(6) (1988). On the extension of the special maritime and territorial jurisdiction of the United States to outer space, see STEPHEN GOROVE, DEVELOPMENTS IN SPACE LAW: ISSUES AND POLICIES 6 (Nijhoff 1991).

15 14 CFR. 1214.701 (1995).

16 S.D. Texas, December 7, 1965. The case is noted in George P. Sloup, *Determination of Applicable Law to Living and Working in Outer Space: The Municipal Law Connection and the NASA/Hastings Research Project*, 25 PROC. COLLOQ. L. OUTER SPACE 245, at 249 (1982).

United States.[17] The question of governmental immunity was carefully analyzed but did not absolve the defendant of liability for damages resulting from negligence in *Berg v. Reaction Motors Division.*[18]

In *Smith v. Lockheed Propulsion*,[19] a California case, the court found that the evidence was insufficient to show negligence and, therefore, the crucial issue was whether the defendant's activity might be classified as ultrahazardous because it involved inherent risks to adjacent properties and as such would carry imposition of strict liability. In another jurisdiction, the Mississippi Supreme Court affirmed the trial court's judgment of dismissal in the case of *Pigott v. Boeing*,[20] which dealt with issues of liability arising out of damage to nearby landowners' property caused by a rocket explosion at a Mississippi test facility. The Mississippi Supreme Court held that a contractor engaged in performing a lawfully authorized function of the U.S. government in accordance with a public contract was not liable for damages to private property in the absence of the contractor's negligence.

In *Smith v. Morton Thiokol*,[21] the death of plaintiff's late husband, Commander Michael J. Smith, in the Challenger disaster raised the issue of the application of the *Feres* doctrine under which the Government is not liable under the Federal Tort Claims Act (FTCA) for injuries to servicemen if their injuries arise out of, or are in the course of, activity incident to service.

The court noted that Commander Smith was a career officer on active duty with the United States Navy at the time of the Challenger disaster and, while detailed to NASA, he was not subject to direct military orders and was not required to perform his regular Navy duties. He was, however, subject to military policies and directives to the extent that they did not affect NASA responsibilities, and he also retained his military rank and privileges. In view of this, the court found that Commander Smith remained subject to ultimate military control throughout the duration of the Space Shuttle program. The court held that the rationale underlying the *Feres* doctrine also precluded the plaintiff's claims against the United States. A subsequent order by the District Court also dismissed the plaintiff's claim against Lawrence Mulloy, a civilian employee of NASA.

The District Court's decision in *Smith v. Morton Thiokol* was affirmed by the higher court in *Smith v. United States*.[22] The higher court

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17 For a brief discussion of some of the tort cases, see Robert F. Scoular, *The Commercialization of Space: Domestic and International Law*, paper presented before the ABA Section on Tort and Insurance Practice, Aug. 11, 1992, at 43-47.

18 37 N.J. 396, 181 A.2d 487 (N.J. 1962).

19 247 Cal. App. 2d 774, 56 Cal. Rptr. 128 (Cal.App. 4th Dist. 1967).

20 240 So. 2d 63 (Miss. 1970).

21 712 F. Supp. 893 (M.D. Fla. 1988).

22 877 F.2d 40 (11th Cir. 1989)*cert.den.* 110 S.Ct. 1111 (1990). This case together with *Smith v. Morton Thiokol* and the *Feres* doctrine are scrutinized in

added that the District Court properly held that there was a lack of subject matter jurisdiction over the claims against defendant Mulloy. The court noted that Congress passed the Federal Employees Liability Reform and Tort Compensation Act of 1988 which retroactively provided exclusive remedy for individuals allegedly harmed by common law torts committed by government employees acting within the scope of their employment. Thus the plaintiff's recourse was through an action against the United States under the FTCA.

A subsequent case, *Smith v. United States,*[23] presented the question of the application of the Federal Tort Claims Act (FTCA) to torts occuring in Antarctica, a sovereignless region that is frequently analogized to outer space. After Smith's husband was killed in Antarctica while he was working under contract to a federal agency, Smith filed this wrongful death action against the United States under the FTCA. The FTCA's foreign-country exception states that the statute's waiver of sovereign immunity does not apply to "any claim arising in a foreign country." Hence, the issue presented was whether Antarctica, a sovereignless region, is a "foreign country" within the meaning of the FTCA.

In the Supreme Court's view, the phrase "foreign country" includes Antarctica, even though it has no recognized government. The Supreme Court justified its holding on both the structure of the FTCA itself as well as on longstanding presumptions against extraterritorial application of Acts of Congress. The plaintiff's wrongful death complaint was therefore barred for lack of subject matter jurisdiction.

Justice Stevens--the lone dissenter--emphasized the profound importance of the issue at hand, stating that the negligence alleged in this case "will surely have its parallels in outer space as our astronauts continue their explorations of ungoverned regions far beyond the jurisdictional boundaries that were familiar to the Congress that enacted the ... [FTCA] in 1946." Fueling his dissent was the fact that at the time it was enacted, the FTCA waiver of sovereign immunity extended to the sovereignless reaches of the high seas. In Stevens' view, the "geographic scope of that waiver has never been amended," and this has made the Government's position that the waiver is confined to territory under the jurisdiction of the United States completely unfounded.[24]

Paul G. Dembling and Richard C. Walters, *The 1986 Challenger Disaster: Legal Ramifications,* 19 J. SPACE L. 1 (1991).

23 113 S. Ct. 1178, 122 L. Ed. 2d 548 (1992). For a case note, see 22 J. SPACE L. 142 (1994).

24 Justice Stevens' observation that the majority holding "will surely have its parallels in outer space" has since been legitimated, although outside the realm of tort law, in *Hughes Aircraft Company v. United States,* discussed under the heading "Intellectual Property," *infra.*

In *Martin Marietta v. INTELSAT*,[25] which involved the launch of a satellite that ended up in a useless orbit, the District Court for the District of Maryland held that the provider of space launch services did not have a duty in tort to the satellite company for loss resulting from a failed satellite mission distinct from duties of performance specified in the contract where the launch contract imposed no duty to exercise due care to avoid negligence. The District Court also concluded that the satellite's failure to separate from the rocket at the proper time constituted a "mission failure" within the terms of the contract, effectively barring INTELSAT's breach of contract claim. The District Court also concluded that the Commercial Space Launch Act Amendments of 1988 allowed the parties to waive their rights of recovery even in instances of gross negligence, a result at odds with Maryland law.

The Court of Appeals affirmed the District Court's dismissal of INTELSAT's negligence claims, but reversed it with respect to the claims founded on contract and gross negligence.[26] The court held that the contract for providing satellite launch services was ambiguous and unclear as to whether the failure of the satellite to reach proper orbit was a "mission failure" that limited the owner's remedy to another launch, and whether the "limitation of liability" provision barred any contract claim other than a replacement launch remedy. The Court of Appeals further held that the Commercial Space Launch Act was never intended to protect parties from their own gross negligence.[27]

In *Transpace Carriers v. United States*,[28] the U.S. Claims Court held that the disputes clause of a contract between a contractor and Government agency covering "[a]ny dispute, whether or not involving an alleged breach

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25 763 F. Supp. 1327 (D. Md. 1991). A detailed discussion of the District Court's decision in this case may be found in Phillip D. Bostwick: *Star Trek: Litigating Commercial Space Issues Through the Courts*, paper presented at the Fourth Annual Symposium on the Law and Outer Space, Georgetown Univ. Law Center, Oct. 16-17, 1992, at 12-16. *See also* Rachel B. Trinder, *Recent Developments in Litigation*, 5 J. L. & TECH. 50-52 (1990). For a case note, see 19 J. SPACE L. 173 (1991).

26 991 F.2d 94 (4th Cir. 1992).

27 For comments on the decisions of both the District Court and the Court of Appeals, *see* Tanja L. Masson-Zwaan, *The Martin Marietta Case or How to Safeguard Private Commercial Space Activities*, 35 PROC. COLLOQ. L. OUTER SPACE 239 (1993); Robert F. Scoular, *The Commercialization of Space: Domestic and International Law*, paper presented before the ABA Section on Tort and Insurance Practice, Aug. 11, 1992, p. 49; Rachel B. Trinder, *U.S. Space Law: The Practical Implications of Recent Case Law Developments on Minimization of Litigation*, in THE USE OF AIRSPACE AND OUTER SPACE FOR ALL MANKIND IN THE 21ST CENTURY 70, at 71 *et seq.* (Chia-Jui Cheng ed., Kluwer 1995); Henri A. Wassenbergh, *The Law Governing International Private Commercial Activities of Space Transportation*, 21 J. SPACE L. 97, at 120 (1993). For a case note, see 20 J. SPACE L. 189 (1992).

28 22 Cl. Ct. 80 (1990). For a case note, see 19 J. SPACE L. 77 (1991).

of this agreement," applied to the contractor's breach claim and required the contractor to exhaust administrative remedies prior to bringing suit.

Interpretation of the provisions of a launch services agreement was at issue in *Hughes Communication Galaxy v. United States*,[29] which involved a contract entered into in 1988 by Hughes with the United States, represented by NASA. Labeled a Launch Services Agreement (LSA), Article XV of the contract limited NASA's obligation to provide Launch and Associated Services "to the extent consistent with United States' obligations. . ., United States' Law and United States' published policy." Article IV of the LSA addressed NASA's obligation to provide launch services, stipulating in relevant part, "with respect to launch priority and scheduling, NASA will provide Launch and Associated Services in accordance with the United States policy governing launch assistance approved by the President of the United States on August 6, 1982."

Hughes' spacecraft were assigned specific slots on this NASA's schedule manifest, which listed all commercial payloads in order of their planned or firm launch dates. However, as a consequence of the Challenger tragedy, the President issued an order on August 15, 1986, in which he announced that NASA would no longer launch commercial spacecraft. In response to this shift in policy, NASA refused to launch any of Hughes' spacecraft. Accordingly, Hughes filed suit in the United States Claims Court alleging that NASA breached the LSA.

The Claims Court[30] held that no breach of the LSA occurred, determining that the new manifest, and the exclusion of Hughes' spacecraft, were the result of a valid sovereign act--a policy decision issued by the President with proper authority. The court reasoned that Article XV of the contract incorporated the sovereign act defense by its terms and that the LSA was therefore explicitly made subject to changes in policy. The Claims Court concluded that because the reorganization of the manifest was in compliance with the new policy announced by the President, the government did not breach the LSA.

The Court of Appeals[31] reversed, holding that Article IV of the LSA unambiguously required the government to schedule launch services according to "the United States policy governing launch assistance approved by the President of the United states on August 6, 1982." The Court stated that by incorporating an existing, specific and dated item of presidential policy, Article IV was manifestly more specific than Article XV, which subordinated the contract only to unspecified United States obligations, law and published policy. Adhering to the well settled principle that "where specific and general terms in a contract are in conflict, those which relate to a particular matter control over the more general language," the Court of Appeals held that Article IV's specific

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29 26 Cl. Ct. 123 (1992).

30 *Id.*

31 *Hughes Communication Galaxy v. United States*, 998 F.2d 953 (Fed. Cir. 1993).

reference to the policy issued by the President on August 6, 1982 remained controlling "with respect to launch priority and scheduling" as provided in Article IV. Thus, although Article XV of the contract incorporated the sovereign act defense--which provides that the United States as a contractor will not be held responsible for the acts of the United States as a sovereign--it did not control the issue at hand and contributed nothing in aid of interpreting the contract. In the court's view, the government essentially surrendered its authority to act as sovereign "with respect to launch priority and scheduling" as provided by Article IV in "unmistakable terms." Consequently, the Court of Appeals held that NASA, absent the successful assertion of another defense in this case, was to bear the cost of changes in launch priority and scheduling resulting from the revised policy.[32]

In *American Satellite Co. v. United States*,[33] which involved an agreement essentially identical to the one executed between Hughes Communication Galaxy and NASA, the holding of the Court of Appeals[34] was "consistent with the opinion in *Hughes*."

Issues of interparty waivers of liability were involved in *Appalachian Insurance v. McDonnell Douglas*[35] *and* in *Lexington Insurance Co. v. McDonnell Douglas*.[36] In *Appalachian Insurance v. McDonnell*

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32 On the Claims Court's decision, 26 Cl. Ct. 123 (1992), referred to by the higher court in *Hughes Communication Galaxy*, see Robert F. Scoular, *The Commercialization of Space: Domestic and International Law*, paper presented before the ABA Section on Tort and Insurance Practice, Aug. 11, 1992, pp. 55-56; Rachel B. Trinder, *U.S. Space Law: The Practical Implications of Recent Case Law Developments on Minimization of Litigation, in* THE USE OF AIRSPACE AND OUTER SPACE FOR ALL MANKIND IN THE 21ST CENTURY 79 *et seq.*. (Chia-Jui Cheng ed., Kluwer 1995). On the doctrine of sovereign immunity as it applies to space law, see Bosco, *The United States Government as Defendant - One Example of the Need for a Uniform Liability Regime to Govern Outer Space and Space-Related Activities*, 15 PEPPERDINE L. REV. 581 (1988). For a case note on *Hughes Communication Galaxy, Inc. v. The United States*, see 21 J. SPACE L. 166 (1993).

33 26 Cl. Ct. 146 (1992). The Claims Court's decision noted by the higher court in *American Satellite v. United States* is discussed in: Robert F. Scoular, *The Commercialization of Space: Domestic and International Law*, paper presented before the ABA Section on Tort and Insurance Practice, Aug. 11, 1992, pp. 55-56; Rachel B. Trinder, *U.S. Space Law: The Practical Implications of Recent Case Law Developments on Minimization of Litigation, in* THE USE OF AIRSPACE AND OUTER SPACE FOR ALL MANKIND IN THE 21ST CENTURY 79 *et seq.*. (Chia-Jui Cheng ed., Kluwer 1995).

34 998 F.2d 950 (Fed. Cir. 1993).

35 214 Cal. App. 3d 1, 262 Cal. Rptr. 716 (Cal.App. 4th Dist. 1989).

36 No. 48-17-13 (Cal. Super. Ct., Orange Co., May 23, 1990). For a thorough analysis of the *Appalachian Insurance v. McDonnell Douglas* and *Lexington Insurance Co. v. McDonnell Douglas* cases, including a detailed review of interparty waiver clauses, see Phillip D. Bostwick: *Star Trek: Litigating Commercial Space Issues Through the Courts*, paper presented at the Fourth Annual Symposium on the Law and Outer Space, Georgetown Univ. Law Center, Oct. 16-17,

Douglas, insurers of a communication satellite were precluded from recovering payments made with respect to the satellite from subcontractors of the seller of upperstage rocket which had malfunctioned causing loss of the satellite. The seller and buyer had executed a mutual waiver of liability under which the buyer had waived its rights to proceed against the subcontractors, and the insurers were bound by the buyer's waiver. A mutual waiver of rights by the buyer and the seller for recovery for damages on behalf of themselves and their subcontractors was not unconscionable, and liability allocation arising from the mutual waiver provision was not commercially unreasonable.

In *Lexington Insurance Co. v. McDonnell Douglas*,[37] the same Shuttle mission in February 1984 which led to a launch failure of the Western Union Corporation's Westar VI satellite[38] also resulted in a similar failure involving Indonesia's Palapa B-2 satellite. In that case, following the satellite's deployment from the Shuttle, the exit cone of the solid rocket motor (SRM) attached to the Payload Assist Module (PAM) failed, which caused the satellite to go into low earth orbit instead of its intended geosynchronous orbit, thereby rendering it useless as a telecommunications satellite.

Following total loss of payments by the insurers to PERUMTEL, the Indonesian government agency responsible for telecommunications satellites, the Lexington Insurance Company, together with the other insurers, brought subrogation action in state court in Orange County, California, against McDonnell Douglas Corporation (MDC), the manufacturer of PAM; Morton Thiokol, Inc., the manufacturer of SRM; and Hitco, the manufacturer of the exit cone. The plaintiffs' actions against all three defendants were based on negligence and strict liability and, with respect to Morton Thiokol, also on breach of warranty.

MDC moved for summary judgment on the ground that the stipulation on interparty waiver of liability in the NASA-PERUMTEL Launch Services Agreement (LSA) barred the action. The defendants also denied any negligence or defect in design.

The court denied the motion for summary judgment, finding that LSA's interparty waiver stipulations were ambiguous and susceptible to two reasonable interpretations, and it ruled the LSA did not bar the plaintiffs' negligence and breach of warranty claims. Following a jury

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1992, at 2-12; *idem, Liability of Aerospace Manufacturers: MacPherson v. Buick Sputters into the Space Age*, 22 J. SPACE L. 75 (1994); *see also* Robert F. Scoular, *The Commercialization of Space: Domestic and International Law*, paper presented before the ABA Section on Tort and Insurance Practice, Aug. 11, 1992, pp. 47-48, 50-51; Rachel B. Trinder, *Recent Developments in Litigation*, 5 J. L. & TECH. 55-57 (1990). For a case note on *Appalachian Insurance v. McDonnell Douglas*, see 18 J. SPACE L. 41 (1990).

37 No. 48-17-13 (Cal. Super. Ct., Orange Co., May 23, 1990).

38 *See* Appalachian Insurance v. McDonnell Douglas, *supra* note 35.

trial, the jury found no negligence and returned a verdict for McDonnell Douglas.

Among other cases in the Torts/Contracts area, *Public Broadcasting Service v. Hughes Aircraft Co.*[39] involved a transponder owner's action against a satellite manufacturer for the early end of life of Western Union's telecommunications satellite. The case was settled but the terms of the settlement were not made public.[40] In *British Aerospace v. Hughes Aircraft Co.*,[41] the court held that the rights granted by Hughes to British Aerospace included a limited license to permit the launch, from a site within the United States, of a space device manufactured by British Aerospace. A third case involving *Martin Marietta v. United Engineers & Constructors*[42] was dismissed without prejudice.

Environment

The first *Florida Coalition for Peace and Justice v. George Herbert Walker Bush*[43] case involved the Galileo and the second one[44] the Ulysses spacecraft.[45]

Plaintiffs, a group of environmentalists, sought to enjoin the launch of spacecraft with Nuclear Power Sources (NPS) on board. In the first case, the space shuttle Atlantis was to carry the unmanned Galileo spacecraft into Earth's orbit. There it was to be released to arrive at Jupiter in 1995 by using close to 50 pounds of plutonium as an energy source. There have been 22 other space flights by the United States using plutonium; however, none has used as much plutonium as the Galileo mission. The second case involved the launch of the space shuttle Discovery and its payload, the Ulysses spacecraft. Ulysses was powered by a Radioisotope Thermo-electric Generator (RTG) which converts heat that is generated from the radioactive decay of plutonium dioxide into electricity. In both cases, the plaintiffs filed a motion for a Temporary Restraining Order ("TRO").

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39 C.A. 90 0736 (D. Cal. L.A., filed Feb. 19, 1990).

40 *See* Phillip D. Bostwick: *Star Trek: Litigating Commercial Space Issues Through the Courts*, paper presented at the Fourth Annual Symposium on the Law and Outer Space, Georgetown Univ. Law Center, Oct. 16-17, 1992, at 20.

41 No. C 682831 (Cal. Sup. Ct. L.A., Dec. 4, 1990).

42 No. 89-B-1947 (D. Colo., filed Nov. 8, 1989).

43 Civil Action No.89-2682-OG (D.D.C. 1989).

44 Civil Action No.89-2682-OG (D.D.C. 1990).

45 A comprehensive analyis of the Bush cases may be found in Stephen Gorove, *Recent Litigation Involving the Launch of Spacecraft with NPS on Board*, 36 PROC. COLLOQ. L. OUTER SPACE 298 (1994); *See also* Rachel B. Trinder, *U.S. Space Law: The Practical Implications of Recent Case Law Developments on Minimization of Litigation, in* THE USE OF AIRSPACE AND OUTER SPACE FOR ALL MANKIND IN THE 21ST CENTURY 82 *et seq.* (Chia-Jui Cheng ed., Kluwer 1995). For a case note, see 21 J. SPACE L. 167 (1993).

As to the merits, the plaintiffs' legal basis for seeking an injunction was that NASA had failed to satisfy the requirements of the National Environmental Policy Act ("NEPA"). Specifically, the plaintiffs advanced two major complaints, namely, that (1) the Environmental Impact Statement ("EIS") did not assess all relevant risks and underestimated their magnitude,[46] and (2) it did not fully consider alternatives to the proposed plan, such as the launching of unmanned rockets or the use of other power sources.[47]

In the overall assessment of the two cases, it was the court's view that NASA's decision, founded on a reasoned evaluation of the relevant factors, had met all the necessary requirements of NEPA. Thus, none of the plaintiffs' challenges were likely to succeed on their merits, and their motions for a TRO were accordingly denied in both cases.

The two cases were decided prior to the adoption of a U.N. resolution on Principles Relevant to the Use of Nuclear Power Sources in Outer Space[48] and had no foreign involvement. Nonetheless, their analysis may provide an opportunity for policy makers to make a comparative evaluation of two distinct approaches, one providing procedural safeguards embodied in domestic legislation and the other one setting forth substantive guidelines and criteria for safe use as well as requirements for safety assessment in an international instrument.

As a postcript, it may be added that the Galileo spacecraft reached Jupiter in December 1995 and has continued to provide invaluable data regarding the giant planet.

