

JOURNAL OF SPACE LAW

A journal devoted to the legal problems arising
out of man's activities in outer space

VOLUME 10

SPRING 1982

NUMBER 1

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CATASTROPHIC ACCIDENTS: INDEMNIFICATION OF CONTRACTORS AGAINST THIRD PARTY LIABILITY

*Paul G. Dembling**

A. Introduction

Much legislation has been enacted covering natural disasters such as hurricanes and floods.¹ However, except for the Price-Anderson Act, dealing with nuclear incidents² and NASA's coverage for users of space shuttle,³ and several other relatively minor statutes,⁴ there is no comprehensive statute to assure adequate protection to the public and to government contractors for widespread injury, death, or property damage that may arise out of man-made catastrophic accidents in government programs.

At least since 1959, government departments and agencies have sought authority to assure adequate protection to the public and to government contractors for such catastrophic accidents. The accidents on which attention was focused were those that might occur as a result of government contractual activities which involve space vehicles, toxic fuels, and other equipment and materials that have the potential to cause widespread destruction.

Stimulus for indemnification of contractors initially came from the contractors themselves. They requested an indemnification provision in their government contracts. They found that they could not adequately insure themselves against the risks of enormous potential destruction, either because insurance could not be obtained for the potential liability or because such insurance could be obtained only at what they believed to be a high cost. Government contractors were often reluctant to enter into contracts with the government because of their concern with the potential ruinous financial liability that they would sustain if a catastrophic accident occurred.

There is another aspect to this problem. In the event of an accident, not only the government contractor might be ruined, but those who suffered injury, damage or loss would have no effective means to be reimbursed for their loss. Assuming, for example, that the damage caused by an accident amounted to 500 million dollars and that the government contractor had acquired some insurance, there would be, in all likelihood, a

*Partner, Schnader, Harrison, Segal & Lewis, Washington, D.C., Former General Counsel of the National Aeronautics and Space Administration and of the U.S. General Accounting Office.

¹E.g., Disaster Relief Act of 1974, 42 U.S.C. §§ 5121-5202 (1977 & West Supp. 1981), amending the Disaster Relief Act of 1970, 42 U.S.C. § 439 (1970); Earthquake Hazards Reduction Act of 1977, 42 U.S.C. §§ 7701-7706 (West Supp. 1980).

²Amendments to Atomic Energy Act of 1954, 42 U.S.C. § 2210 (1973 & West Supp. 1981).

³42 U.S.C. § 2458(b) (West Supp. 1981) amending the National Aeronautics and Space Act of 1958 (indemnifying users of space vehicles).

⁴E.g., National Swine Flu Immunization Program of 1976, 42, U.S.C. § 247b(k) (West Supp. 1974-81). This statute established "substitute liability" in the Federal Government for claims against manufacturers of swine flu serum.

deficit even though the contractor's assets were liquidated and used to compensate the victims. It is probable that the victims could not successfully turn to the government under the Federal Tort Claims Act for reimbursement, since the implementation of the government's program would, under legal precedents, be considered a "discretionary function" within the meaning of that Act and as such, a defense to the claim. It was felt, however, that the government should be responsible to the public for the damage individuals may have sustained as a result of the government program, to the extent the public was unable to obtain satisfaction from the Government contractor and his insurer. What was needed was the authority to indemnify the contractor, and conceivably, authority to assuage the victims by providing some interim compensation on an emergency basis soon after the accident. To accomplish this, legislation was sought.

B. Background: The Saga of Attempting to Secure Indemnification Legislation

In the 86th Congress, H.R. 4148 was introduced which would have authorized the National Aeronautics and Space Administration ("NASA") to indemnify its contractors against hazardous risks and to limit the liability of contractors so indemnified. H.R. 9765, also introduced in the 86th Congress would have authorized NASA to indemnify its contractors with respect to research and development contracts. No action was taken on either of these bills.

During the 87th Congress, H.R. 7115, H.R. 8095, and S.1857 to amend the National Aeronautics and Space Act of 1958 were introduced. These bills would have provided NASA with authority to indemnify against third party liability and property loss or damage arising out of contracts with NASA which involve risks of an unusually hazardous nature. Hearings were held in the House and the Senate, but only H.R. 8095 was passed by the House.

In July of 1963, a report was issued by Columbia University dealing with catastrophic accidents in government programs.⁵ The Columbia report drew upon an earlier 1956-57 study by the same group for the Atomic Industrial Forum, probing the financial protection problem faced by the nuclear power program. That 1956-57 study opened the way for the 1957 Price-Anderson Amendments to the Atomic Energy Act of 1954.

The 1963 Columbia report dealt both with the legal and policy ramifications of the problem and with its technical aspects. A supporting engineering study was directed by Professor Hassialis of the School of Engineering and Applied Science of Columbia University (and Chairman of the Henry Krumb School of Mines). A portion of the engineering study, subcontracted to Arthur D. Little, Inc., of Cambridge, Massachusetts, dealt specifically with the nature and extent of the technical risks involved in a number of government programs.