While not directly related to space law, the issues of noncompliance with NEPA and of its extraterritorial application also came up in *Environmental Defense Fund v. Massey*.[49] In that case, the Fund alleged that the National Science Foundation violated NEPA by failing to prepare an Environmental Impact Statement (EIS) before going forward with plans to incinerate food waste in Antartica. The Court of Appeals, citing *Beattie v. United States*,[50] held that the presumption against the extraterritorial

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46 As to risk assessment, plaintiffs' claim that NASA generally failed to adequately report the true risks of the Galileo Mission in the EIS was found not to have been adequately substantiated. Plaintiffs' relevant evidence was far outweighed by that supplied by the defendants. There was simply not sufficient evidence to support the plaintiffs' contention that the EIS was inadequate.

47 As regards alternatives, NEPA mandates that to be adequate an EIS must examine alternatives to the proposal being examined. According to the plaintiffs, there were three significant alternatives that were left out of the EIS: (a) the option of delaying the Galileo and Ulysses launches until the 1991 windows; (b) the use of a Titan IV launch vehicle instead of the space shuttle; and (c) the use of alternative power sources. In reviewing these complaints, the Court found that all three alternatives were addressed in the relevant EIS's.

48 *See* U.N. Doc. A/AC.105/572, at 47 (1994)

49 986 F.2d 528 (D.C. Cir. 1993).

50 756 F.2d 91 (D.C. Cir. 1984).

application of statutes does not apply where the conduct regulated by the statute occurs primarily, if not exclusively, in the United States, and the alleged extraterritorial effect of the statute will be felt in Antartica--a continent without a sovereign but an area over which the United States has a great measure of legislative control. The court observed that Antarctica is generally considered to be a "global common" and is frequently analogized to outer space.[51]

Antitrust

In three cases involving *Alpha Lyracom Space Communications v. COMSAT,*[52] Alpha Lyracom Space Communications, Inc., and Pan American Satellite, collectively referred to as "PanAmSat," who are the owner and operator of the first international commercial communications satellite outside of the International Telecommunciations Satellite organization (INTELSAT), brought suit alleging that the Communications Satellite Corporation (COMSAT), through INTELSAT and in conjunction with other signatories, engaged in a variety of anticompetitive practices in the market for international commercial satellite telecommunications services in violation of federal antitrust laws. The Communications Satellite Act of 1962 (CSA) created COMSAT as a private corporation and designated it as the U.S. representative or signatory to INTELSAT, a 117 nation organization that includes official representatives such as COMSAT. The CSA provides that COMSAT shall be "subject to appropriate governmental regulation and that the ownership of the corporation [COMSAT] shall be consistent with the federal antitrust laws." In 1990, the District Court for the Southern District of New York granted COMSAT's motion to dismiss on the finding that COMSAT was immune from suit and legal process for its acts as a signatory to INTELSAT.[53] Although the Court of Appeals upheld this finding, it reversed and remanded the case to allow PanAmSat an opportunity to "allege specific aspects of COMSAT's conduct as common carrier that are actionable under the antitrust laws," but specifically cautioned against any effort to dress up "Signatory" allegations in the language of "common carrier" allegations.[54]

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51 The issue of extraterritorial application of NEPA also surfaced in *NEPA Coalition of Japan v. Aspin*, 837 F. Supp. 466 (1993), in which the District Court held that the presumption against extraterritorial application of statutes applied with particular force to U.S. military installations in Japan in view of the substantial likelihood that its application would affect treaty relations and, in any event, U.S. foreign policy interests outweighed the benefits that would result from preparing environmental impact studies.

52 1990-2 Trade Cas. (CCH) P 69, 188 (S.D. N.Y. 1990), 946 F. 2d 168 (2d Cir. 1991), 1993-1 Trade Cas. (CCH) P 70, 184 (S.D. N.Y. 1993). For case notes on these cases, see 20 J. SPACE L. 78 (1992); 22 J. SPACE L. 141 (1994).

53 1990-2 Trade Cas. (CCH) P 69, 188 (S.D. N.Y. 1990).

54 946 F.2d 168 (2d Cir. 1991) *cert. den.* 112 S.Ct. 1174 (1992).

PanAmSat responded to the Appeals Court mandate by amending the core allegations of their complaint in a manner that either omitted reference to INTELSAT altogether or, at the very least, distanced COMSAT's alleged acts as much as possible from its capacity as signatory to INTELSAT. COMSAT principally argued that PanAmSat's amended complaint failed to distinguish between COMSAT's signatory conduct and its common carrier role. Ultimately, COMSAT contended that all of the actions alleged by the plaintiffs were either performed as a signatory or were so intertwined with its signatory duties that they were virtually indistinguishable.[55]

The Court rejected COMSAT's argument,[56] holding that PanAmSat had shown that they were only seeking redress for COMSAT's acts as a common carrier. In the court's view, a standard that required sharper distinctions between COMSAT's roles as a common carrier and an INTELSAT signatory "at this stage" would inappropriately transform the motion to dismiss into a motion for summary judgment.

Taxation

There has been a notable case in the taxation area. In *COMSAT v. Franchise Tax Board*,[57] the Court held that because COMSAT owned an interest in communications satellites and functioned in California at or through an earth station located in California, the satellites were "tangible personal property owned and used" in the state by the taxpayer. The case was an appeal by the Tax Board from a lower court decision which ordered the refund of certain corporate income taxes payed by COMSAT. The Court of Appeals held that the property factor, employed by the Board, which included a portion of the taxpayer's interest in communications satellites, and the sales factor, employed by the Board to apportion the taxpayer's income, which included a portion of receipts from the leasing of satellite circuits and a portion of half-circuit rentals attributable to the use of satellites, were proper.

Intellectual Property

The unauthorized use of a patented invention and the question of whether outer space may be regarded as a foreign country under statutory interpretation came before the court in *Hughes Aircraft Co. v. United States*.[58] Hughes brought action pursuant to 28 U.S.C. §1498 seeking just

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55 1993-1 Trade Cas. (CCH) P 70, 184 (S.D. N.Y. 1993).

56 *Id.*

57 156 Cal. App. 3d 726, 203 Cal. Rptr. 779 (Cal.App. 1st Dist. 1984). For a brief discussion of this case, see Robert F. Scoular, *The Commercialization of Space: Domestic and International Law*, paper presented before the ABA Section on Tort and Insurance Practice, Aug. 11, 1992, at 57.

58 29 Fed. Cl. 197 (1993).

compensation for the unauthorized use or manufacture by or for the government of a spacecraft containing an embodiment of a patented apparatus. The aforementioned section contains a provision similar to that found in the FTCA, stating that §1498 "shall not apply to any claim arising in a foreign country." The *Hughes* Court stated that this provision, by itself, does not prevent the application of §1498 to activities in outer space, because outer space is not a "foreign country" in the ordinary meaning of that phrase. However, citing the *Smith* Court's interpretation of a similar provision in the FTCA,[59] the *Hughes* Court felt constrained to limit §1498 to activities in this country only. Citing Stevens' dissent in the *Smith* holding, the Court stated that "*Smith* also prevents the assertion of §1498(a) over claims arising in outer space." Therefore, the court confined their analysis to activities occurring only within the territorial limits of the United States.

Satellite Communications

In *ITT World Communications v. FCC*,[60] one of the infrequent court cases involving a review of the ruling of the Federal Communications Commission (FCC), the ITT World Communications, Inc., together with other petitioners, sought a review of a series of decisions made by the FCC concerning the question of whether the Communications Satellite Act of 1962 allowed the FCC to designate noncarriers as "authorized users." In its AUTHORIZED USER I ruling,[61] the FCC interpreted the Act as conferring upon it the power to designate noncarriers as authorized users, but established a policy of limiting the class of authorized users to the carriers absent "unique and exceptional circumstances." In its AUTHORIZED USER II ruling,[62] the FCC abandoned its AUTHORIZED USER I policy of permitting only carriers to obtain authorized user status and, thus, permitted COMSAT to enter the international telecommunications retail leased-channel market.

In these decisions, the FCC has attempted to restructure the international telecommunications markets by heightening competition between the two principal modes of telecommunications satellite systems and cable systems. Essentially, the decisions permit COMSAT, which had functioned previously as a wholesaler of satellite services, to sell its satellite services directly to the public, a role which previously had been performed only by petitioners. The basic issue in this case was whether the FCC may permit COMSAT to sell its satellite services to the general public and, if it may, whether it properly had exercised its power in this instance.

As to the threshold question whether the Communications Satellite

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59 *Supra* note 22.

60 725 F.2d 732 (D.C. Cir. 1984).

61 4 FCC 2d 421 (1966).

62 90 FCC 2d 1394 (1982).

Act of 1962[63] permits the FCC to designate noncarriers as authorized users which are able to lease satellite channels directly from COMSAT, the court held that the Act grants the FCC broad discretion to designate noncarriers as authorized users. As to the second issue, the court found that the FCC had not considered all of the issues in implementing its AUTHORIZED USER II decision.

Trust

Many cases may raise issues which touch upon more than one area of the law and make their categorization under a single field somewhat misleading. Thus, for instance, the case *Avtec Systems v.* Peiffer[64] involves not only issues of fiduciary relations but also of copyright infringement. The case reveals that while Peiffer was a full time employee of Avtec Systems, a company that marketed space related computer services, he developed the "Orbit Program," a computer software program that performed various orbital simulations for satellites. He demonstrated a revised version of the program as a unique Avtec capability. Later, he developed another version not intended for demonstration but a general "stand alone" software package and, without informing Avtec, signed an agreement with KKI corporation giving KKI an exclusive license to market the program. Avtec, alleging ownership of the Orbit Program, sought damages for copyright infringement of the program, misappropriation of its trade secret in it, breach of Peiffer's fiduciary duty and imposition of a constructive trust.

In light of Peiffer's misappropriation of Avtec's trade secret in the use of the Orbit Program and his breach of fiduciary duty to Avtec, the court felt that Peiffer and KKI would be unjustly enriched if permitted to retain all benefits and revenues generated by the program. Accordingly, the court granted Avtec's request to impose a constructive trust upon Peiffer and KKI.[65]

Insurance

In *Western Union v. Lexington Insurance Co.*,[66] the original satellite owner brought an action against its satellite insurers and satellite insurance broker claiming insurance coverage for insufficient fuel which the Westar IV and Westar V satellites contained.[67]

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63 47 U.S.C. Sec. 701 *et seq.*

64 805 F. Supp. 1312 (E.D. Va. 1992).

65 For a case note on *Avtec Systems, Inc. v. Peiffer,* see 21 J. SPACE L. 60 (1993).

66 C.A. No. 91-193 (D. N.J., filed Jan. 18, 1991).

67 For a thorough discussion of the developments in this case, see Phillip D. Bostwick: *Star Trek: Litigating Commercial Space Issues Through the Courts*, paper presented at the Fourth Annual Symposium on the Law and Outer Space, Georgetown Univ. Law Center, Oct. 16-17, 1992, pp. 25 *et seq.*

Foreign and International Judicial Decisions

So far, there have been very few foreign court decisions directly related to space activities. In a Canadian case involving *Attorney General v. Lount Corp.*,[68] the Court of Appeals affirmed the lower court's decision, holding that none of the radio apparatus, consisting of earth station receiving equipment designed to receive satellite signals and other equipment designed to receive local off-air televisions signals located at a Holiday Inn, were subject to the requirement of a license under the Broadcasting Act and the Radio Act. One of the contested issues involved the nature of the meaning of "intention." While the satellite signals carrying programs may have been intended to reach paying subscribers only, the broadcasters made no effort to encode the signals and thereby preclude members of the general public from receiving them. In the court's view, this revealed their actual intention. Another issue related to the nature of the meaning of "broadcasting receiving undertaking" in the statutory definition of broadcasting. Since the hotel charged no fee to hotel guests for watching the television programs, the installation was not a "broadcasting receiving undertaking" with direct commercial implications.

In the case of the *Netherlands Antilles v. Antilles Communications N.V.*,[69] Antilles Communications, with the aid of a receiver/transmitter antenna, was receiving television programs intended for reception in the United States via satellite and was transmitting these programs to a number of parties who paid for this service. The main issue was whether a license by the Governor was required and whether the petition for it would be granted.

The lower court held that no such license was required, and it also turned down the petition to grant the license. On appeal, the Supreme Court of The Netherlands Antilles ruled that neither national nor international law barred the granting of a permit.[70] The appeal by The Netherlands Antilles, based also on possible copyright infringements, was rejected by the Supreme Court of The Netherlands which let the lower court's decision stand holding that the copyright infringement argument should have been advanced in the lower courts to receive consideration.[71]

As regards international decisions, on December 15, 1994 the

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68 For a text of the Court of Appeals' decision (Ottawa, June 10, 1985), see 10 ANNALS AIR & SPACE L. 527-535 (1985).

69 A text of the decision of the First Chamber of Supreme Court of the Netherlands (Petition nr. 6661) on Feb. 22, 1985 is reproduced in 10 ANNALS AIR & SPACE L. 552-554 (1985).

70 For a text of the decision of the Supreme Court of The Netherlands Antilles on Nov. 8, 1983 in *Antilles Communications Ltd. v. The Netherlands Antilles, The Minister of Communications and Transport, The Governor of the Netherlands, Antilles, see* 9 ANNALS AIR & SPACE L. 534-542 (1985).

71 *Supra* note 69.

European Court of Justice held that the European Union has the right to negotiate service-related space issues such as launch vehicle sales on behalf of the Union's member states. That right had been disputed by several individual nations.[72]

Concluding Thoughts

The preceding review of leading U.S., foreign and international court decisions, at first impression, indicates that while space law is a distinct discipline among the various branches of the law, the issues which arise in the courts and the procedures used differ little from those encountered in other areas of the law. In space law cases, the courts consider issues, for instance, of torts, contracts, jurisdiction, trusts, insurance, and intellectual property very much in the same manner as they do in cases involving other fields of the law. Claims arising out of contractual stipulations or negligent behavior appear to be little different from issues the courts deal with in other cases as a routine matter. At the same time, disputes involving space telecommunications may present less conventional issues. While foreign judicial decisions have been slow in surfacing, the ones in our foregoing review have basically followed patterns similar to those which arise in U.S. cases in the field of telecommunications.

It is not for the first time that a new legal discipline has arisen as a result of scientific and technological breakthroughs or inventions. Equally, it is by no means unprecedented that a certain field of law--while governed by the internal laws of a particular country--has, at the same time, also been subject to international laws and regulations pertaining to that distinct legal area. Recent examples include, for instance, atomic energy, telecommunications and environmental law. However, the field is not limited to these categories but includes transportation and aviation law and many other areas where international laws and regulations have sprung up to deal with topics of international concern either bilaterally, multilaterally or worldwide.

It is because of this interconnection between domestic laws governing a specific subject and the not infrequent possible existence of some international legal prescription applicable to the same matter that the practicing legal profession must be constantly alert not to overlook possible international implications in given cases but devote the time needed for appropriate reasearch and careful analysis. Additionally, because space laws and regulations have emerged in many countries, the comparative legal aspects should not be ignored.

Seen in the light of the preceding thoughts, it is not surprising to find that even the early cases predating the space age suggest a relevance of

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72 U.N. Doc. UNOV/OOSA, HIGHLIGHTS IN SPACE - PROGRESS IN SPACE SCIENCE, TECHNOLOGY AND APPLICATIONS, INTERNATIONAL COOPERATION AND SPACE LAW 1995, at 51 (1995).

jurisdictional considerations which may touch not only upon the domestic laws of airspace but also on the issues of the upward extent of national sovereignty and bring to the fore questions of the demarcation between airspace and outer space. These, in turn, call to our attention issues which have surfaced in connection with the claims of equatorial countries to areas of the geostationary orbit lying above their territories. They also bring to mind questions raised by the development of a hybrid vehicle capable of flying in the air as well as moving in outer space which again raises not only jurisdictional issues but comparative legal issues regarding the applicability and enforcability of national air laws of different countries and their possible claims to specific altitudes of airspace above their territories.

The close interrelationship among the different legal disciplines such as air law and space law and the frequently observed interdisciplinary association between the legal and scientific disciplines is once more concretely demonstrated by recent revolutionary developments which appear to indicate that the lowest orbit of satellites around the earth may be at a height of 30 km instead of at an altitude of 90-110 km. This unexpected event may thrust upon policy makers a host of choices in connection with the application or nonapplication of principles of air law or space law in a given factual situation. The policy choices which should be made after a careful assessment of national and international claims may include a gamut of variables ranging from national legislative or executive action, international steps or even inaction with the idea that it is best to let sleeping dogs lie. In the latter case, the appropriate national or international courts may handle the matter, if and when a case is brought before them.

The linkage between the domestic aspects of U.S. laws and their possible relevance to space law has been intimated in our discussion in connection with matters involving the extraterritorial application of the Federal Tort Claims Act. Thus it may be recalled that the issue presented in the *Smith v. United States* case[73] was whether Antarctica, a sovereignless region which has frequently been analogized to outer space, is a "foreign country" within the meaning of the FTCA. In the Supreme Court's view, the phrase "foreign country" included Antarctica, even though it has no recognized government. An interesting unresolved legal and policy issue is whether reference to a "foreign country" in a U.S. domestic law governing for instance matters of importation or customs, or even in an international agreement, should be interpreted to include outer space and, if so, whether it should also apply to a U.S. or foreign spacecraft in outer space, or just to free space.

In another group of cases, more specific issues involving provisions in launch service agreements, especially interparty waivers of liability, had to be carefully scrutinized by the courts. These cases appear to put legal technicians on notice to draft such agreements with utmost care and

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73 *Supra* note 23.

circumspection while keeping even rarely expected and unlikely future eventualities in mind. Also, it stands to reason that the legal profession handling space related disputes should make every effort to avoid the possibility of disputes which may arise from ambiguous contractual or legislative provisions and should do its best to prevent lengthy and expensive litigation by using all available techniques of amicable dispute resolution.

If we turn our eyes toward the future, our short- and long-range expectations reveal a variety of likely events many of which we have already been witnessing with the passage of each day. They include, for instance, the incredible rapidity of technological and scientific breakthroughs, especially in the telecommunications field, the expected building of the U.S./International Space Station and the participation by different nationals in it. The continuing proliferation of national space laws, the further spread in the establishment of national or international spaceports and the increasing number of organizations involved in space related matters in the four corners of the world will undoubtedly provide an additional impetus to this trend. In light of these developments, it is reasonable to assume that contentious cases related to outer space will multiply. Short of alternative dispute resolutions, these cases will have to be handled either by courts under the domestic laws of a particular state or, in appropriate situations, by an international arbitration court, like the one set up in France[74] or, possibly by a regional international tribunal,[75] or perhaps by the International Court of Justice itself or a special chamber of it.

If this writer may put forth a modest suggestion for space lawyers and policy makers, it would be that they should not lose sight of the interdisciplinary connotations but keep a watchful eye both on the revolutionary technological developments and the interrelationship between law and the other social sciences. This will enable mankind to weather with as little pain and individual suffering the magnitude of changes which we are witnessing as we move toward the uncharted waters of the 21st century.

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74 *See* M. G. Bourély, *Creating an International Space and Aviation Arbitration Court,* 36 PROC. COLLOQ. L. OUTER SPACE 144 (1994).

75 *See* text preceding note 72, *supra*.

EVENTS OF INTEREST

A. PAST EVENTS

Reports

INTERNATIONAL COOPERATION AND SPACE LAW - 1995

The Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space held its 34th session in Vienna from 27 March to 7 April 1995. The Subcommittee continued its discussion of its three agenda items: the question of early review and possible revision of the principles relevant to the use of nuclear power sources in outer space; matters relating to the definition and delimitation of outer space and to the character and utilization of the geostationary orbit; and consideration of the legal aspects related to the application of the principle that the exploration and utilization of outer space should be carried out for the benefit and in the interests of all States, taking into particular account the needs of developing countries.

With regard to the question on the definition and delimitation of outer space, a "Questionnaire on possible legal issues with regard to aerospace objects" was finalized. The Subcommittee agreed that the purpose of the questionnaire was to seek preliminary views of States members of the Committee on the Peaceful Uses of Outer Space on various issues relating to aerospace objects. It was hoped that the replies to the questionnaire would provide a basis for the Legal Subcommittee to decide how it might continue its consideration of the agenda item. Some progress was also achieved on other matters on the agenda. More details can be found in the report of the Subcommittee in United Nations document A/AC.105/607.

On 15 December 1994, the European Court of Justice ruled that the EU has the legal right to negotiate service-related space issues such as launch vehicle sales on behalf of the Union's member nations. That right had been contested by several of the individual nations.

On 23 December 1994, Russian Space Agency (RSA) director Yuri Koptev and Indian Space Research Organization (ISRO) chairman Krishnaswamy Kasturirangan signed a comprehensive cooperative agreement covering broad areas of space science, use of both space and ground-based facilities, meteorology, environmental monitoring, remote sensing, communications, life sciences, space medicine, materials processing, and human space flight research. The new agreement also covers military and technical cooperation through 2000.

Pursuant to decisions reached in 1994, in January 1995 Inmarsat began building a capital funding base for a new sub-organization, known as Inmarsat-P, that will establish, own and operate a global, personal telephone communication satellite network. Original system cost is

estimated to be US$2.6 billion. In January the first capital subscription produced about $440 million from the Americas and Europe, about $150 million from a small group of Middle Eastern countries, about $670 million from Asia and the Far East, and $150 million from the Inmarsat Organization, exceeding half the total system capital required. On 7 April, Inmarsat's council approved a new policy allowing the United Nations free access to its satellite constellation for use in disaster relief operations. Up to eight mobile ground stations will be able to use the system at no charge for renewable three week periods upon request by the United Nations. In July, Ghana joined Inmarsat as its 79th member nation.

A new International Space Science Institute (ISSI) was founded in Bern, Switzerland, on 6 November 1995 with an international workshop on the outer reaches of the solar system. The focus of the institute is on data from international missions devoted to the physics of the Sun, the solar wind and other space plasma, comets, and interactions between the Sun and Earth. The ISSI is funded by ESA, the Swiss and Bern canton governments, and the Swiss firm Contraves.

Six major telecommunications companies representing ASEAN created a new company on 24 January to provide a single point of contact for multinational companies involved in both satellite and terrestrial communications networks. The six ASEAN nations are the Philippines, Indonesia, Singapore, Malaysia, Thailand, and Brunei. On 14 February, companies in three of these nations (the Philippines, Indonesia, and Thailand) also agreed to set up a joint system to deliver mobile satellite communication services. The new company, the Association of South East Asian Nations Cellular Satellite System (ACES), completed equity financing of $150 million on 18 May, and on 6 July contracted with Lockheed Martin to deliver two A2100 satellites in 1998. The $650 million ACES system will employ dual mode hand-held telephones compatible with both ground-based cellular systems and the two GEO satellites. The telephones are to be developed and built by Ericsson (Sweden) under a $225 million contract signed in July.

On 30 January the governments of China and the United States reached a bilateral accord extending their agreement relating to launch services. The original agreement, entered into in 1988, expired in 1994. The new agreement provides that China's Great Wall Industries may launch up to 15 geostationary satellites through 2001, including 11 new spacecraft and 4 already under contract. Under the terms of the agreement, China will price its launches within 15 percent of Western companies' charges for comparable payloads.

In February 1995, Japan's Ministry of Posts and Telecommunications announced plans to accelerate deregulation of Japan's telecommunication industry by permitting more transborder satellite broadcasting. The ministry was expected to grant several licenses to Japanese-based cable companies to take direct feeds from foreign television broadcasters for programme distribution through Japanese cable systems. Kokusai Denshin Denwa Co. Ltd. (KDD) is permitted to establish a new satellite receiving

facility in Tokyo to meet growing demand from broadcasters for trans-Pacific links. In May, KDD announced receipt of approval from the Japanese Ministry of Posts and Telecommunications to operate an international television relay service from 1 June 1995. The service will make available television programme relay from the United States via Panamsat 2.

On 15 March, India's parliament approved a 31 per cent increase, to $330 million, in the 1995-1996 ISRO budget. The budget for the commercial space company Antrix Corporation was also increased 25 per cent, to $250 million. ISRO's budget covers the Polar Satellite Launch Vehicle, the cryogenic upper stage and other elements of the Geosynchronous Launch Vehicle, remote sensing satellites IRS-1C and IRS-1D, a new ocean data spacecraft Oceansat, the Insat communications and weather satellites Insat 2C, 2D, and 2E, a new launch pad, and miscellaneous space applications and space science programmes.

On 22 March, Japan's Diet approved a 1995 space budget of $2.56 billion, 5.1 per cent more than 1994's budget. The new budget doubled funding for the unpiloted shuttle Hope-Ex, to $106 million, and increased support for Earth observation by 54 per cent, to $531 million. ISAS was allocated the same level of funding as in 1994. It included funding for Lunar A, which will be launched in 1997 to investigate the Moon's internal structure, and Planet B, scheduled for launch in 1998 to study Mars' atmosphere.

United States President William Clinton and Ukrainian President Leonid Kuchma announced on 11 May an agreement for civil space cooperation. Specific elements included the flight of a Ukrainian cosmonaut aboard a United States Shuttle in October 1997 and negotiation of an agreement for commercial launch services by Ukrainian Zenit and Tsyklon rockets. Similar agreements are currently in force between the United States and Russia and China.

On 16 June, the French and Brazilian space agencies signed a cooperative agreement for work on satellite ground control and small satellite systems for Earth observation, beginning with development of a propulsion system for a small Brazilian Earth observation satellite.

The United States turned over the scientific instrument operation of the International Ultraviolet Explorer (IUE) spacecraft to a European-nation partnership on 1 October. The spacecraft has been operated by NASA's Goddard Space Flight Center (GSFC) since its launch in 1978. GSFC will still manage the IUE's "housekeeping" operations, but Spain's Villa Franca ground station will now collect the spacecraft's data for analysis by European and United States scientists.

From 23 October until 18 November the International Telecommunication Union hosted the World Radiocommunication Conference 1995 (WRC-95) in Geneva, Switzerland, at which substantial attention was given to issues relating to future low Earth orbit satellite radio frequency requirements and other radio regulatory issues involving space communications.

During 1995, the INTELSAT organization added its 135th member, Malta, on 20 January, and its 136th member, Botswana, on 14 April.

In January 1995, Afro-Asian Satellite Communications Ltd. of Bombay signed a US$700 million contract for two geostationary satellites on which they will base a new, satellite-linked hand-held telephone network serving Southern and Central Asia with plans to expand services later into East Asia and Africa. On 9 March Hughes Communications announced formation of Galaxy Latin America, a new partnership with Venezuelan Cisneros Group of Companies, Brazilian Televisao Abril, and Mexican MVS Multivision. Beginning in 1996, the new partnership will offer 144 television channels and 60 compact-disk quality music channels to individual households across Mexico, Central and South America and the Caribbean, using direct broadcast satellite technology. During June, Hong Kong company TVB International, a producer of Chinese language programming, leased a transponder from Panamsat, a US firm, to transmit television programming to Taiwan and countries in Northeast Asia.

In June, Daimler-Benz Aerospace announced that their Orbital Infrastructures Division signed an MOU with the Russian RKK Energia, of Kaliniingrad, and with Rockwell International of Seal Beach, CA, USA, for the 1997 launch of a free-flier camera that will permit inspection of the outer surface of the Mir Space Station. The German built camera will be launched aboard a Russian Progress supply vehicle. On 26 October, WorldSpace Inc., an American corporation, announced a contract with Alcatel Espace of France to build three satellites for US $600 million. The three satellites would make digital sound broadcasting available to 80 percent of the world's population. The contract includes the construction and launch of the satellites as well as the establishment of required ground stations on five continents. Some digital video will also be available from the satellites, but the mainstay of the programming would be high quality sound broadcasting.

In 1995, the International Institute of Space Law (IISL) continued both to develop the substantive law of outer space and to disseminate knowledge about space law. The major formal framework of the institute's work is its annual Colloquium at which papers on space law matters are presented and discussed. The 1995 Colloquium, the 38th, was held, as usual, in conjunction with the annual Congress of the International Astronautical Federation, which took place in Oslo, Norway. The Colloquium covered intellectual property, space debris and developments in international organization dealing with space matters. The Institute also participated in the Congress on Public International Law, which was held at United Nations Headquarters in New York in March 1995 as part of the celebration of the fiftieth anniversary of the founding of the United Nations. A successful Round Table on Space Law, organized, chaired and contributed to by the Institute's President and other Directors and members, demonstrated the United Nations's accomplishments in this field of international law. Lead speakers focused on how the Untied Nations system had fostered the development of space law, particularly through the

Committee on the Peaceful Uses of Outer Space (COPUOS) and the General Assembly, and also discussed the five international space treaties and the various Principles relevant to space which have been adopted by the General Assembly, and sought to discern where current and future discussions might lead.

In cooperation with the European Centre for Space Law (ECSL), the IISL organized a Symposium for the benefit of delegates to the 1995 session of the Legal Subcommittee of COPUOS, on "Technical and Policy Issues Related to the Use of the Space Environment."

Several other important conferences dealing with various aspects of space law were held in 1995. These included an International Symposium on "20 years of the ESA Convention," held in Munich in September, an International Colloquium on Air and Space Law, held at the University of Cologne in June, and an International Conference on "International Air Transport and Space Activities," held at Beijing in August. The ECSL's annual summer course on space law and policy was held this year in Aberdeen, Scotland, United Kingdom.*

THE NEED FOR REGULATION OF PRIVATE NATIONAL SPACE ACTIVITIES

On December 8, 1995 a Workshop was held on the subject of "The Need for Regulation of Private National Space Activities." It was the 4th Workshop of this kind held by the Dutch National Point of Contact (NPOC) of the European Centre for Space Law (ECSL). Thanks to the generous cooperation of ECSL, ESA and ESTEC, the Workshop took place at the premises of the Space Expo at ESTEC, Noordwijk, The Netherlands. The Chairman of the Workshop was *Prof. Dr. H.A. Wassenbergh*, Emeritus Professor of Air and Space Law of Leiden University and Chairman of the Board of the International Institute of Air and Space Law at Leiden University.

In his introduction to the theme of the Workshop, *Prof. Wassenbergh* explained that the issue of establishing a national space law or other regulation within the Netherlands had already been on the agenda for some time. Thus, he had written a letter to the Minister of Foreign Affairs of the Netherlands on this issue. The privatization of many space activities, such as low earth orbit communications services, would soon require more attention.

The morning session, entitled "The European Perspective," was then opened by the presentation of *Mr. M. Ferrazzani*, of the Legal Affairs department of the European Space Agency. He spoke on "The European Space Agency and National Space Legislations in Europe." He provided an overview of the many bits and pieces of national legislations which existed in Europe and were relevant to space activities. He also dealt with the impact of the European Space Agency on the issue of national space

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* UNOV/OOSA, HIGHLIGHTS IN SPACE - PROGRESS IN SPACE SCIENCE, TECHNOLOGY AND APPLICATIONS, INTERNATIONAL COOPERATION AND SPACE LAW 1995, at 50-54 (1995).

legislation. He dwelt in some detail upon the French situation: France had no national space legislation in force. On the other hand, CNES was created by a law, and both Arianespace and SPOT had been given a 'Concession d'Etat.'

The next speaker was *Mr. J.A. Ballard Esq.*, of Allison and Humphreys Solicitors, London, on "The UK Outer Space Act and Non-Governmental Activities in the United Kingdom." Mr. Ballard had actually been involved in the issuing of the first two licenses under the 1986 UK Outer Space Act. Firstly, he pointed out the three basic objectives that the Act was established to serve. Mr. Ballard then focused on a few difficulties pertaining to the Act. He discussed the very wide scope of activities coming under the Act. Various terms required further interpretation on the national level. Also, he made clear that foreign entities operating from British territory, even if permanently resident in the United Kingdom, were not required to obtain a license under the Act. Yet, the United Kingdom government could be held internationally responsible for such activities.

The third speaker planned was *Prof. Dr. P.M. Martin*, a professor at Toulouse University. In his absence due to the aviation strikes in France, *Mr. F.G. von der Dunk,* Co-Director of the International Institute of Air and Space Law, presented Prof. Martin's paper on "The Absence of National Space Legislation in France." First, the paper dealt with those various legal regulations in France related to space activities. Prof. Martin concluded that these texts were really "a private arrangement between the French and the French." In the long run he considered the absence of French national space legislation seriously prejudicial to French interests.

The last speaker in the morning session was *Mr. D.E. Reibel,* General Counsel with Esprit Telecom in Amsterdam. He provided an overview of "The US National Space Legislation: Past, Present and Future." He showed that the political decision of France not to establish national space legislation as such was quite in contrast to the policy in the United States. Crucial here was the provision of a clear legal framework for private national space activities as the best and most proper way for the government to develop commercial markets in space activities.

The first speaker of the afternoon session on "The Dutch Perspective" was *Mrs. L.A.C.J. Verweij,* Commercial Contracts Manager with BT (Worldwide) of Amsterdam. Her topic was "Dutch Industry and the Policy Framework for National Space Activities in the Netherlands." She characterized the general attitude of the Dutch government as "patronizing." She discussed the general policy framework in the Netherlands with regard to space activities, and regretted the focus on the industry sector. Demonstrating that with respect to satellite communications it might already be too late to play a facilitating role, she suggested that, as to future remote sensing markets which she tentatively foresaw coming, the government should take a more future-oriented facilitating approach.

The second speaker in the afternoon was *Mr. J.C. Bell,* Managing Director of Satellite Services at Unisource, Hoofddorp, The Netherlands. Mr. Bell had already joined the earlier discussions on the United States' role in promoting the interests of its national satellite communications entities, and now he had called for a unified European stance. He outlined the structure of satellite communications in Europe. He dealt with the various sorts of licenses required, and the different players in the field. He pointed toward the necessity of European deregulation in regard to uplink and downlink facilities and coupled it with a demand of reciprocity in the negotiations with the United States concerning opening of the respective markets.

The last speaker was *Mr. M.A.J.M. van der Heyden,* Director of High Key Communications in Amsterdam, on the subject of "Economic Opportunities for Non-Governmental Entities with respect to Space Activities." He pointed out that, so far, space policy, at least within the Netherlands, has always been technology-driven and without real market pulls. This framework now needs to be changed. A change of focus from industrial output to facilitating services in the field is required. For example, questions of licensing, liability arrangements and copyrights should be dealt with in order to answer the increasing opportunities available to the Dutch government to help create and develop an international market under a Dutch licensing scheme.

Despite the air transport problems which had prevented the French and Belgian participants from attending, some thirty participants were present at the Workshop. Due to the informal atmosphere, lively discussions arose on a number of occasions during the speeches. At the end, the Chairman concluded the meeting by saying that the subject of national space legislation even within The Netherlands justified serious consideration. He stressed that the topic was worthy of further consideration, and that The Netherlands might be foregoing an interesting opportunity to support a healthy economic development of private space activities.*

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Comments

COMMERCIAL SPACEPORTS: PRELIMINARY SITE SELECTION CRITERIA AND REGULATORY CONSIDERATIONS

The space of development of commercial opportunities in space is directly related to the availability of predictable, reliable and economical access to earth orbit. Routine transportation to space will require

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* Presently, proceedings of the Workshop are being prepared for publication in close cooperation with the European Centre for Space Law.

dedicated spaceports providing necessary services and support operations.[1] Commercial spaceports may be established at a wide range of locales, each with their own particular attributes and features. The spaceports of the future will share many similarities with the airports of today, including the enhancement of the economic development of their surrounding communities.

The State of Arizona, through the Arizona Space Commission,[2] has recognized that a commercial spaceport could have a significant role to play in the local economy of the next century. However, the establishment of a commercial spaceport is an inherently complex undertaking. Geographic, environmental, political, regulatory, economic and societal factors must be considered, as well as the type or types of technology that are intended to be served by the facility. This report identifies and discusses the preliminary criteria which must be examined in the selection of potentially suitable locations for a commercial spaceport, together with regulatory and administrative considerations.

A growing list of states have entered the commercial space age by creating or studying whether to create a commercial spaceport within their borders.[3] Many states with existing federal launch complexes have embarked upon ambitious programs to refurbish such facilities for commercial use. Other states, with no pre-existing launch sites within their borders, are able to take a "green field" approach. The list of potential spaceport locations is not restricted to the United States, of course, as many nations have or are developing independent launch capabilities which can be marketed for commercial use.[4]

It may appear that the list of potential spaceports already is indicative of a glut on the market of the future. Indeed, most of the

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[1] Section 3(14) of the Spaceport Florida Authority Act, Fla. Stat. 331.301 (1989), defines "Spaceport" to mean "any area of land or water, or any manmade object or facility located therein, developed by the authority under this act, which area is intended for public use or for the launching, takeoff, and landing of spacecraft and aircraft, and includes any appurtenant areas which are used or intended for public use, for spaceport buildings, or for other spaceport facilities, spaceport projects, or rights-of-way."

[2] The Arizona Space Commission was established by the state legislature in 1992. *See* A.R.S. §§ 41-1561 *et seq.*

[3] Approximately 35 states have joined together in the AEROSPACE STATES ASSOCIATION, which meets periodically to exchange information regarding the development of aerospace industries within their borders, including in many instances, the establishment of commercial spaceports.

[4] In addition to the Guiana Space Center in Kourou, spaceport facilities potentially available for commercial use are in existence in a number of locations around the globe, including Churchill, Manitoba, Canada; Andøya, Norway; Russia; China; and Japan. It can be expected that launch services will be offered by additional nations and organizations in the next several years, such as by India and Israel. Proposals for establishing a spaceport in Australia have repeatedly been made and initiated, with varying degrees of success.

proposed spaceports are intended to serve multi-stage expendable rockets as the chief, if not the sole, method of delivering a payload to earth orbit. Nevertheless, the facilities used to launch expendable rockets are merely a specie of artillery range, with all the inherent risks and limitations attendant thereto. The space commerce of the next century will require a safer, more reliable, and more economical means of reaching space than can be delivered by the expendable rockets of today. Reusable launch systems, including single or two stage to orbit rockets, may eventually provide routine and affordable access to orbit, as well as point to point transportation between two locations on earth. In such circumstances, spaceports will be located in dozens of locations throughout the globe.

The spaceports servicing the reusable launch systems of the future will be modeled after the airports of today. The emphasis will be on rapid turnaround times between launches with a relatively small maintenance crew.[5] The particular characteristics of the launch vehicles intended to be served will impact the specific facilities a spaceport will need to provide.[6] Thus, not all spaceports will be able to serve all types of launch vehicles. In this regard, spaceports will be quite distinct from airports.

There are three primary factors which must converge for a location to be considered as a potential site for a commercial spaceport. First, the location must be accessible by conventional modes of transportation. Second, the location must have appropriate geography, including a sufficient safety zone in all directions. Third, the location must be in relatively close proximity to necessary human and material resources.[7] Within each of these categories are numerous subsidiary factors and variables. Moreover, there is significant overlap and interplay between many of these considerations, making sharp distinctions and precise categorization elusive.

Expendable rockets traditionally have been launched from locations adjacent to oceans or other large bodies of water, or from remote inland facilities. These natural attributes provide an inherent zone of safety in which spent stages of the launch vehicle are dropped. Reuseable, single stage to orbit (SSTO) spacecraft will not shed components during flight like an expendable rocket. Thus SSTO vehicles do not have an intrinsic need to be launched over water or vast expanses of unpopulated and undeveloped land. It has been estimated that a radius of ten miles could provide a sufficient range for safety, including emergency downrange abort capabilities for SSTO launch operations. This safety range also would

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5 *See, e.g.*, Gaubatz, DC-X to X-33, IAF Paper No. IAF-95-V.5.08 (1995) (describing the DC-X and the DC-XA vehicles of the X-33 program, currently administered by NASA).

6 Examples include vertical take off and landing, horizontal take off and landing, vertical take off and horizontal landing, or nose first or tail first re-entry. Each type of vehicle will present its own support and service requirements.

7 *See* G. Harry Stine, *The SSTO Operational Environment* 4 J. PRACTICAL APPLICATIONS IN SPACE 101, 115 (1993).

encompass a noise pattern clear zone.[8] In addition, the spaceport must be located within a clear airspace corridor, which is not necessarily coterminous with the safety range. The precise safety range will need to be determined with reference to the specific characteristics of a particular launch vehicle. Nevertheless, it appears that spaceports serving reusable launch vehicles could be located in close proximity to population centers, just as airports are today, with full allowance for safety considerations.

The relative proximity of the spaceport to a population center will have a significant influence on the economics involved in the operation of the launch facilities. The factors influencing the site selection include but are not limited to the availability of a talent pool from which a trained workforce can be drawn; educational and research facilities to ensure the continued availability of the talent pool; and an extensive and robust business, technical and industrial base from which a comprehensive support network can be developed. This support network will be indispensable for providing the spaceport with a myriad of goods and services utilized in all aspects of conducting passenger and cargo transportation. Clearly, the economic viability of a spaceport can be enhanced where the requisite human and other resources are in existence or can be developed within close proximity to the facility.[9]

It is likely that equipment, supplies and other materials will be transported to a spaceport by a combination of surface and air transportation modes. Thus, the proximity of existing railroads, highways and air passenger and cargo service will be an important consideration in reducing the capital outlay required for the creation of a commercial spaceport. Of course, the successful establishment of spaceport operations will provide another important link in the transportation network, and the spaceport itself could be among the direct users of services provided and goods transported by sub-orbital spacecraft.

One of the most significant requirements of a spaceport will be securing a source of energy for its own use. Potential sites, therefore, must be evaluated in terms of proximity to high capacity electric power grids. An additional significant requirement will be the availability of a source of fuel to be utilized by the launch vehicles. Many of the SSTO concepts are based on vehicles fueled by liquid hydrogen, which can be processed from natural gas. For this reason, it is appropriate to consider the relative proximity of natural gas pipelines to a potential spaceport site. Many public safety issues relating to the utilization of hydrogen and other gasses already are subject to national standards and codes. For example, the National Fire Protection Association (NFPA) has adopted national standards concerning the storage, handling and use of liquefied hydrogen, compressed and liquefied gasses, and liquid and solid oxidizers. The NFPA standards have received general acceptance, and many of the

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[8] *Id.*

[9] *See* Portanova, Moncrief, Hickman, & Adams, *Reducing Costs in Space Launch System Infrastructure,* I.A.F. Paper No. IAA.1.1-83-644 (1993).

standards have been incorporated into the laws or regulations of several states.[10]

The surrounding, natural geography and environment present a wide range of site selection concerns. Possible sites must be appropriate for economic access to the orbits intended to be served by the vehicles utilizing the facility. A potential location must be free of natural hazards, for example flood plains or seismic fault lines. Title to the possible site, as well as a reasonable distance surrounding the location, must be investigated and researched. In addition, it must be verified that the site is not a reasonably likely candidate to be subject to claims that it is on sacred land or otherwise protected on archeological, historic preservation, environmental or other grounds.

The presence or absence of buildings and other structures which can be used or adapted for use by a spaceport must be considered. In addition, any preexisting contamination of local environmental features may require substantial study and remedial measures to make a particular location suitable for spaceport operations. The local climate must be conducive for flight operations.[11] The geographic analysis must be conducted in three dimensions, with sufficient consideration given to the flight characteristics of the vehicles intended to be served to ensure that take-off, landing, and possible abort scenarios will not constitute a hazard to existing recognized air traffic routes.