The Columbia report observed that "[f]orces of unprecedented power, only recently unleashed by science, are increasingly employed or directed by the United

⁵*Colum. U. Legis. Drafting Research Fund, Catastrophic Accidents in Government Programs* (1963).

States for governmental purposes in furtherance of the national interest."⁶ It concluded that "[t]he possibility of devastating accidents is real and must be faced."⁷ A two-phase program was recommended to deal with the need to protect both the public and government contractors and subcontractors by providing for interim emergency compensation as well as an ultimate remedy. Although several alternate legislative solutions were proposed, the report was clear that a legislative solution was necessary in order to "provide for the consequences of a disaster before the event rather than to rely on the hope that adequate measures would be promptly enacted in the turmoil following a disaster."⁸ The report went on to say:

Such experience as we have affords no assurance that either industry or the public would be promptly or adequately taken care of by subsequent congressional action; in the case of the Texas City disaster, which may serve as a gauge of the speed and adequacy of what Congress might do, relief legislation did not come until eight years after the accident, and then it provided a measure of compensation which in many cases was grossly inadequate.⁹

Starting in 1964, the Department of Defense (DOD) and NASA collaborated in the drafting of a comprehensive government-wide bill that followed to a large extent the recommendations of the Columbia study. The bill was circulated by the Bureau of the Budget throughout the Executive Branch and thereafter was further revised to accord more closely with the Price-Anderson approach. Action was suspended on the bill shortly thereafter.

In the early 1970s the Commission on Government Procurement also addressed the problem. One of its Study Groups (No. 8) evaluated the current statutes and proposed legislation as well as procedures governing government indemnification for man-made catastrophic accidents rather than natural disasters or "Acts of God." In its Report and Recommendations, this Study Group, after defining "Catastrophe" as "a disaster of such magnitude that the resulting claims for personal injury and property damage would exceed the monetary level for which there is reasonably available insurance coverage", went on to review and analyze the possibility of such catastrophes, the applicable law if catastrophe occurred, liability for catastrophe occurring abroad, the role of insurance, the problems of government indemnification of contractors under existing law, the problems confronting victims of catastrophes attempting to secure compensation for their injuries and damages and other related matters. The Study Group also supported the findings of the Columbia Study and the other previous studies that legislation was needed to rectify these matters. Specifically, the Study Group recommended the enactment of federal legislation "dealing with catastrophic

⁶*Id.* at 7.

⁷*Id.*

⁸*Id.* at 12.

⁹*Id.* Also consider that this was a Texas disaster and the then Speaker of the House of Representatives was Rep. Sam Rayburn of Texas and the then Senate Majority Leader was Senator Lyndon B. Johnson, also of Texas.

accidents before they occur to assure prompt and adequate compensation to the public and to shield contractors against losses beyond available insurance."

This recommendation was subsequently endorsed and adopted by the Procurement Commission in its Official Report. These recommendations were as follows:

4. Enact legislation to assure prompt and adequate compensation for victims of catastrophic accidents occurring in connection with Government programs.
5. Enact legislation to provide Government indemnification, above the limit of available insurance, of contractors for liability for damage arising from a catastrophic accident occurring in connection with a Government program.¹⁰

These recommendations were based upon the conclusion, stated in the Commission's Official Report, that:

In summary, present means are inadequate for compensating for the consequences of a catastrophic accident arising from a Government program. They do not assure in advance prompt relief to members of the public who may be victims of such a catastrophe, and they do not protect Government contractors from potentially ruinous liabilities. . . .¹¹

Subsequent to the Procurement Commission Report, an Intragovernmental Task Group was established to draft appropriate legislation, which, if enacted, would carry out the recommendations of the Commission on Government Procurement. A draft bill and report proposed by the Task Group were circulated by the Office of Federal Procurement Policy (OFPP)¹² for comment. The Report stated that "even though catastrophes of the magnitude contemplated. . . are rare. . . there should be a ready authority to provide aid to victims at the earliest time". It recommended coverage of "any legal liability" that resulted from a catastrophe. The proposed bill provided (a) interim payments for restoration of essential services and medical expenses of victims, (b) effected tort law reform by requiring waiver of defenses against indemnified claims, (c) defined "catastrophe" in terms of estimated total damages, and (d) established a maximum total liability limit of \$500 million for all claims resulting from a single catastrophe.

In 1978, OFPP released for comment a new draft bill which omitted the waiver of defenses (tort reform) and maximum liability limitation. This draft bill also abandoned the "unusually hazardous activity" requirement and substituted instead a requirement that the provisions of the bill would apply only to contracts wherein the head of the contracting agency determined that "cumulative account of liability. . . may exceed the higher of either \$60 million or the amount of such insurance as may be required or

¹⁰*Report of the Comm. on Gov't. Procurement, Recommendations H-4 and H-5* 103 (1972).

¹¹*Id.* at 104.