The geographic location of a spaceport may be subject to overlapping jurisdiction of governmental authority. Thus, the regulatory and administrative issues regarding the establishment and operation of a spaceport are as varied and complex as the geographic site selection criteria. Local municipal zoning regulations, as well as requirements imposed by federal, state or subsidiary bodies could apply to a given location. Environmental and other regulations also could be adopted by several authorities exercising concurrent jurisdiction. In proper cases, Native American tribal authorities may assert jurisdiction over a spaceport and/or aspects of its operations.

The advent of scheduled SSTO flight operations will present significant regulatory challenges. The operations of SSTO vehicles during ascent and descent through the atmosphere, as noted above, will raise issues of airspace traffic control and coordination with aircraft flight patterns. The federal government, through the Federal Aviation Administration (FAA), is charged with regulating and controlling the certification, operation and maintenance of aircraft. The limit of FAA authority is Flight Level 600,[12] that is, an altitude of 60,000 feet, which is

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[10] *See, e.g.*, A.R.S. § 41-2168; Ariz. Op. Atty. Gen. No. I88-057 (1988); 527 Code Mass. Reg. 12.00; Tex. Ins. Code Art. 5.43-2 § 2.

[11] This factor may decrease in significance over time, as space launch activities are conducted in accordance with an established schedule in a variety of weather conditions, similar to commercial airline operations.

[12] *See* 14 C.F.R. § 71.33.

sufficient to cover the operational range of all forms of commercial aircraft presently in use.

It is open to question whether the FAA should have authority to regulate the ascent and decent of SSTO spacecraft above FL 600, or at any altitude during ascent or descent while in the clear airspace corridor. This is an issue which must be addressed on both the national and international levels. An additional question that will require resolution is whether procedures should be adopted for the certification of spacecraft as being flightworthy, and thereby permit multiple flights of the craft, as opposed to obtaining a launch license from the Office of Commercial Space Transportation (OCST) or other appropriate entity for each individual launch.

The operation of regularly scheduled space launches will require an entirely different regulatory framework than has existed to date. Legal rules and requirements intended to govern single mission, expendable launches will be ineffective if applied to SSTO vehicles capable of being launched on a published timetable. Although OCST has requested that consultations for spaceport licenses be made at an early stage of planning,[13] the drafting of specific regulations providing guidance as to the contents of the application or the extent and nature of the authority of the OCST over spaceport operations has not been completed. On the international level, the Registration Convention may need to be reevaluated in terms of accommodating advance disclosure of launch activities, as opposed to the present system of reporting at varying times after the fact of a launch.

A primary concern for regulating spaceport operations concerns liability for damage caused on the surface of the earth or to aircraft in flight. Certainly, many of the economic risks can be reduced or limited by appropriate liability insurance policies, similar to those obtained for commercial launches utilizing expendable rockets. The availability, exclusions, and pricing of insurance are all issues that will need to be addressed and periodically reassessed as spaceport and launch vehicle operations commence and progress to a level of maturity. Nevertheless, the determination of the geographical characteristics of the "clear zone" should be made in consultation with insurance underwriters to make certain that coverage will not be unavailable due to geographic or other factors which could have been remedied at an early stage of planning.

One final factor which may influence spaceport site selection criteria is whether a particular location is subject to a federal program favoring its use as a new space launch facility, or otherwise subject to beneficial treatment. The draft "Omnibus Space Commercialization Act," currently under study and review by certain members of the House of Representatives, would facilitate proposals by commercial providers of launch services by obtaining interests in lands for new space launch facilities, and the "sale, lease, grant of overflight and clearance easements or other transfer of interests in such lands." House Resolution 1953,

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[13] 14 C.F.R. § 413.3.

entitled the "Space Business Incentives Act of 1995," would grant certain tax benefits for investments in commercial space centers and space launch and launch support facilities.

The factors and criteria discussed above represent the range of issues which must be considered in selecting an appropriate site for conducting spaceport operations. It is by no means intended to be all-inclusive, and each specific location may present unique and novel issues. Based upon the foregoing criteria, not less than three possible locations in Arizona have been identified could be suitable for the operation of a spaceport.[14] It is anticipated that further study of these locations will be conducted.

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TRANSPONDER AGREEMENTS

I. Introduction.

Although transponder agreements are of utmost importance to the space industry, especially to the telecommunications sector, they have not yet been given much attention by space law scholars. Furthermore, these contracts involving transactions for over millions of dollars are sometimes negotiated and drafted by non-outer space attorneys.

This article intends to analyze different agreements concerning satellite transponders with a view toward providing a basis for further discussion and analysis of unresolved issues. Since most of these agreements are governed by United States law, special reference will be made to U.S. legal and tax rules.

II. Transponders

Basically, a satellite communications system is made up of (1) a space segment and (2) a ground segment. In general, the ground segment is used for establishing communication with the satellites by transmitting and receiving signals by means of equipment located on earth, whether fixed or mobile. The ground segment consists of the earth stations, the terrestrial distribution and the network control facility. Earth stations in their most common configuration use an antenna system with a solid dish, a

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[14] The first potential site is east of the metropolitan Phoenix area. The second is located between Phoenix and Tucson. The third is situated southwest of Tucson. All of these potential sites are less than two hours drive from a major population center.

microwave feed, a pedestal, and equipment for adjusting the dish orientation.[15]

The space segment may comprise one or several satellites, which in turn may each have one or several transponders. As regards communications satellites, their space segment includes the following subsystems: (i) antennas; (ii) communications; (iii) telemetry, tracking and command; (iv) electric power; (v) thermal control; and (vi) secondary propulsion.[16] The most important subsystem and the most relevant to this article is the communications subsystem.

Signals transmitted from the Earth (uplink phase) are received by the satellite antennas at a certain bandwith. These signals, which may include television, telephone, facsimile, and digital information, are processed and enhanced and then re-transmitted back to earth (downlink phase) through the transmitting antennas, generally at a different bandwith to prevent interference. The whole process of a repeater, including all the equipment which process the signals from the exit from the receiving antennas up to the entrance to the transmitting antennas is known as *transponders.*[17]

In general, a communications subsystem consists of many transponders, whose number depends on the design of the satellite. In the Federal Communications Commission's words, a transponder is the device on a communications satellite which amplifies and relays transmissions between 'transmit' and 'receive' earth stations. Transponders were conceived in order to increase the capacity and transmission power of the satellite by segmenting the broadcast spectrum into several (transponder) units.[18]

III. Main Agreements

Although the most frequently used legal instrument regarding transponders is the *Lease Agreement,* other contracts are also used, depending on the needs of the operator. Indeed, a satellite operator may

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15 EMANUEL FTHENAKIS, MANUAL OF SATELLITE COMMUNICATIONS 21 (McGraw Hill, 1984).

16 RODOLFO NERI VELA, SATÉLITES DE COMUNICACIONES 27 (McGraw Hill, 1991). The antennas are used to send and transmit radiofrequency signals. The telemetry, tracking and command stations are meant to follow the satellite, and to exchange information with the Earth. Solar energy is the main source of power in communications satellites. Energy from the sun is converted to electricity and stored in batteries to provide energy to the satellite while it is in the earth's shadow. The thermal control subsystem aims at regulating the temperature of the whole system and the secondary propulsion is designed to keep and correct the position of the satellite.

17 RODOLFO NERI VELA, *supra* note 2, at 31.

18 *"Communications Satellite,"* Microsoft (R) Encarta. Copyright (c) 1994 Microsoft Corp., Copyright (c) 1994 Funk & Wagnall's Corp.

also resort to *Purchase Agreements* and *Sales and Lease Back Contracts*, among other arrangements.

The decision to opt between these different legal alternatives is dependent on the financial necessities and possibilities of the operator rather than on strict legal issues. Thus, the Purchase Agreement provides the operator with funds sooner than a Lease Agreement. However, the sale price will usually be lower than the aggregate amount the operator may collect under a Lease contract. Indeed, the proceeds of a sale of transponders may aid the operator to pay off the liabilities incurred in connection with the purchase of the satellite, its launching and insurance at a much earlier stage. Such costs usually range from approximately $140 to 200 million.[19] For the customer, the purchase of a transponder means the assurance of a stable price and supply.

Another possibility for the operator confronting the costs associated with the purchase and launch of a satellite is to obtain financing through *Transponder Sale and Lease Back Agreements*.[20] Under these agreements the operator sells several transponders to banks or other financial institutions with the view towards recovering part of the investment made and to obtain funds to operate and market the satellite capacity without losing control of the transponders.

It is worth adding that another category of agreements related to transponders is Marketing Agreements. These are arrangements between the satellite operator and a marketing firm to commercialize the satellite facilities. Specialized marketing skills and experience in space business are essential for the successful commercialization of transponders. In order to fulfill this task the operator may decide to market the satellite capacity by itself - - usually through another division or a related company - - or it may rely on the services of highly specialized marketing firms. In the latter case, a careful drafting of the Marketing Agreement becomes of fundamental importance for the satellite operator.

IV. Lease Agreements

Transponder lease agreements may be defined as the understanding between the operator and the customer, under which the former agrees to provide transponder capacity in a communications satellite and render services which permit an acceptable use of such capacity by the customer in consideration for a periodic payment of a stipulated price.

As pointed out by Craig Eadie,[21] despite of its denomination, the lease agreement belongs to the category of service supply contracts, and no control or possession ever passes to the lessee. The operator may be the

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19 AV. WK. & SPACE TECH. 22 (Jan. 20, 1992).

20 PAMELA L. MEREDITH & GEORGE S., ROBINSON, SPACE LAW: A CASE STUDY FOR THE PRACTITIONER 15 (Martinus Nijhoff, Dordrecht, 1992).

21 Craig Eadie, *Satellite Transponder Agreements*, 1 TELECOMM. & SPACE J. 315 (1994).

owner of the satellite or it may be a lessee with full power to sublease the transponder capacity granted by the satellite owner in their underlying contract.

The Lease Agreement may be executed either before the satellite is launched or once it has been placed in the geostationary orbit. In the first case, the contract will become effective when the satellite on which the transponder in question is located becomes operational, *i.e.*, when the satellite is ready to provide commercial service. In the latter alternative, the parties to the agreement may designate the beginning of the contract by focusing on the necessities of the user.

The end of the term of the Lease Agreement may be any period agreed by the parties. Under no circumstances should the term exceed the life of the satellite as warranted by the operator. This has given rise to disputes and litigation. Indeed, in 1984 Western Union sold four transponders to Public Broadcasting Service (PBS) warranting that each had at least a ten-year life. However, before the warranty expired the satellite (Westar IV) consumed its fuel faster than as calculated by the manufacturer of the satellite, Hughes Aircraft Co.[22] Public Broadcasting Service demanded the payment of compensation from both Western Union and Hughes. While the satellite operator settled the claim, the manufacturer informed PBS that it would not honor it, and thus PBS subsequently filed suit against Hughes.[23]

The Lease Agreement should foresee different alternatives to termination in the event of technical failures of leased transponders. A transponder always has redundant equipment, *i.e.*, devices which have the same functions. They are installed so that in the event of a failure of one of them, another one may be put into work without affecting the performance of the transponder. Thus, the agreement generally specifies that in the event of a failure in the equipment of the transponder, the operator is not liable to the customer if the transponder can continue to work with a redundant device.

In order to assure the continuance of service in the case of transponder failure the operator could also choose to replace the whole transponder with a reserved one, *i.e.*, a transponder which is not operational unless switched into service by the operator. This may be implemented either by a specific provision in the Agreement whereby the lessor undertakes to replace the transponder in the case of a total failure to operate, usually as the sole remedy, or by the lessor's undertaking to provide for transponder capacity instead of designating a specific transponder in the Lease Agreement, so that it can change the lessee's transponder for any reason or for no reason at all. Thus, if one transponder fails, or for any other reason the operator needs it, such as for

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22 This dispute arose out of a Purchase Agreement. *See* Phillip D. Bostwick, *Liability of Aerospace Manufacturers: MacPherson v. Buick Sputters into the Space Age*, 22 J. SPACE L. 89 (1994).

23 Public Broadcasting Services v. Hughes Aircraft Co., CA No. 90-0736 WDK (Bx) (C.D. Cal.), quoted by Phillip D. Bostwick, *supra* note 8, at 89.

re-allocating it to another user, the operator will be able to replace this transponder with a spare one, provided of course it assures the user the conditions agreed to for this circumstance in the contract. Needless to say, repair work of a transponder in outer space, although technically feasible, is unthinkable from a financial standpoint, at least at the present stage of technology.

The Agreement should provide for the priority in the re-allocation of capacity among different customers. In this respect, there are different contractual categories of customers in the Lease Agreements. Indeed, the highest rank in the priority scale is for customers with *protected status*. Customers without such status are designated as *pre-emptible customers*. Protected users are entitled to re-allocation of transponder capacity in the event of loss of facility even to the expense of other customers. [24]

Another key issue in Lease Agreements is the provision for dealing with the operator's possible loss of its license to operate the satellite. Such loss would trigger off the termination of the Lease Agreement. Generally, termination due to the loss of the operator's license or other events which do not occur through any negligent act or omission on the part of the operator do not entitle the customer to receive payment of damages or any other compensation. It must be pointed out, however, that the validity of these clauses has not yet been tested in any court.

Other provisions usually found in a Lease Agreement concern other rights and obligations of both the customer and the operator, such as the operator's conveyance to the lessee of the rights to use the frequency associated with the transponder, and the possibility or impossibility of the lessee to assign transponder capacity to third parties. Additionally, each party represents and warrants to the other that it has obtained all authorizations, permits, and approvals from international, federal and local authorities, to execute the agreement and to conduct its business as agreed in the contract.

V. Transponder Purchase Agreements

A Transponder Purchase Agreement constitutes an understanding by the seller and buyer, whereby the seller conveys to the purchaser, for valuable consideration, ownership and title of a specific transponder, including equipment installed expressly to deliver in combined form the aggregate communications signals from and to the receive and transmit antenna feed arrays on the satellite. Indeed, by virtue of a Purchase Agreement, in contradistinction with a Lease Agreement, the buyer of a transponder acquires *full title to specific, physical facilities*, assumes risk of loss, enjoys the tax consequences of ownership, and has authority to convey, lease, assign and encumber its designated ownership interest.[25]

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24 Craig Eadie, *supra* note 7, at 319.

25 Domestic Fixed-Satellite Transponder Sales, Memorandum Opinion, Order and Authorization, 90 FCC 2d.1238 (1982). *See* STEPHEN GOROVE, UNITED STATES

Essentially, a purchase agreement entails an alternative method of obtaining significant capital necessary to underwrite the costs of satellite system development, launch and operation.

The Purchase Agreement stipulates that the seller transfers to the buyer the rights of access to use the frequency associated with their transponder. However, as pointed out above, this right does not differ from the one conveyed to the user under a Lease Agreement. In all purchase agreements, the seller maintains the operation of the telemetry, tracking and control subsystems of the satellite,[26] and is responsible in general for the operation of the satellite in orbit.

A frequent alternative in a Purchase Agreement is the possibility of acquiring a protected transponder. Indeed, in the event the designated transponder fails during the warranted period of life, the seller will replace it with a spare transponder on the same satellite. This does not mean, as in the Lease Agreements, that the operator merely provides transponder capacity and service rather than actual ownership rights on a determined transponder. On the contrary, the purchaser does acquire full title and ownership rights of a specific transponder. However, if the transponder does not meet the agreed performance in any moment during its life, the seller will substitute it with another one, in which the buyer will again hold proprietary interest. So long as these spare transponders are not in use, the seller may allocate them to a user under a Lease Agreement on a pre-emptible basis as explained above.

Simultaneously with the execution of the Purchase Agreement, the seller - - the operator of the satellite - - may enter into a Service Agreement for the proper maintenance of the satellite during the warranted period of the transponder's life.

In the United States of America, as a result of the scarcity of satellite capacity in the early 1980s, several corporations, *i.e.*, Western Union Telegraph Company, RCA American Communications, and Southern Pacific Communications Company, sought authorization from the Federal Communications Commission to engage in transponder sale transactions.[27] Thus the FCC issued a notice in February 1982 inviting public comment on the requests.[28]

The parties opposed to the transponder sales contended that sale transactions were inconsistent with the common carrier obligations and that the domestic satellite licensee would obtain supra normal profits, thus limiting the transponder access to only those customers who could afford above-the-market prices. This was argued to be inconsistent with the provisions of the Federal Communications Act of 1934.

SPACE LAW- NATIONAL AND INTERNATIONAL REGULATION (Oceana, Binder II, I.A.5. (6-a), at 6 (1993).

26 *Cf. supra* note 2.

27 *Cf. supra* note 11, at 2.

28 Domestic Fixed Satellite Transponder Sales, 88 FCC 2d. 1419 (1982).

Nonetheless, the Federal Communications Commission found that the transponder sale proposals presented a positive market development that would enhance the provision of satellite services to the public and that these transactions were consistent with the public interest and all outstanding legal and regulatory policy.[29] Therefore, the Commission granted authorization to provide noncommon carrier service by means of the sale of transponders.[30]

As to the tax treatment of transponder sales, it must be pointed out that in the United States the Federal Congress enacted in 1988 specific legislation concerning space activities applicable to transponder transactions. Indeed, section 863 of the Internal Revenue Code dealing with special rules for determining source of income now prescribes that *space activities performed in Outer Space are to be deemed to be performed within the United States*. This means that income derived from space activities is taxed as U.S.-source income, and expenses arising from such activities may be deducted pursuant to the provisions set forth for U.S. income deductions instead of being deducted according to the set of rules governing outbound-income deduction.[31] Additionally, the purchaser of a transponder is entitled to use the depreciation method established for satellites by section 168 of the Internal Revenue Code, which allows, for tax depreciation purposes, the recovery of the cost of the satellite in a period shorter than the satellite's life.[32]

VI. Sales and Lease Back Contracts

As pointed out above, the Sales and Lease Back Contracts offer the satellite owner an alternative to finance its investment. These agreements are arrangements made by the satellite operator and a bank or a financial

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29 *Cf. supra* note 11, at 24.

30 The FCC thus overturned traditional common carrier policy. Prior to its decision, however, the Federal Communications Commission had long permitted companies to lease whole transponders on a satellite, by maintaining the fiction of common carriers with respect to the owner of the entire satellite. NATHAN D. GOLDMAN, AMERICAN SPACE LAW 158 (Iowa St. Univ. Press 1988).

31 Said section 863 provides as follows:

"(d) Source rules for space and certain ocean activities.

(1) In general. Except as provided in regulations, *any income derived from a space* or ocean *activity* - (A) *if derived by a United States person, shall be sourced in the United States,* and (B) if derived by a person other than a United States person, shall be sourced outside the United States. (2) Space or ocean activity. For purposes of paragraph (1) - (A) In general. *The term 'space* or ocean *activity' means* - (i) *any activity conducted in space*, and (ii) any activity conducted on or under water not within the jurisdiction (as recognized by the United States) of a foreign country, possession of the United States, or the United States. Such term includes any activity conducted in Antarctica." (Emphasis added.)

32 PAMELA L. MEREDITH & GEORGE S. ROBINSON, *supra* note 6, at 15.

institution by means of which the satellite operator sells one or several transponders to the bank or financial institution and simultaneously leases the transponders back for its own use. Generally, this includes the possibility of subleasing the transponders so transferred.

As in any other sale and leaseback contract, the main objective for the satellite owner's execution of the agreement is to free cash in the amount of the purchase price paid by the bank to cover the satellite owner's necessities. Such needs include the payment of liabilities incurred in connection with the manufacture and deployment of the satellite, as well as the costs for the immediate future marketing and operation of the satellite.

The Sales and Lease Back Agreement is comprised of two separate agreements: (i) a sales contract, and (ii) a lease agreement. By means of the sales contract the satellite operator conveys to the bank the ownership of certain transponders for a fixed price. The lease agreement, which is part of this transaction does not resemble the Transponder Lease Agreement analyzed above since it does not constitute a service supply agreement. The bank leases back the acquired transponders to the former owner who can exploit them commercially. Thus, the bank will not provide any kind of technical services. Although the lease actually follows the sale, both contracts are conceived and agreed to as part of the same transaction.

A key issue which has to be borne in mind while drafting Sales and Lease Back Contracts is that the bank should grant the satellite owner the right to sublease the transponders to any third party. This is advantageous for both parties, since it fosters the satellite owner's obtention of funds, which will consequently enable the owner to meet the obligations incurred with the bank.

VII. Conclusions

Choosing between the different types of transponder agreements depends largely on the financial needs and possibilities of the satellite operator. As in any other major transaction, tax implications are of great importance. Each type of contract entails different tax consequences, which should be carefully considered before embarking on a project of this nature.

Market fluctuations concerning satellite manufacturing costs, general satellite capacity and demand of communications services also influence the decision to elect the best type of agreement for each situation. In addition to the contracts analyzed above, marketing agreements also entail an essential aspect of transponder transactions.

Julian Hermida[*]

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PROVISIONS IN SOME NON-SPACIAL, BILATERAL AGREEMENTS DIRECTLY RELATED TO OUTER SPACE

Upon succeding to the international agreements entered into by the former Yugoslavia, namely the 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (U.N.G.A. Res. 2345 (XXII), and the 1972 Convention on International Liability for Damage Caused by Space Objects (U.N.G.A. Res. 2777 (XXVI), the Republic of Slovenia entered into the domain of outer space law. Since that time, the Republic of Slovenia has accepted other international agreements related to the use of outer space, namely the international Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (Moscow 1963) and the international Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite (Brussels 1974). The acceptance of these agreements was formally affected by notifications to the relevant depositaries, and Slovenia is bound by these instruments by virtue of Article III of the Constitutional Act of Slovenia (1991) which provides for this possibility.

Underlying Slovenia's rationale for acceptance of these instruments was a desire to provide consistency with its aforemntioned prior commitments entered into upon succession, its awareness of the possible remote or even imminent danger of nuclear conflict and its wish to keep up with developments and provide for practical necessities *(e.g.,* the 1974 Brussels Convention on Programme-Carrying Signals Transmitted by Satellites).

Owing to the transitional problems and those linked to the disintegration of former Yugoslavia, the need to establish relevant organizational mechanisms and to provide the necessary financial means has had to rely upon private organizations. The promotional activities of space law and aspects of technical science were mostly left to individual enthusiasts. Indeed, students at the University of Maribor and the University of Ljubljana during 1994-95 were exposed to lectures devoted to space law and the technical fields of science, but these involvements largely depended upon the private initiative of students. There was also a club called the Slovenian Rocket Agency which was intended to familiarize the school going children with these matters, but the effort remained at the level of private organization. At the same time, it is true that as early as 1979 the Slovenian Branch of the then Yugoslav Astronautical and Rocket Society (composed of different clubs and societies having an interest in outer space studies), was already functioning. It was renamed in 1992 as the Slovenian Austronautical and

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The author wishes to express his sincere appreciation to Michael Milde for opening the doors of the McGill Institute and Centre of Air and Space Law, and Kuo Li Lee whose assistance for this and other projects has been invaluable.

Rocket Society but to date it has not attained the status of a government agency.

This development conveys to us the idea that in a global view in order to be effective a promotional activity involving outer space, should go beyond the classic interpretation of international law in which normally only states and not individuals are regarded as its subjects. This idea was conditioned exclusively by the practical necessities and could be founded and realized only with all necessary safeguard clauses. It was slightly reflected in an appeal made before the 34th Session of the Legal Subcommittee of the COPUOS held in Vienna in March-April 1995, and is likely to surface soon in other deliberations.

Notwithstanding the highlighted negative factors and associated lack of a more intensive direct approach, the developments which took place in related areas of activity required, in addition to its indirect approach, also a direct focus on the thematics of outer space at least in some respects. While of general concern, the environmental field and mechanisms for defense against nuclear danger seemed to be the most productive fields in this respect.

It is true that the Convention on Assistance in the case of a Nuclear Accident or Radiological Emergency, adopted by the General Conference of the International Atomic Energy Agency at Vienna, 26th September 1986, together with the Convention on Early Notification of a Nuclear Accident adopted on the same day, represented a turning point toward a better understanding of the imminent danger to humanity,

On the so created plattform of international instrumentality (referring also to the provisions of the Preamble to the Decision of the Council of European Communities on December 14. 1987), Slovenia saw itself prodded to establish bilateral agreements on the same subject. For instance, an agreement on Early Exchange of Informations in Case of Radiological Danger, concluded with Hungary on July 11, 1995 and ratified by the Act of Parliament of Slovenia on December 12 1996, was subsequently followed with an identical bilateral agreement with Austria in March 1996, which has yet to be ratified.

The Agreement, which is based on the usual legal structure, deals in Art. 2 with Notification and Information, in Art. 3 with Information (the type of data that has to be provided by the contracting parties), in Art.4 with Cooperation in taking appropriate measures, in Art. 5 with Competent Authorities and points of contact, in Art. 6 with Other informations (on planned and construed facilities and programs, working experiences of nuclear facilities, and legal regulations in the fields of nuclear safety and radiation protection), in Art. 7 with Programme of measurements (of ionizing radiation and radionuclids in the environment). The provisions which follow are mostly of a technical character (Consultations in Art. 8, Coordinators in Art. 9, Public informing in Art. 10, Expenses in Art.11, etc.).

For our purposes, *i.e.*, the identification of space law implications in the said Agreements (Art. 1 on the Scope of application) gives us some

enlightenment. Point 1(b) of this Article stipulates the obligation to notify and take measures of a widespread nature in order to protect the general public in case of, among others, radiological energencies or "the detection within or outside its own territory of abnormal level of radioactivity which are likely to be detrimental to public health in that contracting party."

It is self-explanatory that the term "detection" includes detection by "remote sensing," inasmuch as the Principles X and XI of the Principles relating to remote sensing of the Earth from space aim at the same goal, *i.e.*, to avert any phenomenon harmful to the Earth's natural environment (Principle X) and protection of mankind from natural disasters (Principle XI).

Paragraph 1(d) of the Agreements mentions "other accidents from which a significant release of radioactive materials occurs or is likely to occur," and includes those facilities listed in paragraph 2, which are:

a) any nuclear reactor wherever located;
b) any other nuclear fuel cycle facility;
c) any radioactive waste management facility;
d) the transport and storage of nuclear fuels or radioactive wastes;
e) the manufacture, use, storage, disposal, and transport of radio-isotopes for agricultural, industrial, medical and related scientific and research purposes

These provisions show not only the consistent textual resemblance to the UN General Assembly's Principles relating to remote sensing of the Earth from space and, even more so, to the Principles relevant to the use of nuclear power sources in outer space, but as we stated above, because they pursue the same goals (*i.e.* the safety of humankind and protection of the environment) - a substantial connection. Therefore, in our opinion the said provisions are a direct occurrence resulting from the law of outer space, and in no event could a close, though indirect, incidence be denied.

The definite and uncontested provision resulting from the influence of space law is reflected in point 2 (f) of the Agreements, as it directly emphasizes the use of radioisotopes for power generation in space objects.*

In conclusion, it appears useful to list the various multilateral agreements that have been recently ratified by Slovenia. They are:

The 1985 International Agreement on the Use of the International Maritime Satellite Organization (INMARSAT) Stations Ship - Earth in the Territorial Sea and Ports, London, 16 October 1985 (ratification, in force for Slovenia from 21 August 1995).

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* It should also be emphasized, as is characteristically the case, that the implementation of these Agreements is by the Act of ratification given in charge of the Ministry of Environment and the Administration of Nuclear Safety of Slovenia.

Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, Vienna, 1986 (in force for Slovenia from 25 June 1991).

Convention on Early Notification of Nuclear Acccident, Vienna, 1986 (Succession, in force for Slovenia from 25 June 1991).

Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite, Brussels, 1974 (Succession, in force for Slovenia from 3 November 1992).

The Convention Establishing the European Telecommunications Satellite Organization (Eutelsat), Paris, 1982; the Agreement Relating to the International Telecommunications Satellite Organization (IINTELSAT), with annexes; and the Operating Agreement Relating to the International Telecommunications Satellite Organization, Washington, 1971, are accepted by succession but not yet in force.**

Dr. Milan Vivod
Professor, Maribor University, Faculty of Law
Slovenia

Case Developments

On December 15, 1994, the Court of Justice of the European Communities ruled that the European Union has the right to negotiate service-related space issues, such as launch vehicle sales, on behalf of the Union's member states. That right had been disputed by several individual nations. +

A lawsuit by Sea-Fone Corporation against Comsat was dismissed on March 1, and Sea-Fone was ordered to pay Comsat 103,170 in back payments for Inmarsat service.

Comsat filed a lawsuit March 14 against News Corp. of New York, PanAmSat and Televisa of Mexico. The $250 million lawsuit claims News Corp. unlawfully terminated its contract for capacity on an Intelsat satellite, and asserts that PanAmSat and Televisa conspired to arrange PanAmSat to provide the service instead of Comsat.

Short Accounts

BEIJING INTERNATIONAL SYMPOSIUM ON AIR AND SPACE LAW

The 3rd Biennial Beijing International Symposium on the Use of the Air and Outer Space at the Service of World Peace and Prosperity, using the

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** The ratification procedure is entered for the Convention on Nuclear Safety, Vienna, 1994, and for the Agreement on Operating of the European Telecommunications Satellite Organization EUTELSAT, Paris, 1982.

+ *See* p. 55 of the first footnote citation, *supra*.

slogan "Shortening the Long March to International Understanding in the Interests of All Mankind," was held in Beijing, China on August 21-23, 1995.* It was sponsored by Peking University, Beijing, China with cooperation of the Asian Institute of International Air and Space Law, Soochow University, Taipei, Taiwan R.O.C., International Institute of Air and Space Law, Leiden University, Leiden, The Netherlands and Institute of Air and Space Law, McGill University, Montreal, Canada. The Symposium is held biennially, alternating in the Asian and European countries.

Many distinguished speakers and panelists as well as hundreds of law professors, scholars, judges, lawyers, high-ranking Governmental officials in the field of air and space law, staff members of space agencies and airlines (Australia, Canada, China, Germany, Hong Kong, Japan, Korea, Macau, The Netherlands, Philippines, Singapore, Taiwan, U.S.A., and UK),

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* The 1st International Conference on the Law, Policy and Commerce of International Air Transport and Space Activities -- Legal, Political and Financial Aspects -- using the Slogan "The Highways of Air and Outer Space over Asia," sponsored by the Graduate Institute of European Studies, Tamkang University, Taipei, Taiwan R.O.C. and the International Institute of Air and Space Law, Leiden University, The Netherlands, was held at Taipei, Taiwan, R.O.C. on May 26-31, 1991, where the holding of such conferences in the future has first been proposed.

The 2nd International Conference of Air Transport and Space Application in a New World, using the Slogan "The Use of Airspace and Outer Space for All Mankind in the 21st Century," was organized jointly by the Society for the Study of Law and Policy on Space Utilization in Japan and the Institute of Legal Studies and Faculty of Law, Komazawa University, Tokyo, Japan in cooperation with the three aforementioned Institutes of International Air and Space Law, located in The Netherlands, Canada, and Taiwan, R.O. C. was held at Tokyo, Japan on June 2-5, 1993.

The 4th International and Global Conference of Air and Space Law, using the Slogan "Issues in International Air and Space Industry and Law for the 21st Century," sponsored by the Korean Association of Air and Space Law in cooperation with the already noted famous Institutes of International Air and Space Law located in Japan, Canada, The Netherlands, Taiwan, R.O.C. will be held at Seoul, Korea on June 23-25, 1997. The Conference expects to deal in depth with the current political, economical, technological and legal problems of the air and space industry in preparing for 21st century on a global basis. It is indeed a great pleasure and honor for this writer to extend a warm invitation to all readers to participate in this Conference. Especially, we would like to invite the many world famous scholars, professors, lawyers, high ranking Government officials, staff members of space agencies and airlines from all over the world to come to this Conference, the location of which they may remember from the 24th Seoul Olympic Games of 1988.

The 5th International Conference of Air and Space Law sponsored by the International Institute of Air and Space Law, Leiden University, The Netherlands will probably be held at The Hague, The Netherlands in order to commemorate the end of the 20th Century and discuss the global problems of the air and space law in 1999.

and representatives of international organizations (EUTELSAT, IATA, I.C.J., U.N., W.T.O., *etc.*), as well as thirty-one Korean delegates, have participated in the Beijing Symoposium to discuss issues associated with the launch and other space activities, security in outer space and anticipated space events toward the 21st century.

The main space law speakers and their topics were the following: *B. Cheng* (U.K.), International Responsibility and Liability for Launch Activities; *V.S. Vereshchetin* (The Hague), Legal Problems of Manned Space Flight; *Diedriks-Verschoor* (The Netherlands), Settlement of Disputes (Space); *K.H. Bockstiegel* (Germany), International Competition in Launch Service; *Doo Hwan Kim* (Korea), Liability or Damages Caused by Space Debris; *N. Jasentuliyana* (Director, Office for Outer Space Affairs, U.N.), Future Space Application, Including the Future legal Framework within the United Nations; *T. Kosuge* (Japan), Space Telecommunications in the Asian-Pacific Region; *R. D. Margo* (U.S.A.), Insuring Aviation and Space Activities: What is the Future?; *J. Grenier* (Director-General, EUTELSAT), Leasing in Space: From Transponders to Satellites; *HE Qizhi* (China), Preliminary Study of China's Bilateral Agreements with Foreign Countries; *Chia-Jui Cheng* (Taiwan, R.O.C.), New Sources of International Space Law

The Beijing Symposium was a very fruitful and welcome opportunity for many very famous scholars and professors in the world to address the legal problems associated with the launch and other space activities, the safety in outer space and the space services toward the 21st century.

Prof. Dr. Doo Hwan Kim
Dean, The College of Law, Soong Sil University
President, The Korean Association of Air and Space Law

PROTECTION OF THE SPACE ENVIRONMENT

As in previous years, the International Institute of Space Law (IISL) and the European Centre for Space Law (ECSL) organized a symposium shortly after the opening of the session of the Legal Subcommittee of the U.N. Committee on the Peaceful Uses of Outer Space. The symposium took place on March 18, 1996 and dealt with the "Protection of the Space Environment." *Dr. Nandasiri Jasentuliyana*, President of the IISL, had requested *Dr. Ernst Fasan*, Honorary Director of IISL, to serve as coordinator, and *Mr. Jitandra Thaker*, Legal Affairs Officer to the UN Office for Outer Space Affairs to act as rapporteur.

Fasan welcomed the audience which consisted of most of the delegates to the Legal Subcommitee meeting, and of several other attendants. He introduced the four speakers in order of the agenda, namely: *Professor Lubos Perek* of the Czech Academy of Sciences, Astronomical Institute; *Dr. Gabriel Lafferanderie*, Chairman of the ECSL and legal adviser of ESA; *Bryan Cheuvront III, Esq.*, Senior Counsel of Motorola, Inc.; and *Professor*

Vladimir Kopal, General Counsel of the International Astronautical Federation.

The coordinator pointed out that the topic of the symposium was not on the agenda of the Legal Subcommittee for this year and expressed his hope that the papers to be presented would informally provide some background information for the audience. He then called on the first speaker.

Perek reported on "Space Debris: Summary of Discussions in the Scientific and Technical Subcommittee (1995 and 1996)," and noted that this Subcommittee had elected a new chairman, *Professor Dietrich Rex* of the Federal Republic of Germany. The question of space debris was a priority item on the Scientific & Technical Subcommittee's agenda.

Perek gave an overview of the discussion with some of the following highlights. The Research Institute for high frequency physics in Germany uses a 34m antenna for tracking objects down to 5cm in size at a 2500km altitude, and to 1m objects in size in the geosynchronous orbit. The United States Space Debris Measurement Program uses radar for Low Earth Orbits (LEOs) and optical telescopes for deep space. There are roughly 100,000 pieces of debris in LEO down to an 11 cm size. An unsuspected source of debris was discovered near the 900 km altitude, possibly from Rorsat nuclear reactors. Special attention was given to the IAA Position Paper on Orbital Debris.

Finally, *Perek* pointed out that the Subcommittee had prepared a structured Report. He noted that a proposal to explain what is the common understanding of the term Space Debris had failed to find support in the Subcommittee. However, he drew attention to this year's report which had stated:

> "It is understood that space debris are inactive man-made objects, such as spent upper stages, spent satellites, fragments or parts generated during launch or mission operation or fragments from explosions and other break-ups."

No size limit of space debris had been expressly stated. Evidently, the upper limit is the largest man made spacecraft, if and when it becomes inactive, whereas the lower limit deals with submillimeter-size particles. The question of space debris, according to the speaker, required a *"sui generis"* approach.

The second panelist, *Cheuvront* spoke about "Space Debris: Industry Viewpoint." He stated that, according to his knowledge, the only collective recommendation from industry sources on space debris was the 1992 AIAA Special Report on "Orbital Debris Mitigation Techniques: Technical, Legal and Economic Aspects."

Cheuvront noted that NASA is currently preparing an Orbital Debris Handbook. It will also prepare a Memorandum "The Orbital Debris Assessment Reference Manual," which is expected to consist of three volumes, namely "Assessment of Debris Mitigation Procedures," "Technical

Background for Assessing Orbital Debris," and "The Debris Assessment Software Users Guide."

He then reported on Motorola's debris mitigation approaches on the IRIDIUM® Program, which is a registered trademark and service mark of Iridium, Inc. IRIDIUM is one of a number of LEO satellite-based telecommunications systems, and is expected to begin service in 1998. It will utilize 66 LEO satellites in six orbital planes.

In the IRIDIUM Program, Motorola required, among others, the following specifications from all of its suppliers:

> "Subsequent to development of all the IRIDIUM Space Vehicles, the launch vehicle upper stage must perform a de-orbit maneuver placing the upper stage in a decay orbit."
>
> "Design analysis shall also be performed to demonstrate that the launch vehicle or related hardware does not generate any debris on orbit in excess of the limitations specified in the IRIDIUM Space Segment Specification."

Cheuvront also expressed his hope that such a mitigation philosophy would be generally incorporated in the early development efforts of new spacecraft and launch vehicle systems.

Lafferanderie discussed "ESA Activities, Status and Organisation of the Inter-Agency Space Debris Co-ordination Committee (IADC)." In 1986, ESA created a "Space Debris Working Group." As a sequel, an ESA Council Resolution was adopted, entitled "Resolution of the Agency vis-a-vis the space debris issue," and a document was approved, entitled "ESA Activities for space debris." A two phase (later a three phase) implementation plan was foreseen, beginning with an "Analysis and Preparation" phase, and then an "Implementation and operations" phase, and finally a third phase covering the period 1996-1998 and addressing the LEO region and the consequences of multi-satellite constellations. For guidance and coordination of ESA's work, two groups were created, namely the ESA Space Debris Advisory Group and the Space Debris Coordination and Technical Analysis Group.

The speaker then reported on the cooperation with other space agencies, such as NASA, and on the 1993 First European Space Debris Conference initiated by ESA. On this occasion, the first multilateral meeting with representatives of NASA, the Russian Space Agency (RKA), Japan and ESA led to an agreement to establish an Inter-Agency Space Debris Coordination Committee (IADC). Its members are ESA, Japan, NASA, RKA, the Chinese Space Administration (CNSA), the French Centre National d'Etudes Spatiales (CNES), the UK Defense Research Agency (DRA), and the Indian Space Research Organisation (ISRO).

IADC is a forum for information and discussion, and is organizing international meetings, such as the one in Darmstadt. Its current activities focus on a joint debris database, the discovery of new significant debris

sources, debris mitigation in GEO transfer orbits, and debris management practices in the geostationary ring. In conclusion, *Lafferanderie* pointed out the important role of UNCOPUOS and the contribution of ESA to the elaboration of new standards, subject to a mandate given by its member states.

Kopal discussed "Space Debris: A review of the Current Regulatory Structure." He reported on the existing Space Legal Agreements, especially the 1967 Outer Space Treaty, the 1973 Liability Convention, and the 1976 Registration Convention. The notions of "carrying out space activities for the benefit of all countries," avoiding "harmful contamination of the earth environment," "avoidance of harmful interference with activities of other State Parties" and the request "for consultations," *etc.*, would include the space debris phenomena. Underlying this point is the fact that the Liability Convention specifically mentions the "component parts" of a spacecraft. But the principle of fault-based liability for damages in space makes it difficult to find a practical solution in a real case scenario because it might be hard to prove the origin of the debris particle. However, as the speaker pointed out, the Registration Convention opened the door for the possibility of providing "additional information," and the "Principles Relevant to the Use of Nuclear Power Sources in Outer Space" of 1992 might contain a usable example. The speaker expressed his opinion that a comprehensive agreement would ultimately be needed. In such a case an agreed set of standards or some special regulations might be a starting point.

Kopal then discussed the work of nongovernmental bodies. He quoted as examples the International Academy of Astronautics (IAA), which had held a round table on space debris problems as early as 1984, the annual Colloquia of the IISL and, especially, the 1994 ILA's Buenos Aires Draft which also proposed a legal definition of space debris. Taking into account the technical definition efforts of the UNCOPUOS Science & Technology Subcommitee on the one hand and the ILA's legal definition proposal on the other, it seemed obvious to the speaker that a final definition of the term space debris could be achieved.

Kopal's paper was followed by a 'questions and answers' period. The delegate of China, *Prof. Iluang Huikang* asked *Dr. Lafferanderie* about the accessibility to membership in IADC. The speaker responded that new members might be accepted upon a decision by the IADC. The second question was addressed to *Prof. Kopal*. It asked whether the Legal Subcommitee should, in his opinion, discuss the matters of space debris and if so, when. The speaker responded that in his personal opinion the matter should be taken up as soon as possible, as several delegations of the LSC had already so recommended. Then the delegate of Australia, *Dr. McIntosh*, asked *Mr. Cheuvront* whether the provisions of the Liability Convention had had some influence on the decision to implement IRIDIUM. The speaker responded that the Liability Convention's provisions had little influence because there was usually an adequate insurance coverage.

Rather, there was more concern about minimizing the proliferation of debris.

Dr. Vaclav Mikulka, Chairman of the Legal Subcommittee, expressed his thanks for the information given on an informal basis. He pointed out that the problems of space debris were of great concern, and he congratulated the IISL on the choice of this topic. After that, *Fasan* expressed his gratitude to the speakers and the audience, and on behalf of IISL and ECSL invited the attendants to an informal reception.

Dr. Ernst Fasan
Honorary Director, IISL

LEGAL AND POLICY ISSUES RAISED BY THE U.N. QUESTIONAIRE ON AEROSPACE OBJECTS

Questions concerning the Legal Regime for Aerospace Objects were raised in a Working Paper by the Russian Federation, and a "Questionnaire on possible legal issues with regard to aerospace objects" was submitted by the Chairman of the respective Working Group in the Legal Subcommittee of the U.N. Committee on the Peaceful Uses of Outer Space.* The International Space Law Interest Group of the American Society of International Law (ASIL), during the Society's 90th Annual Meeting on March 30, 1996, discussed the legal and policy issues raised by the U.N. Questionnaire on aerospace objects. Three distinguished authorities in the field of space law, *Prof. Harry Almond Jr.* of Georgetown University, *Edward R. Finch, Jr.* of Snow Becker Krauss P.C., New York City, and *Paul G. Dembling* of Schnader, Harrison, Segal and Lewis, Washington, D.C., and the Chairman, Prof. *Stephen Gorove* of the University of Mississippi Law Center, gave their views.

The distinguished participants and the Chairman were in general agreement that an aerospace object could be defined as an object which was capable both of traveling through outer space and/or using its aerodynamic properties to remain in the airspace for a certain period of time.

As regards the legal regime applicable to such objects, it was stressed that the primary function of the aerospace object should control this determination. If the aerospace object was used as an aerospace plane for the primary purpose of point-to-point transportation on earth and had only incidentally reached the fringes of outer space, air law should be applicable to it. If the aerospace object was used for the primary purpose to operate as a device in outer space, space law should apply to it. Once the primary purpose of the object is determined, the corresponding legal regime applicable to it should continue to be applied for the duration of the object's flight, without any regard to the special design features of the object or its location (whether in the airspace or outer space) at a particular time. The participants felt that attempting to proceed otherwise

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* *See* U.N. Docs. A/AC.105/C.2/L.189 and A/AC.105/C.2/1995/CRP.3/Rev. 3 of 31 Mar. 1995. For a text of the Questionnaire, please see 23 J. SPACE L. 223 (1995).

would lead to conflicting interpretations with respect to the applicable law and would greatly confuse the problem.

In accordance with the general consenses to focus on the primary function or purpose of the object, it was thought that the norms of national and international air law would be applicable to an aerospace object of one State while it was in the airspace of another State only if the aerospace object's primary purpose and function had been to operate as an aircraft. If the primary function of the object was to operate as a spacecraft, then air law would not be applicable to it except in situations in which the craft returns in a non-accidental situation to a non-launching State. It was also agreed that aerospace objects launched into outer space were subject to the rules governing the registration of objects so long as the primary purpose of the object had been to operate as a spacecraft.

Also, it was felt that the take-off and landing phases of an aerospace object should not be specially distinguished as involving a degree of regulation different from an entry into airspace from outer space orbit and a subsequent return to that orbit. Rather, the object should be governed by the national laws of the launching State, or if it was launched from a platform in outer space, it should be governed by outer space rules.

Finally, the participants appeared to agree that -- as long as the object's primary function was to operate as a spacecraft -- its safe passage to and from outer space has now attained the status of international customary law. In non-accidental situations, the air law of the launching State, or the air law of the landing State would apply to such objects. However, *Mr. Dembling* noted that the application of national and international laws might differ, depending on whether the spacecraft was merely traversing the airspace to arrive at its destination or was in fact operating in the Earth's atmosphere.

Stephen Gorove
Chairman,
ASIL Interest Group on International Space Law

Congressional Notes

The proposed **FY 1996 NASa Authorization** bill provided funds for **Mission to Planet Earth**, which would give detailed data on soil conditions, topography, crops, and other information critical to the farming and ranching communities. The EROS Data Center in Sioux Falls, South Dakota, will be one of the regional centers that will collect and distribute this satellite data. The bill also authorized a **Reusable Launch Vehicle** program intended to pave the way for a replacement of the Shuttle in the next decade. Also authorized were the **New Millennium initiative** to develop microminiature technologies, two infrared astronomy programs - the Stratospheric Observatory for Infrared Astronomy and the Space Infrared Telescope Facility, and a Radar Satellite Program which would provide the ability to see through cloud cover and dramatically enhance the capability of current optical-based satellite systems such as Landsat. Finally, the bill provided some rather limited funding for the **Space**

Station because of concerns that it has become too expensive, complex, and dependent on the contributions of Russia, the latest station partner.*

The proposed **Space Business Incentives Act of 1996** (H.R. 1953) would provide tax breaks to companies and investors engaged in "space related products and services" by commercial space corporations and space centers. The Act would also give the U.S. Secretary of Transportation the authority to designate a facility as a space center.

The draft **Omnibus Space Commercialization Act** would create a non-profit organization modeled after Comsat to promote space commercialization. It would consolidate some functions under the Commerce Department's space commerce office, some of which are currently performed by NOAA and the International Trade Administration (ITA).

State Legislative Initiatives

There are currently six different locations within the United States in which efforts to establish **commercial spaceports** are being undertaken. The sites include: Vandenberg, California; Cape Canaveral, Florida; Wallops Island, Virginia; Kodiak Island, Alaska; and Las Cruces, New Mexico. Potential sites are being considered in Arizona, the first is east of the metropolitan Phoenix area, the second is located between Phoenix and Tucson, and a third is situated southwest of Tucson.** Many regulatory and jurisdictional issues surround the spaceports, one issue being whether licenses from the Office of Commercial Space Transportation are needed for commercial spaceports on federally owned launch facilities.

Executive Actions

On March 29, 1996, President Clinton approved a comprehensive national policy on the future management and use of the **U.S. Global Positioning System** (GPS), which is to use a constellation of 24 pentagon satellites orbiting 11,000 miles above the earth, to give motorists, airline pilots, boats, trains, outdoorsmen, police attempting to locate stolen vehicles, and anyone else needing directions, the location of their position on the earth to within a few yards by using a small, hand-held receiver.***

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* For the final text of the NASA FY 1996 Authorization bill which was part of FY 1996 Authorizations (under Additional Appropriations for Independent Agencies), and was signed by the President on April 26, 1996, please consult Pub. L. 104-134 (1996).

** For details, see Patricia M. Sterns and Leslie I. Tennen, *Commercial Spaceports: Preliminary Site Selection Criteria and Regulatory Considerations*, *supra*, at p. 54.

*** For the text of the announcement by the White House Office of Science and Technology Policy, National Security Council, see Fact Sheet on U.S. Global Positioning System Policy, March 29, 1996, *reproduced in* Current Documents I, *infra*.

Domestic Telecommunications Developments

The **Telecommunications Act of 1996** was enacted on February 8, 1996.*

If approved by the FCC, a new breed of radio stations that could be heard anywhere in the country, could be transmitting nationally by satellite. The new stations are likely to be offered for a fee and will be targeted mainly to people who spend a lot of time driving their cars. The digital technology which is at least 3 years away would provide listeners with CD-quality audio.

Sky Station International (SSI) has recently requested authorization from the **Federal Communication Commission** (FCC) to construct, deploy, and operate Sky Station -- a global stratospheric telecommunications system -- by using a revolutionary technology that will bring unprecedented benefits to the citizens of the United States and the world.** The technology uses the "*Corona Ion Engine*," which will hold each of the proposed 250 Sky Station platforms stationary at a 30 km altitude. Sky Station uses the plentiful flux of ions available in the stratosphere to generate the propulsion necessary to remain stationary.

International Developments

NASA and the **Russian Space Agency** have revised their previous agreement concerning construction of the international space station. Russian officials previously planned to abandon upkeep of the Mir space station in 1997 to dedicate their resources to construction of the international space station. But with international research in high demand aboard the Mir, officials have now agreed to extend the life of Mir to the year 2000. Russia will deliver the first power hub for the station, called the Functional Cargo Block, and the station's Service Module where the first crew members will stay, in 1997 and 1998. In return, the space shuttle will provide supplies to Mir over three separate missions, and also deliver Russia's Science Power Platform to the international space station in 1999, in lieu of 3 Russian launches.

On March 3, 1995 the governments of the **United States** and **China** signed a bilateral accord extending their agreement relating to launch services. The original agreement, entered into in 1988, expired in 1994. The new agreement regarding international trade in commercial launch services provides that China may launch up to 15 geostationary satellites through 2001, including 11 new spacecraft and 4 already under contract. Under the terms of the agreement, China will price its launches within 15 percent of Western companies' charges for comparable payloads.***

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* 104 Pub. L. 104; 110 Stat. 56 (1996).

** *See* Request to Establish New GSTS Service, Additional Comments and Petition for Rulemaking, FCC, ET Docket No. 94-124, Mar. 20, 1996.

*** For a text of the U.S.-China Agreement, see Current Documents II, *infra*.

The United States and China also signed an agreement on Satellite Technology Safeguards at Beijing on February 11, 1996.

United States **President William Clinton** and Ukrainian **President Leonid Kuchma** announced on May 11, 1995 an agreement for civil space cooperation. Specific elements included the flight of a Ukrainian cosmonaut aboard a U.S. space shuttle in October 1997 and negotiation of an agreement for commercial launch services by Ukrainian Zenit and Tsyklon rockets.

As a follow-up, on December 14, 1995, the **U.S.** and **Ukraine** signed a launch trade agreement. The agreement allows Ukraine to launch up to 20 western-built satellites through the year 2001. This accord is similar to others the U.S. has negotiated with China and Russia.*

On November 28, 1995, **NASDA** concluded an "Agreement for the Cooperative Research and Development on the Application Technology of Japanese Earth Resources Satellite (JERS-1) Data" with the Swedish Space Corporation, to promote growth of developing countries and environmental protection. NASDA also signed a $1 million contract with the Russian Space Agency to perform radiation and microgravity experiments on-board the Mir space station. The experiments will provide important information to Japan concerning its planning and development of the Japanese Experiment Module (JEM).

China's Long March 3B rocket was unsuccessful in its first launch attempt on February 15, 1996 The rocket veered off course only seconds after launch and crashed into a hillside less than 1 mile from the launch pad. The rocket was attempting a launch of a satellite owned by **INTELSAT,** marking China's third commercial failure involving a Chinese-built rocket since 1992, and the sixth Long March launch failure since 1990. INTELSAT has canceled 3 future satellite launch contracts with China due to its concern over the Long March 3B's reliability. The launch contracts allowed INTELSAT to be released from performance if evidence of substantial development problems with the Long March became present.

INMARSAT began building a capital funding base for a new sub-organization, known as **INMARSAT-P,** that will establish, own and operate a global, personal telephone communication satellite network.

On April 7, 1996 **INMARSAT's Council** approved a new policy allowing the United Nations free access to its satellite constellation for use in disaster relief operations

The **ITU,** along with the Pan-African telecommunications agencies [the Regional African Satellite Communications Organization (*RASCOM*) and the Pan African Telecommunication Union *(PATU)], AT&T,* and *Alcatel,* will be taking part in the **Africa ONE** project, which involves a highly sophisticated undersea fiber optic cable network that will create a communications ring around the continent. The goal of Africa ONE is to

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* Under a 1994 accord, Russia was limited to a maximum of 8 launches to geosynchronous orbit, and up to 3 launches to low earth orbit. For a text of the accord, see 22 J. SPACE L. 175 (1994).

connect African governments, businesses, and consumers to each other and to the rest of the world. Construction work on Africa One is expected to begin in 1996 and to be completed in 1999. The total cost is estimated at U.S. $2.6 billion.

On December 6-8, 1995, the **5th ITU Regulatory Colloquium** considered the issues associated with the impact which the emerging free trade regime of the world trade organization will have on national telecommunication regulation, as well as on the telecommunications industry in general. It also more clearly identified the practical realities which regulatory structures must confront in applying these principles, and paid particular attention to the needs and interests of developing countries.

The **1995 World Radio Telecommunication Conference** was faced with the challenge to limit or control, by means of technical and legal criteria, the multiplicity of satellites notified to the ITU, not all of which will necessarily be placed in orbit.

The **African Regional Telecommunication Development Conference,** convened by the ITU **in Abidjan, May 6-10, 1996,** adopted landmark recommendations and resolutions for the construction of Africa's telecommunications and information infrastructure well into the next century. The **African Green Paper** which the Conference has adopted seeks, among other things, "to initiate dialogue among all the actors concerned in designing and creating legal and regulatory frameworks that strengthen the sector's economic, socio-cultural and technical contribution." Key areas of discussion centered on trade-in-services, the importance of licensing, the role of regional and sub-regional orgnizations in Africa and the ways and means of strengthening this role, and the industrialization and manufacturing (including the transfer of technology).

The telecommunication sector managed to outperform overall economic growth in **Africa** for the period 1990-1995.

Americas TELECOM 96 took place in Rio de Janeiro, June 10-15, 1996. It comprised two summits: the Strategies Summit, with the theme "Telecommunications: from building infrastructure to emerging information economies," and the Technology Summit, with the theme "Broader and Faster -- Technologies in transition towards the information age."

The ITU has developed a multi-faceted Plan of Action to help restore the communications infrastructure in the war-torn state of **Bosnia** and **Herzegovina**, which the ITU expects to be completed by mid to end 1997.

On June 16, 1995, the **French and Brazilian** space agencies signed a cooperative agreement for work on satellite ground control and small satellite systems for Earth observation, beginning with development of a propulsion system for a small Brazilian Earth observation satellite.

On 23 December 1994, the **Russian Space Agency** (RSA) and **Indian Space Research Organization** (ISRO) signed a comprehensive cooperative agreement covering broad areas of space science, use of both space and ground-based facilities, meteorology, environmental monitoring,

remote sensing, communications, life sciences, space medicine, materials processing, and human space flight research. The agreement also covers military and technical cooperation through 2000.

The **3rd Asia-Pacific Regional Space Agency Forum** meeting in Tokyo, March 13-14, 1996, focused on future international cooperation in space development and discussed the roles of government and private sectors in the commercialization of remote sensing data, space-related educational programs, and space technology utilization.

The **3rd International Space Conference** entitled "Protection of Materials and Structures from the LEO Space Environment" was held in Toronto, Canada, April 25-26, 1996.

Apart from the Reports of the Scientific and Technical, and the Legal Subcommittees, items under consideration before the recently convened Thirty-ninth session (June 3-14, 1996) of **COPUOS** included the "Ways and means of maintaining outer space for peaceful purposes," the "Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space" and the "Spin-off benefits of space technology: review of current status."

The **International Academy of Astronautics** held a Workshop on Small Satellites for European Countries, Dublin, Ireland, May 7-10, 1996, and planned a Symposium on Missions to the Outer Solar System and Beyond, in Turin, Italy, June 25-27, 1996.

The **International Space University** organized an international symposium entitled "Space of Service to Humanity" on February 5-7, 1996 in Strasbourg, France. The symposium discussed educational, environmental, medical, communication, and food production issues.

Loral Corporation's Space Systems/Loral subsidiary plans to build two satellites, known as L-STAR 1 and L-STAR 2, for the Asia Broadcasting and Communications Network Public Company of **Bangkok** and the Government of **Laos** to provide direct-to-home television services throughout India, Southeast Asia, China and Taiwan.

Other Events

The **U.S. Space Foundation**'s 12th National Space Symposium, which met in Colorado Springs, Colorado, April 9-12, 1996, discussed the U.S. launch vehicle industry, remote sensing, use of imaging by developing countries, the international space station, and space launch capabilities, among others.

The **AIAA** legal aspects committee met in Christol City, Virginia, May 1, 1996. Scheduled discussion topics included: Current Legal Issues in Launch Services Agreements *(P. Bostwick);* Regulatory/Policy Issues Update re New Satellite Applications *(G. Musarra);* Update on Space Related Legislative Initiatives and Bilateral Agreements *(D.J. Burnett);* Space Launch Trade Issues *(D. Scott);* Commercial Use of Excess Strategic Ballistic Missiles *(P. Meredith);* Space Insurance - State of the *Market (J.*

Vinter); Orbital Debris - OSTP Report *(J. Hoffgard);* and "Big" Low-Earth Orbit (LEO) Satellite Systems' Status *(B. English).*

The **Space Horizons** summit, organized May 3-4, 1996 by **Boston University's** Center for Space Physics and other co-sponsors, addressed in a workshop setting the fundamental changes now occurring in the way humans operate in and use space.

The United Nations Programme on Space Applications, in cooperation with the Government of the United States of America, held a **UN/USA** International Conference on **Spin-off Benefits** of Space Technology: Challenges and Opportunities, at Fort Collins, Colorado, from April 9-12, 1996.

Brief News

Astronomers have reportedly discovered a galaxy 14 billion light years away from earth, making it the most distant galaxy ever detected... The unprecedented bright images of the **Hubble Space Telescope**, freed from the distortion of our atmosphere, have been characterized as the "astronomical equivalent of the Dead Sea Scrolls." Pictures taken by the **Hubble** on November 17, 1995, have confirmed the existence of a brown dwarf roughly 19 light-years from Earth. The previous existence of brown dwarfs, which are stars that lack enough mass to ignite a nuclear reaction, was only theoretical...The first surface photos of the planet Pluto, taken by the Hubble 2 years ago, were released by NASA in March 1996. The photos reveal icy polar caps and groups of light and dark blotches...After a six year space journey, the **Galileo** spacecraft made a historic plunge into Jupiter's atmosphere on December 7, 1995, making it the first artificial object to make direct contact with an outside planet...In December, 1995, **NASA** launched the **X-ray Timing Explorer** satellite to explore the workings of neutron stars, black holes and distant galaxies at the edge of the universe.

Astronomers announced in January 1996, what they believe to be only the **second and third planets** found outside our solar system. One is thought to orbit a star in the constellation Virgo, and the other a star within the Big Dipper.

The **comet Hyakutake** passed less than 9.5 million miles away from Earth in March 1996 and became the brightest comet to pass Earth since 1956. A couple of months later an asteroid, traveling 36,000 miles an hour and getting as close as 279.000 miles away, whizzed past the Earth and became the largest known object to have a close encounter of the astronomical kind.

On January 12, 1996 the space shuttle **Endeavour** had to fire its maneuvering jets in order to avoid a defunct Air Force satellite. The satellite was on track to pass within 0.8 miles of the shuttle, well below the 1.3 mile safety requirement established by NASA.

The thermal suits that astronauts will wear during construction of the international space station passed a major test on January 17, 1996, as an American astronaut remained comfortable outside the shuttle

Endeavour's cargo bay in temperatures of nearly 100 degrees below zero for 35 minutes.

On February 25, 1996 the space shuttle **Columbia** attempted to unreel an Italian satellite connected by a 12-mile slender cord in the hopes of generating electricity as the satellite sweeped through Earth's magnetic field at 17,500 mph. But the cord unexplainably broke before the satellite had been fully extended...The space shuttle Columbia was repeatedly damaged by space debris during a recent mission, the biggest damage occuring to one of its cargo bay doors, which sustained a 1-centimeter wide dent. The impact received is reportedly the largest impact recorded to date.

On March 23, 1996 the space shuttle **Atlantis** successfully docked with the Mir space station. While docked, two NASA astronauts performed a six hour spacewalk outside the Mir in order to prepare them for assembly of the international space station. The astronauts bolted four experiments to Mir's docking module, removed an unneeded TV camera, and tested various assembly aids. One of the experiments was designed to catch space debris so NASA will know the kind and quantity of debris that may hit the international space station. The docking lasted five days, with Atlantis leaving behind a U.S. astronaut for a five-month stay aboard Mir.

During their late May mission in 1996, **Endeavour** astronauts deployed and retrieved a satellite which was designed to stabilize itself without jet thrusters by using the Earth's magnetic field. It would make satellites much cheaper to launch and maintain without the heavy rocket equipment. Endeavour's astronauts also released and retrieved from orbit Spartan, a small satellite, containing the data from their experiment with a huge inflatable foil antenna, which was sprung from Spartan. Inflatable antennas are cheaper and easier to assemble, for such tasks as radio astronomy, communications and environmental monitoring.

A partnership between NASA and the U.S. commercial space industry to develop a small reusable booster rocket called the X-34 has ended due to concerns over costs and technical problems...NASA will begin a feasibility study on a program to develop an advanced radar satellite system that can provide day and night images of the Earth, even through clouds. This would apply advanced technology to reduce dramatically the mass, volume and cost of Synthetic Aperture Radar missions and to develop a national strategy for the role of radar in earth science and commercial remote sensing.

1995 was a disasterous year for small rocket launches for both the **U.S. and Russia.** The U.S. sustained 3 failed launches, and Russia sustained 2 such failures, destroying or leaving useless millions of dollars of investment.

On December 10, 1995, debris from Russia's **Cosmos 398** spacecraft, which was launched in 1971 in hopes of fulfilling Russia's effort to land a cosmonaut on the moon, fell into the South Atlantic.

After a U.S. astronaut was pulled from a stay on the Russian **Mir space station** because he was too tall, a second U.S. astronaut, has suffered the same fate because she was 160 centimeters to short.

On February 8, 1996, a Russian cosmonaut and a European astronaut performed a three-hour spacewalk outside of the Russian Mir space station in order to retrieve experiments and add other experiments to Mir's outer shell...More recently, two Russian cosmonauts installed a U.S.-made solar battery that will power their Mir orbiting station.

A **Russian Proton rocket** exploded after launch of a Raduga communications satellite on February 19, 1996 leaving the satellite in a useless orbit. But the Proton rocket redeemed itself on April 9, 1996, successfully launching a European Astra 1F satellite, making it **Russia's first commercial launch** of a Western communications satellite and officially entering it into the field of commercial launch services. Under expectations of new business resulting from this successful launch, the managers of Russia's commercial Proton rocket plan to press the U.S. to raise the number of U.S.-built spacecraft the rocket enterprise is allowed to launch.

In an effort to reduce management costs, the **European Space Agency** (ESA) is moving its space station and microgravity program to ESA's Estec technology center in Holland. The move is expected to be completed by August, 1996...ESA has given formal approval to the international space station...The Solar and Heliospheric Observatory **(SOHO)**, launched from Florida and built by ESA in cooperation with NASA, is the first solar observatory capable of round-the-clock observations. One of the main missions of SOHO is to determine how the sun expels material into space and the effect of this material on the Earth's environment.

As a major setback to ESA efforts over ten years and costing $7 billion, on June 4, 1996 technicians blew up by remote control **Ariane-5**, carrying four satellites, shortly after lift-off from the French Guayana since it appeared to be veering off its intended trajectory.

INMARSAT has decided to stop further investment in an international satellite navigation service that was proposed to be operational in the year 2000.

Satellites in the **Asia Pacific Region** are getting so **congested** that signal interference is becoming a major problem. A recent decision by **INTELSAT** to space four satellites 2 degrees apart instead of the traditional 3 degrees along the geostationary belt could further complicate the situation. There are reportedly more than 200 proposed satellites currently being registered at less than 1 degree, but many of these are expected to never be actually launched.

The International Telecommunications Union celebrated **World Telecommunication Day, May 17, 1996** commemorating the founding of the ITU in Paris 131 years ago.

Britain re-entered the space race on February 4, 1996, when a privately funded rocket, powered by a sugar-based propulsion system, flew to a height of 3,000 feet as planned.

A **Canadian** astronaut became the first Canadian Mission Specialist on board the space shuttle Atlantis STS-74 mission launched November 11, 1995, the first Canadian to operate the CANADARM, and the first Canadian to visit the russian space station Mir...On November 4, 1995, Canada's Space Agency (CSA) successfully launched its **RADARSAT** satellite which will produce remote sensing imagery for both environmental and commercial purposes.

A **German** orbital re-entry capsule named **Express,** after being launched over a year ago and presumed lost, was found in the jungles of Ghana where it had landed just hours after the launch.

Japan's space agency, NASDA, is working on a high-quality **lunar robot rover** that uses more advanced technology developed since the U.S. Apollo lunar buggy and the former USSR's lunokhod...On January 13, the first Japanese Mission Specialist on-board the Space shuttle Endeavour retrieved a scientific satellite that was launched from Japan in March of 1995.

India's space budget is undergoing enormous growth, from about $235 million in 1995 to $330 million this year, with expectations of $450 million by the year 2000...India's most advanced remote-sensing satellite, the IRS-1C, was successfully launched on December 28 by a Russian Molniya rocket from the Baikonur cosmodrome in Kazakhstan.

Globalstar agreed to form a joint venture with **Rostelcom** Joint Stock Company, Russia's leading telephone and communications operator, which will make Rostelcom the sole provider of Globalstar service in Russia.

Hughes Space and Communications Co. has ordered 10 firm launches over the next 5 years from Sea Launch Co., a Boeing-led international joint venture. The satellites will be launched on Ukrainian Zenit rockets from a converted offshore oil drilling rig that can be towed to any location needed for a launch.

B. FORTHCOMING EVENTS

The Case for Mars VI conference will be held in ***Boulder, Colorado, July 17-20, 1996*** and will discuss plans and prospects for the exploration and settlement of Mars. The conference is expected to emphasize education and review proposed Mars missions, including those of the Europeans and Russians.

The next biennial Conference of the **International Law Association** will be held in ***Helsinki August 12-17, 1996*** and is expected to discuss space law issues in connection with the meetings of its space law committee.

The **1996 IISL Colloquium** will be held during the 47th International Astronautical Congress in ***Beijing, China, October, 7-11 1996.*** As previously noted, the proposed titles and chairmen for the four sessions are:

Session 1: The Legal Status of Property Rights on the Moon and Other Celestial Bodies. Chairman: *Dr. HE Qizhi* (China).

Session 2: Cases and Methods of Dispute Settlement in Space Law. Chairman: *Karl-Heinz Böckstiegel* (Germany).

Session 3: Legal Aspects of Sharing Benefits from the Conduct of Space Activities. Co-chairmen: *Eduardo Gaggero* (Uruguay), *Stephen Doyle* (USA).

Session 4: Other Legal Subjects, which might include topics such as 'Liability Problems and Contracting for Space Activities' or 'Legal Issues Raised by Expanding Satellite Communications.' Co-chairmen: *Toshio Kosuge* (Japan), *Ernst Fasan* (Austria).

An International **Conference on Small Satellites: Missions and Technology** is planned for ***October 1996 in Madrid, Spain.*** It is organized by the Instituto Nacional de Técnica Aeroespacial and the United Nations.

The **IAA Symposium on Small Satellites for Earth Observation,** co-sponsored by the German Space Agency and the German Aerospace Research Establishment, will be held ***November 4-7, 1996*** in *Berlin, Germany.*

The Scientific and Technical Subcommittee of COPUOS at its 1996 session recommended that **COSPAR and IAF,** in liaison with Member States, should be invited to arrange a symposium on the theme "Space systems for direct broadcasting and global information systems" with as wide a participation as possible, to be held during the first week of its thirty-fourth session in **1997.**

Asia TELECOM 97 will take place in ***Singapore, June 9-14, 1997.***

The 4th International and Global Conference of Air and Space Law, sponsored by the **Korean Association of Air and Space Law** addressing "Issues in International Air and Space Industry and Law for the 21st Century," will be held in ***Seoul, Korea in June 1997.***

The **1997 IISL Colloquium** will take place during the 48th International Astronautical Congress in ***Torino, Italy, October 1997*** on the theme **"Celebrating the 30th Anniversary of the Outer Space Treaty of 1967."** The IISL Board decided on the following sessions and chairmen:

Session 1: Background and History of the Outer Space Treaty (invited papers only).
Chairmen: *N. Hosenball (USA)* and *A.A. Cocca (Argentina).*

Session 2: Concepts of space law and the Outer Space Treaty (A session to explore the concepts of law contained in the Outer Space Treaty and the elaboration of those concepts as contained in

the subsequent international treaties and agreements in space law).
Chairmen: *E. Galloway (USA)* and *G. Catalano Sgrosso (Italy).*

Session 3: Applications and Implementation of the Outer Space Treaty (A session to explore the problems and realities of applying and implementing the Outer Space Treaty and the basic provisions of space law therein).
Chairmen: *S. Doyle (USA)* and *G. Lafferranderie (France).*

Session 4: The future applications of the Outer Space Treaty (Examination of the Treaty from a 21st century perspective; should the Treaty be amended, supplemented or otherwise reinforced?)
Co-chairmen: *K.-H. Böckstiegel (Germany)* and *A. Terekhov (Russian Federation).*

The next **World Radiocommunication Conference** is scheduled for 1997.

BOOK REVIEWS/NOTICES*

Reviews

PRESERVATION OF NEAR-EARTH SPACE FOR FUTURE GENERATIONS, edited by John A. Simpson (Cambridge Univ. Press 1994), pp. 247.

This book is the result of an interdisciplinary symposium on the occasion of the 100th Anniversary of the University of Chicago, June 24-26, 1992. The danger of the proliferation of man-made space debris has been increasingly recognized especially in scientific circles and has been the motivating force behind the organization of this unique symposium under the leadership of *John A. Simpson* of the Department of Physics and the Enrico Fermi Institute of the University of Chicago, and his associates.

It was recognized from the outset that any effective effort in the direction of finding feasible solutions to the challenging problem of the preservation of near-Earth space for future generations must consider not only technical aspects but also economic factors, legal issues, and international cooperation for future civil and military uses of space.

The book contains a multitude of eminent scholarly presentations which, first of all, are aimed at defining the problem and dealing with mitigation and adaptation techniques and practices. This is followed by a focus and analysis of economic issues, including insurance aspects.

Of particular legal interest are the presentations on the current status of the regulation of orbital debris *(Howard A. Baker)*, the issues of environmental treaty making *(Winfried Lang)*, and the question of who should regulate the space environment *(Diane P. Wood)*. Additional contributions review the prospects for international cooperation *(Jeffrey Maclure and William C. Bartley)*, the initiatives in the United Nations *(Stephen Gorove)* and the options and approaches for regulatory action at the national and international levels *(Pamela L. Meredith)*.

This comprehensive study with the participation of outstanding contributors from a broad variety of disciplines concludes with panel discussions lead by *Diane Wood* and *Paul Uhlir* as well as a list of suggested further readings on orbital debris.

SPACE TRANSPORT LIABILITY: NATIONAL AND INTERNATIONAL ASPECTS, by R. Bender (Nijhoff 1995), pp. 406.

The author, an Adjunct Professor at Southwestern University School of Law in Los Angeles, describes the book as having two goals. First goal is to determine who can sue and be sued, what law applies and what causes of actions and defenses exist in two situations, namely: (a) when space transport accidents involve single or multiple aircraft engaged in a common endeavour and (b) when accidents involve multiple spacecraft of different

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* Edited by Michael A. Gorove, Attorney at Law, Associate Editor, J. SPACE L.

states not involved in a common endeavour or a single spacecraft which damages another state not engaged in a common endeavour with the launching state. The second goal of the book is to compare and contrast the national and international principles of space transport law which apply in the two situations.

Within the perimeters of the pursued objectives the book's coverage extends to procedural issues, tort principles, space transport carriage of goods principles and a comparison of national and international space transport principles. As a postscript, the 1995 Xichang launch failure is examined.

While the book contains much relevant information and extensive annotations, it is unfortunate that it has no index and that the texts of four well known conventions, namely those of the Outer Space Treaty of 1967, the Rescue and Return Agreement of 1968, the Liability Convention of 1972 and the Registration Convention of 1975, indicate the status of participants as of September 1, 1991, when much more recent updates have been published in legal periodicals and are available from the United Nations.

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SPACE -- VISION AND REALITY: FACE TO FACE, THE ELEVENTH NATIONAL SPACE SYMPOSIUM PROCEEDINGS REPORT, April 4-7, 1995, edited by Beth Ann Lipskin *et al.* (United States Space Foundation 1995), pp. 192.

This well illustrated compilation, much like earlier accounts of past proceedings of the United States Space Foundation, presents the views of scores of distinguished participants, many of them key policy decision makers in the space field. A major theme of the symposium was that the wonderful expectations about the future of space exploration and activities must be tempered with reality and understanding the risks and the balance of all societal needs. With this realistic approach in mind, special attention was given to U.S. positioning for the future, business opportunities in space, national security requirements, foreign involvements in and the outlook for space.

THE FUTURE OF THE SPACE INDUSTRY: PRIVATE ENTERPRISE AND PUBLIC POLICY, by Roger Handberg (Quorum 1995), pp. 169.

This book focuses on issues of space commercialization and points to what the author regards as the necessity of having space industry break away from its dependency on the public, military and civil space programs. The author believes that public policy restrains the activities of the private sector and, in a series of chapters, he reviews the perceived failure of privatization and the lessons learned from Landsat.

The study also provides an overview of the implications for the internationalization of space and assesses the opportunities and trends in the commercial development of space.

CAN DEMOCRACIES FLY IN SPACE: THE CHALLENGE OF REVITALIZING THE U.S. SPACE PROGRAM, by W.D. Kay (Praeger 1995), pp. 244.

W.D. Kay, an Associate Professor of Political Science at Northeastern University in Massachusetts, examines what he regards as NASA's checkered past accomplishments and looks at the prospects for reform which he finds as not the best because of the difficulties that surround the space projects -- size, expense, and complexity -- in the traditional workings of a democratic political environment.

MAKING SENSE OF SPACE: THE HISTORY OF NORWEGIAN SPACE ACTIVITIES, John Peter Collett (Ed.), (Scandinavian Univ. Press 1995).

This well illustrated book describes the role that a small nation like Norway has taken in space research and technology for over a century. Four prominent historians describe the Norwegian scientific, political, and industrial development showing that broad international cooperation has characterized the Norwegian space efforts, both bilaterally and multilaterally through international organizations.

LA TÉLÉVISION PAR SATELLITE, ASPECTS JURIDIQUES INTERNATIONAUX, by Philippe Achilleas (CEDIN-Paris I, 1995), pp. 199.

It is not a frequent occurrence that the publication of a student written manuscript is supported by institutions of such prestigious organizations as the Universities of Paris I and Paris II. The selection of this paperback for this distinction appears to be well deserved. The monograph is a solid study of the international legal aspects of television by satellite. The inquiry is set against the background of the technological economic, and political environment of such television and the international debate between those who advocate the free flow of information and those who champion prior consent. The author reviews in great detail the applicable global regulatory framework and general principles of international space law and does the same with respect to the regional institutional network focusing on the European example. Perhaps a way out of the diametrically opposed tenets of free flow of information and prior consent might be a regional approach more deferential toward national identities.

Notwithstanding the clarity of presentation and its clear-cut organizational breakdown, an index and bibliography as well as annotations covering the non-French literature would have been useful.

LAS TRANSMISIONES INTERNACIONALES DIRECTAS DE TELEVISION POR SATELITE - REGIMEN JURIDICO, by Jose Humberto Castro Villalobos (1995), pp. 165.

This study written by a former Professor of International Law at the University of Guanajuato, Mexico also deals with the legal issues of direct international transmissions of television by satellite. Unlike the preceding

French monograph, this paperback focuses on a detailed analysis of the Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting adopted by the U.N. General Assembly on December 10, 1982 and includes a brief review of internal Mexican legislation which, in the author's view, is in accord with the international norms, especially the respect for the sovereign rights of states. While the booklet has no index, it does have a bibliography and extensive references to the relevant international literature.

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ADDENDA

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I

THE WHITE HOUSE

Office of Science and Technology Policy
National Security Council

FOR IMMEDIATE RELEASE
March 29, 1996

FACT SHEET

U.S. GLOBAL POSITIONING SYSTEM POLICY

The President has approved a comprehensive national policy on the future management and use of the U.S. Global Positioning System (GPS) and related U.S. Government augmentations.

Background

The Global Positioning System (GPS) was designed as a dual-use system with the primary purpose of enhancing the effectiveness of U.S. and allied military forces. GPS provides a substantial military advantage and is now being integrated into virtually every facet of our military operations. GPS is also rapidly becoming an integral component of the emerging Global Information Infrastructure, with applications ranging from mapping and surveying to international air traffic management and global change research. The growing demand from military, civil, commercial, and scientific users has generated a U.S. commercial GPS equipment and service industry that leads the world. Augmentations to enhance basic GPS services could further expand these civil and commercial markets.

The basic GPS is defined as the constellation of satellites, the navigation payloads which produce the GPS signals, ground stations, data links, and associated command and control facilities which are operated and maintained by the Department of Defense; the Standard Positioning Service (SPS) as the civil and commercial service provided by the basic GPS; and augmentations as those systems based on the GPS that provide real-time accuracy greater than the SPS.

This policy presents a strategic vision for the future management and use of GPS, addressing a broad range of military, civil, commercial, and scientific interests, both national and international.

Policy Goals

In the management and use of GPS, we seek to support and enhance our economic competitiveness and productivity while protecting U.S. national security and foreign policy interests.

Our goals are to:

(1) Strengthen and maintain our national security.

(2) Encourage acceptance and integration of GPS into peaceful civil, commercial and scientific applications worldwide.

(3) Encourage private sector investment in and use of U.S. GPS technologies and services.

(4) Promote safety and efficiency in transportation and other fields.

(5) Promote international cooperation in using GPS for peaceful purposes.

(6) Advance U.S. scientific and technical capabilities.

Policy Guidelines

We will operate and manage GPS in accordance with the following guidelines:

(1) We will continue to provide the GPS Standard Positioning Service for peaceful civil, commercial and scientific use on a continuous, worldwide basis, free of direct user fees.

(2) It is our intention to discontinue the use of GPS Selective Availability (SA) within a decade in a manner that allows adequate time and resources for our military forces to prepare fully for operations without SA. To support such a decision, affected departments and agencies will submit recommendations in accordance with the reporting requirements outlined in this policy.

(3) The GPS and U.S. Government augmentations will remain responsive to the National Command Authorities.

(4) We will cooperate with other governments and international organizations to ensure an appropriate balance between the requirements of international civil, commercial and scientific users and international security interests.

(5) We will advocate the acceptance of GPS and U.S. Government augmentations as standards for international use.

(6) To the fullest extent feasible, we will purchase commercially available GPS products and services that meet U.S. Government requirements and will not conduct activities that preclude or deter commercial GPS activities, except for national security or public safety reasons.

(7) A permanent interagency GPS Executive Board, jointly chaired by the Departments of Defense and Transportation, will manage the GPS and U.S. Government augmentations. Other departments and agencies will participate as appropriate. The GPS Executive Board will consult with U.S. Government agencies, U.S. industries and foreign governments involved in navigation and positioning system research, development, operation, and use.

This policy will be implemented within the overall resource and policy guidance provided by the President.

Agency Roles and Responsibilities

The Department of Defense will:

(1) Continue to acquire, operate, and maintain the basic GPS.

(2) Maintain a Standard Positioning Service (as defined in the Federal Radionavigation Plan and the GPS Standard Positioning Service Signal Specification) that will be available on a continuous, worldwide basis.

(3) Maintain a Precise Positioning Service for use by the U.S. military and other authorized users.

(4) Cooperate with the Director of Central Intelligence, the Department of State and other appropriate departments and agencies to assess the national security implications of the use of GPS, its augmentations, and alternative satellite-based positioning and navigation systems.

(5) Develop measures to prevent the hostile use of GPS and its augmentations to ensure that the United States retains a military advantage without unduly disrupting or degrading civilian uses.

The Department of Transportation will:

(1) Serve as the lead agency within the U.S. Government for all Federal civil GPS matters.

(2) Develop and implement U.S. Government augmentations to the basic GPS for transportation applications.

(3) In cooperation with the Departments of Commerce, Defense and State, take the lead in promoting commercial applications of GPS technologies and the acceptance of GPS and U.S. Government augmentations as standards in domestic and international transportation systems.

(4) In cooperation with other departments and agencies, coordinate U.S. Government-provided GPS civil augmentation systems to minimize cost and duplication of effort.

The Department of State will:

(1) In cooperation with appropriate departments and agencies, consult with foreign governments and other international organizations to assess the feasibility of developing bilateral or multilateral guidelines on the provision and use of GPS services.

(2) Coordinate the interagency review of instructions to U.S. delegations to bilateral consultations and multilateral conferences related to the planning, operation, management, and use of GPS and related augmentation systems.

(3) Coordinate the interagency review of international agreements with foreign governments and international organizations concerning international use of GPS and related augmentation systems.

Reporting Requirements

Beginning in 2000, the President will make an annual determination on continued use of GPS Selective Availability. To support this determination, the Secretary of Defense, in cooperation with the Secretary of Transportation, the Director of Central Intelligence, and heads of other appropriate departments and agencies, shall provide an assessment and recommendation on continued SA use. This recommendation shall be provided to the President through the Assistant to the President for National Security Affairs and the Assistant to the President for Science and Technology.

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II.

MEMORANDUM OF AGREEMENT BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE GOVERNMENT OF THE PEOPLE'S REPUBLIC OF CHINA REGARDING INTERNATIONAL TRADE IN COMMERCIAL LAUNCH SERVICES

I. PURPOSE

The Government of the United States of America (U.S.) and the Government of the People's Republic of China (PRC) (hereinafter the "Parties") have entered into this Memorandum of Agreement (Agreement), of which the attached Annexes are an integral part, to address certain issues regarding international trade in commercial launch services including continued PRC participation in the international market for commercial launch services. Nothing in this Agreement applies to launches of payloads for military purposes or for use in the non-commercial, civilian space programs of either Party including programs using spacecraft or satellites made by or for the use of the Government of the PRC.

II. TRADE ISSUES AND MARKET PARTICIPATION

The Delegation of the People's Republic of China and the Delegation of the United States of America held 5 rounds of negotiations in Beijing and Washington, D.C. As a result of these discussions, the parties believe that the entry of PRC commercial launch services into the international market has facilitated cooperation between the PRC and the U.S. in the space area, and agree that certain measures are appropriate to address certain issues regarding international trade in commercial launch services, including continued PRC participation in the international market for commercial launch services. Accordingly, after mutual and friendly consultations, the U.S. and the PRC have agreed as follows:

A. The U.S. and the PRC support the application of market principles to international competition among providers of commercial launch services, including the avoidance of below-cost pricing, government inducements, and unfair business practices.

B. The PRC shall continue to take steps to ensure that providers of commercial launch services controlled by or operating within the territory of the PRC do not materially impair the smooth and effective functioning of the international market for commercial launch services.

(i) Among these steps, the PRC shall ensure that any direct or indirect government support extended to its providers of commercial launch services is in accord with practices prevailing in the international market.

(ii) The PRC providers of commercial launch services shall not launch more than 11 principal payloads to geosynchronous earth orbit or geosynchronous transfer orbit for international customers during the period of this Agreement, excluding Apstar II, AsiaSat II, Intelsat 708 and Echostar I, which were reviewed and determined to be covered by the provisions of the 1989 Memorandum of Agreement. Any satellite launched by PRC providers that is entirely leased on orbit to international customers (pursuant to a commitment between the PRC and such customers) represents a launch of a principal payload for purposes of this Agreement. If not entirely leased on orbit to international customers, such a satellite may represent a launch of a principal payload if the satellite's capacity is primarily leased to international customers, depending upon the circumstances and facts of a particular case.

(iii)(a) The United States and the PRC take note of the potential emergence of the market for launches to low-earth-orbit (LEO) since 1989 as a separately identifiable commercial market with its own particular characteristics. It is still under development and is closely related to the rapid evolution of the satellite market and telecommunications market. The two parties further note that participation of its providers of commercial launch services in an appropriate manner in this market segment will contribute to, rather than detract from, the development of this market segment.

(b) Taking into account the current predictions for the growth in, and structure of, the LEO market, the United States recognizes that the participation of PRC launch services providers in that market segment could be substantial, so long as that participation is consistent with the provisions of this Agreement. The PRC states that its participation in the LEO market shall be consistent with the provisions of the agreement and with significant U.S. participation in the development of the LEO market and agrees to take steps to ensure that such participation will be proportionate and non-disruptive.

(c) If either party believes that the other party is participating, or may participate in this market in a manner inconsistent with its commitments under the agreement, the parties shall meet pursuant to the consultations provided for under Article IV(2) to ascertain the facts of the situation and take appropriate corrective action. In assessing the effect, or potential effect of PRC participation in the LEO market relative to its commitments in this Agreement, the United States Government will be guided, inter alia, by the following factors:

1) The extent and growth of overall PRC and U.S. participation in the LEO market;

2) With respect to proposals to deploy LEO communications satellite constellations, the extent of participation by U.S., PRC, and third country launch service providers - in particular, whether the overall level of participation by launch service providers in countries with whom the U.S. has concluded a bilateral launch services agreement (measured according to distribution of payloads) in the deployment of any single LEO communications satellite constellation is greater than the participation of market economy launch service providers. The following factors should, inter alia, also be taken into account:

- the extent of PRC and U.S. participation in the deployment;
- launch scheduling requirements and the need to optimize launch vehicle selection to meet deployment or operational requirements;
- the availability of competitively-priced market economy launches to meet these requirements;
- opportunities made available to the parties for participation in the replacement market;
- reasonable considerations by the proposed system operator regarding commercial risk sharing;
- customers' requirements.

(iv) The PRC agrees that its providers of commercial launch services shall offer and conclude any contracts to provide commercial launch services to international customers (including sole source or directed procurements) at prices, terms, and conditions which are on a par with those prices, terms and conditions prevailing in the international market for comparable commercial launch services offered by commercial launch services providers from market economy countries, including the United States.

(a) When the differential between a bid, offer or contract by a PRC launch services provider and the bid, offer or contract by a commercial space launch services provider from a market economy country, including the U.S., to provide the commercial space launch services described in subparagraph (ii) above is less than 15 percent, it shall be assumed, unless information is provided to the contrary, that such bid, offer, or contract is consistent with subparagraph (iv) and that no special consultations are needed. When the differential between a bid, offer or contract by a Chinese launch service provider and the bid, offer or contract by a commercial space launch services provider from a market economy country, including the U.S., is greater than 15 percent and after taking into consideration the comparability factors described in Annex II, the U.S. believes that China's launch service prices are not consistent with subparagraph (iv), the parties shall have special consultations under Article IV of this agreement.

(b) With respect to the commercial launch services described in subparagraph (iii) above, the Parties agree to undertake a detailed examination on a per payload basis, of the factors affecting the comparability of bids, offers or contracts for such services with a view towards completing this examination by the end of 1995.

(v) If, after consultations, both parties agree, the PRC may offer an introductory price on only the first test flight of a new type of launch vehicle.

(vi) The PRC agrees that any commitments to provide commercial launch services to international customers by PRC launch service providers shall be proportionally distributed over the period of the Agreement. To this end, the PRC shall make its best efforts to prevent a disproportionate concentration of such commitments during any two-year period of the Agreement. The PRC may make commitments in any three-year period of the Agreement consistent with subparagraph II(B)(ii) above. The PRC shall seek to ensure that PRC launches of principal payloads for international customers are performed as scheduled in the original launch commitment.

(vii) The PRC agrees to require its launch service or insurance providers to offer international customers any insurance or reflight guarantees on a par with prevailing rates and practices in international markets for comparable risk.

C. The U.S. stated that the U.S. does not provide government inducements of any kind in connection with the provision of commercial launch services to international customers which would create discrimination against launch service providers of other nations and has no intention of providing such inducements in the future. Accordingly, the PRC stated it agreed not to offer inducements of any kind in connection with the provision of commercial launch services to international customers which would create discrimination against launch service providers of other nations.

III. NON-DISCRIMINATION

The U.S. stated that U.S. providers of commercial launch services do not discriminate unfairly against any international customers or suppliers and that it is not U.S. Government policy to encourage any such unfair discrimination by U.S. providers of commercial launch services. Accordingly, in implementing its commitments under this Agreement, the PRC shall require that its providers of commercial launch services not discriminate unfairly against any international customers or suppliers.

IV. CONSULTATIONS

1. The PRC and U.S. will consult annually with respect to the obligations in this agreement - in particular, the implementation of Article II(B)(ii), (iii), and (iv), including the nature and extent of direct and indirect government support provided to commercial launch services providers and developments--in particular, those described in Paragraph 3 below--in the international market for commercial launch services.

2. In addition, each party undertakes to enter into special consultations within thirty (30) days of a request by the other party to discuss matters of particular concern.

In particular, special consultations will be held to review the situation in which there is an absence of Western launch availability due to full manifests or launch failures during the required launch period (generally within three (3) months before and after the preferred launch date), if the PRC has reached the limitation set out in Article II(B)(ii), or if the bunching provisions established in Article II(B)(vi) would apply to prevent the launch of a satellite. If information is provided which verifies, to the satisfaction of the U.S. that the situation described above exists, the U.S. may increase the quantity restriction of available launches established under Article II(B)(ii) or relax the bunching provision set out in Article II(B)(vi) to permit the satellite to be placed on the PRC launch vehicle manifest for launch.

3. Semiannually, the limitation on the total number of satellites for international customers that may be launched by PRC providers of commercial launch services will be reviewed by both parties and, if appropriate, adjusted to reflect changes in the demand for launch services (including changes arising from a projected absence of Western launch availability over an extended period) upon request of the PRC in light of developments in the commercial launch services market.

Among the developments which would justify favorable reconsideration and cause the U.S. and the PRC to raise the quantity restriction established under Article II(B)(ii) and/or relax the bunching provision under Article II(B)(vi) are:

(a) development of the market for commercial space launch services to GEO that is significantly greater than the estimated average over the life of the agreement of 12-15 commercial launches per year upon which the limitation set out in Article II(B)(ii) is based, taking into account PRC compliance with its commitments under the agreement; or

(b) the development of a commercially viable project for satellite services that fundamentally changes demand for launch services.

If the parties agree that either of the above conditions exist, the U.S. may increase the quantity restriction established under Article II(B)(ii) and/or relax the bunching provision set forth in Article II(B)(vi) to satisfy the change in demand for launch vehicles for GEO satellites.

4. With respect to Article II(B)(ii), if the average annual number of commercial launches subject to the provisions of Article II(B)(ii)(including launch failures) is 20 or more over the first three years of the agreement, or if the two governments, by mutual agreement, conclude that commitments (as defined in Annex I) for such launches indicate that average annual launches of 20 or more will occur during that three year period, then the quantitative limit contained in Article II(B)(ii) shall be increased to 13.

If the average annual number of commercial launches subject to the provisions of Article II(B)(ii) (including launch failures) is 20 or more over the first four years of the agreement or, if the two governments, by mutual agreement, conclude that commitments for such launches indicate that average annual launches of 20 or more will occur during the first four years of the agreement, then the quantitative limit contained in Article II(B)(ii) shall be increased to 16.

5. If the U.S. independently determines that any of the conditions listed in paragraphs 2 or 3 of this Article have been met, the U.S. may unilaterally raise the quantity restriction set out in Article II(B)(ii) or relax the bunching provision described in Article II(B)(vi). Before such action, the U.S. shall notify the PRC of its intent to act unilaterally, and the PRC shall have thirty (30) days in which to respond to the proposed U.S. action. If the PRC does not object within thirty (30) days, the U.S. may take unilateral action to increase the quantity restriction or relax the bunching provision.

6. The U.S. and the PRC agree to work toward a common understanding of the application of market principles to prices, terms, and conditions of commercial launch services for international customers.

7. To facilitate the annual consultations, the U.S. and the PRC agree to exchange information as follows:

(a) The U.S. shall each year in advance of such consultations provide to the PRC such publicly releasable information as it possesses with respect to prices, terms and conditions prevailing in the international market for commercial launch services.

(b) The PRC shall each year in advance of such consultations provide comprehensive information to the U.S. regarding prices, terms, and conditions offered by PRC providers of commercial launch services for the launch of satellites. The PRC may also provide other information that it believes may have a material effect on pricing practices of PRC providers of commercial launch services.

(c) The PRC may request that the U.S. provide additional publicly releasable information with respect to international prices, terms, and conditions, and may in addition request U.S. views regarding prevailing international market conditions and likely future developments, as well as government supports or inducements. The U.S. shall respond to such requests within thirty (30) days. If such information cannot be provided directly because of business confidentiality, the U.S. shall provide such information in summary form.

(d) The U.S. may request additional information with respect to the prices, terms, and conditions offered by PRC providers of commercial launch services and any PRC government supports or inducements. The PRC shall respond to such request within thirty (30) days. If such information cannot be provided directly because of business confidentiality, the PRC shall provide such information in summary form.

(e) The U.S. and the PRC shall keep all information received from each other under this paragraph strictly confidential and shall not provide it to any other government or any private person without the written consent of the other.

8. The U.S. and the PRC shall also provide each year, in advance of the annual consultations, information on a consolidated basis concerning the commitments their launch service providers have undertaken to provide commercial launch services for international customers. This information may be made publicly available.

9. If a launch of a satellite for an international customer will not be performed as scheduled, the PRC shall notify the U.S. regarding the reasons for the delay and the new date for the launch as soon as possible.

10. It is understood that the U.S. and the PRC will review the information contained in this Article during annual consultations in the context of developments in the international market for commercial launch services.

V. **CLARIFICATION OF RIGHTS AND OBLIGATIONS**

1. If, after friendly consultations with the PRC, the U.S. determines that there is clear evidence that the provisions of this Agreement have been violated, the U.S. reserves its right to take any action permitted under U.S. laws and regulations, taking into account the harm caused to U.S. interests under the agreement. The U.S. shall seek to avoid actions inconsistent with this Agreement.

2. With regard to export licenses, any applications for a U.S. export license will be reviewed on a case-by-case basis consistent with U.S. laws and regulations. Nothing in this Agreement shall be construed to mean that the U.S. is constrained from taking any appropriate action with respect to any U.S. export license, consistent with U.S. laws and regulations. Nevertheless, the U.S. will do its utmost to assure, consistent with U.S. laws and regulations, continuity of issued license(s) and the completion of the transactions covered in such license(s).

VI. **DISCUSSIONS ON INTERNATIONAL RULES**

The U.S. and the PRC are prepared to enter into discussions with other interested parties on comprehensive international rules with respect to government involvement in and other matters relating to the international market for commercial launch services. It is understood, however, that nothing in this Agreement shall prejudice any position on any issue that either the U.S. or the PRC may take in those discussions.

VII. **COMPREHENSIVE REVIEW**

The U.S. and the PRC shall complete a comprehensive review of the terms and operation of this Agreement by mid-1998.

VIII. **ENTRY INTO FORCE**

This Agreement shall enter into force on January 1, 1995 and shall remain in force until December 31, 2001. It may be terminated at any time by mutual agreement if superseded by an international agreement on government involvement in, and other matters relating to, the international market for commercial launch services or under such other circumstances as may be mutually agreed.

IN WITNESS WHEREOF, the undersigned, being duly authorized by their respective Governments, have signed this Agreement.

DONE at Beijing in duplicate, in the English and Chinese languages, both texts being equally authentic, this 3 day of March, 1995.

For the Government of the United States of America:

For the Government of the People's Republic of China:

ANNEX I

The following agreed definitions constitute an integral part of the Memorandum of Agreement between the Government of the United States of America and the Government of the People's Republic of China Regarding International Trade in Commercial Launch Services of March 13, 1995.

1. "Commercial space launch services" means commercially offered or provided services to launch into space any spacecraft or satellite, including but not limited to communications satellites, for an international customer. All types or classes of launch vehicles that may be used by a Chinese space launch service provider to provide commercial space launch services are subject to this Agreement.

2. "PRC space launch service providers" means any PRC entity, or agent or instrumentality acting on its behalf, permitted by the government of the People's Republic of China to provide commercial space launch services or the space launch vehicles for such services.

3. "International customer" refers to the following:

(a) any person, or any kind of corporation, company, association, venture, partnership, or other entity, whether or not organized for pecuniary gain, or privately or governmentally owned or controlled other than those institutions or entities which are owned or controlled by PRC nationals and provide telecommunications services primarily to the Chinese domestic market; or

(b) any governmental body, excluding the Government of the United States of America and the Government of the People's Republic of China; or

(c) any international organization or quasi-governmental consortium, including but not limited to INTELSAT, INMARSAT, or their respective legal successors;

which is the ultimate owner or operator of a spacecraft or satellite or which will deliver a space craft or satellite to orbit for use by such ultimate owner or operator.

4. "Commitment" means any agreement by an international customer with a provider of commercial launch services to launch a principal payload, which effectively removes the launch from international commercial competition. The term "commitment" does not include reservation agreements.

5. "Comparable commercial space launch services" means commercial space launch services offered to launch a spacecraft of the weight class that is the subject of a launch competition, sole source or directed procurement, taking into consideration relevant factors that may be considered when evaluating the prices, terms and conditions of such services, including, but not limited to, such factors as intended orbit, risk management, financing, satellite lifetime on orbit and integration costs.

6. "Government inducements" with respect to a particular launch services transaction include, but are not limited to, unreasonable political pressure, the provision of any resources of commercial value unrelated to the launch service competition and offers of favorable treatment under or access to defense or national security policies or programs, development assistance policies or programs, and general economic policies or programs (e.g., trade, investment, debt, or foreign exchange policies).

7. "Unfair business practices" means the making of any offer, payment, promise to pay, promise or offer of anything of value or the authorization of the payment of anything of value, or any promise to make such payment, to any official, individual, or any other entity for the purpose of obtaining or retaining business for or with or directing business to, any person, including making payment to a person while knowing that all or a portion of the payment will be offered, given or promised, directly or indirectly, to any official, individual or any other entity for the purposes of obtaining or retaining business.

8. "Geosynchronous earth orbit" means an orbit approximately 19,400 nautical miles (35,900 kilometers) above the surface of the earth at the equator in which a payload completes one earth orbit in a 24-hour period, holding a fixed position above the earth.

9. "Geosynchronous transfer orbit" means a temporary orbit used to reposition a spacecraft or satellite into a geosynchronous earth orbit.

10. "Low earth orbit" means, for purposes of this agreement, any orbit below geosynchronous earth orbit.

11. "Principal payload" means a telecommunications satellite, or, in the absence of a telecommunications satellite, any other spacecraft or combination of spacecraft.

12. "Sole source or directed procurement" means any agreement where the launch services customer does not hold a competition and selects a supplier with whom to negotiate a launch services agreement.

13. A "new type of launch vehicle" must have significantly higher risk for the first launch than other launch vehicles already in production in order to qualify for a "test flight" price. Significantly higher risk results only from major changes to high-risk systems such as the propulsion or avionics systems. Accordingly, a "new type of launch vehicle" is one in which a majority of the primary systems (e.g. propulsion, end-to-end avionics, primary structure) and a majority of the component subsystems (e.g. strap-on boosters, guidance package, interstage adaptor) have been redesigned or significantly modified, resulting in a new untested capability not previously available on that vehicle. Minor vehicle enhancements, such as an enlarged fairing, upgraded software, extended propellant tanks, a modified payload or interstage adaptor, or a slightly modified electrical system would not by themselves represent a redesign or a significant modification for purposes of determining a new vehicle.

Annex II: Pricing Comparability Factors for Commercial Launch Services to GEO

Both parties agreed to the following six factors for comparing or evaluating launch services in the international market. Such factors can often explain legitimate distinctions in the price offered for the launch of a particular payload relative to market economy providers of commercial launch services.

For each factor, a brief description is provided, along with average ranges representing the impact that the factor could have on the ultimate price to the customer when applied in a competition. These cost ranges represent the values associated with the factors for contracts involving PRC launch providers in the international commercial launch services market. The particular value associated with a given comparability factor may be higher or lower than the ranges discussed below for a specific case. Such a value can be used if it can be definitely established after examination of the actual circumstances in that case.

During annual consultations, the ranges for each factor shall be evaluated to determine if they have changed.

Intended Orbit:	Based on delivery orbit for launch provider, and provider of Perigee Kick Motor (PKM).
Resolution:	Both sides agreed that recent contracts involving the purchase of a PKM by the customer have resulted in additional costs of $6 to $7 million (USD) for the purchase of the PKM alone. Integration and risk management costs for the payload/PKM will be included in this factor, when appropriate. To the extent that integration and risk management costs for the payload/vehicle and PKM/vehicle exist, they already are included in the "additional costs" and risk management factors discussed below. In some cases this factor may also reflect certain discounts representing customer preferences for GTO delivery, rather than LEO delivery.
Risk Management:	Addresses potential differences in insurance prices for the customer (and different forms of risk management, such as political risk insurance).
Resolution:	Both sides agreed that the basic risk management insurance rates for PRC vehicles can be 1 to 4 percent higher than the rates for market economy vehicles, depending upon the particular vehicles in question (relative rates can also vary greatly on the basis of a vehicle's recent performance). However, this difference in rates does not always result in significantly different absolute premiums for the customer, depending on the difference in launch service prices and satellite costs. It was also agreed that (in addition to differing vehicle characteristics) factors such as political risk may be considered in this calculation, if appropriate.
Additional Costs:	Integration costs address different types of payload/vehicle, and/or PKM/vehicle integration costs, and mission software/hardware modification costs. Launch support costs involve extra transportation expenses, security costs, extra equipment, and personnel support.
Resolution:	Both sides agreed that the total costs for this factor range between $4 and $6 million.
Vehicle Lift Capability:	Ensures comparison of vehicle classes providing similar performance.
Resolution:	Both sides agreed that lift capability may sometimes be applied as a comparability factor due to differences in vehicle prices from one class of performance to the next.

Payment Conditions and Terms: Relates to various payment and financial conditions or incentives.

Resolution: The issue centers on the economics of the customer's financial position. A lower total cost is determinate in instances where a customer is cash-rich. On the other hand, a launch provider's ability to offer favorable credit terms, which would produce a favorable payment schedule, may be more important in cases where the customer has credit limitations. In cases where favorable credit terms are not possible, a flexible payment schedule still can be a powerful incentive. Since both sides have the capability to offer credit, they agreed that both payment conditions and terms should be considered as comparability factors, when appropriate.

Lifetime: Addresses impact of different satellite lifetimes resulting from launch services.

Resolution: Both sides agreed that the use of some PRC launch vehicles can result in satellite lifetimes that are 1 to 2 1/2 years less than launches on a market economy vehicle, though in some cases there may be no impact on satellite lifetime. Evaluation of this factor is complex and must be done on a case-by-case basis. Additional elements such as intended (or desired) satellite lifetime, cost per transponder, number of transponders, etc., must also be considered.

III+

Santiago Declaration

(Adopted by the Second Space Conference of the Americas, Santiago, 26-30 April 1993)

The Second Space Conference of the Americas,

1. Stresses the relevance of the Conference that reaffirms the interest of all the participating countries in furthering cooperation in the space activities area and affirms the commitment of all the States in the region of Latin America to the exploration and exclusively peaceful use of space activities,

2. Reiterates the importance of continuing the advances in the preparation of rules that will contribute to the development of international space law,

3. Affirms that in order to create the capacity in the Latin American countries in space matters, continuity, coordination and stability in the long term are required in national space programmes and those to be necessarily established in the future,

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+ Source: U.N. Doc. A/28/20, at p. 22 (1993).

4. Holds the need for these national programmes and their projects progressively to converge, integrating as appropriate the space activities of the Americas,

5. Emphasizes the need for international cooperation in space matters in an increasingly interdependent world, inviting governmental agencies constructively to participate in support of the space activities of the Americas,

6. Urges national programmes, governmental agencies and international organizations to support and foster action by the scientific and academic groups participating in space projects and activities in the Americas,

7. States also that cooperation projects in space matters should develop and foster the uses of space technology in order to increase the number of beneficiaries in the region,

8. Adopts the creation of a pro-tempore secretariat to follow up and give continuity to the results of the Conference, so as to promote cooperation in space matters among the participating countries, the headquarters of which will be in the host country of the Space Conference of the Americas, and decides that the concerned countries designate focal points for communication with this secretariat,

9. Expresses its interest that the United Nations system, particularly through the United Nations Office for Outer Space Affairs and the Economic Commission for Latin America and the Caribbean (ECLAC) provide support to follow up the Conference resolutions,

10. Recommends, in this context, that in the decentralization processes of the United Nations system, ECLAC be given the necessary support as well as the appropriate human and financial resources,

11. Decides that the Third Space Conference of the Americas will be held within three years, having a preparatory scientific-technical part, intended to analyse space activities and to evaluate the technical feasibility of projects submitted by the countries of the region. Said preparatory meeting will recommend priorities and projects to the plenary Conference,

12. Endorses the conclusions and the work of the Conference contained in the report by the rapporteur and the governmental, institutional and individual contributions presented in the commissions, which constitute an important asset for the follow-up of the Conference,

13. Adopts together with its financing commitment by the proposing countries and for their implementation among the concerned countries, the projects submitted with express governmental endorsement, individually detailed in the rapporteur's report.

14. The list of projects mentioned in the preceding paragraph may be enlarged, mainly with those projects to be submitted to the conference through the pro-tempore secretariat in the future.