¹²*Office of Fed. Procurement Policy Memo.* (March 9, 1977).

approved under or for the contract. . .". Indemnification coverage was to be on a contract-by-contract basis, as was the case in the earlier draft bill. While the Task Force bill indemnified "any legal liability," the 1978 bill covered only liability for death, bodily harm or loss or damage to property and thus omitted coverage for economic losses.

The long history of attempting to agree on an Executive Branch position continues. A newly constituted Intradepartmental Task Force,¹³ under the aegis of OFPP, submitted its report to the Administrator of OFPP on January 28, 1982. This report "concludes that there is justification for amending Executive Order 10789, as amended, so that an increased number of Executive Agencies may agree to indemnify its contractors if the national defense would be facilitated thereby and if either the contract work (i) is unusually hazardous or nuclear in nature or (ii) gives rise to the possibility of catastrophic losses."¹⁴

C. *Product Liability Law: Holding the Contractor Absolutely Liable*

The situation currently facing the government contractor is most unsatisfactory. In the case of a contractor, the concept of absolute liability in tort law where an "ultra-hazardous activity" is involved opens up the possibility that the contractor in a hazardous program may be liable merely upon establishment of causation. The development of the law governing products liability accents the exposed position of a company supplying equipment or services for a government program. Starting with *MacPherson v. Buick Motor Co.*,¹⁵ the manufacturer or assembler of a product has increasingly become subject to liability to an ultimate user for harm or damage caused by his product. Moreover, liability is joint and several, which means that one company may be liable for all damages to all claimants even though a number of other industrial concerns and government employees and officials had participated in the work of the program. The supplier of a component part, the furnisher of faulty design specifications, the systems contractor who fails to detect a faulty component may each be found jointly and severally liable. Nor does inspection and acceptance by the government exonerate a company from such liability.

The following discussion illustrates the extent to which the law has developed in extending the application of the *MacPherson* doctrine to situations involving Government projects.

With the adoption of the Federal Tort Claims Act (FTCA) in 1946, Congress waived the government's immunity from tort liability and granted the federal district

¹³This task force was established in response to recommendations H-4 and H-5 of the Commission on Government Procurement and in response to a request dated June 12, 1981 from the General Counsel, NASA which identified a request by the Committee on Science and Technology, House of Representatives recommending that NASA coordinate an indemnification policy with cognizant Executive agencies.

¹⁴Report of the OFPP Interagency Task Force on Indemnification, Part I - Indemnification of Government Contractors Against Third Party Liability Claims, 1982, cover letter. See *infra* notes 29-38 and accompanying text.

¹⁵217 N.Y. 382, 111 N.E. 1050 (1916).

courts jurisdiction over subsequent tort claims against the government.¹⁶ Four years later, the United States Supreme Court created an exception to the FTCA's general waiver of immunity in *Feres v. United States*.¹⁷ In *Feres*, the Supreme Court held that active duty service personnel (and their heirs) could *not* recover from the government under FTCA for injuries or deaths sustained "incident to service." Courts have generally interpreted this phrase "incident to service" quite broadly, holding that *all* injuries suffered by active duty service personnel (whether or not these injuries result from the performance of a service-related task) are incident service.

In *Boeing Airplane Company v. Brown*,¹⁸ the Court held the manufacturer of a plane operated by the Air Force liable for the death of an Air Force Major. Although the explosion and crash were the result of a malfunction of a component furnished by another company, Boeing was held negligent in assembling the airplane with an inadequate component. In *Sevits v. McKiernan-Terry Corporation*,¹⁹ the Court upheld a complaint against a manufacturer by a Navy crew member based on injury sustained aboard a U.S. Navy aircraft carrier. The Court held that a component manufacturer could be liable even without proof of negligence. In *Stencel v. Aero Engineering Corp.*,²⁰ the Supreme Court ruled that the manufacturer of an aircraft component supplied to government had no third-party cause of action against the government in tort for liability to servicemen resulting from a defect in a component. *Stencel* involved a claim brought under the FTCA by a National Guard officer who had been injured when the ejection system of his fighter aircraft malfunctioned during a mid-air emergency. The faulty ejection system had been manufactured in accordance with government specifications.

Henry v. Bell Textron,²¹ involved a helicopter delivered to the government in 1966. The helicopter had been used during two combat tours in Vietnam and had been damaged. It had been overhauled on two occasions and had been modified during normal maintenance to the extent that virtually every part had been replaced at least twice since manufacture. In 1976, an accident occurred which resulted in the death of two pilots performing training duty as members of the Virginia Army National Guard. The Court held that the manufacturer was liable although the Department of Army Report stated that the government "defendants were more responsible for the crash than Bell Textron." However, the Court stated: "Bell Textron is placed in a very difficult position by the expanding doctrines of product liability and Eleventh amendment immunity, but unfortunately for it, the law is clearly against it."

¹⁶28 U.S.C. § 1346(b) (1976 & West Supp. 1981).

¹⁷340 U.S. 135 (1950).

¹⁸291 F.2d 310 (9th Cir. 1961).

¹⁹264 F. Supp. 810 (S.D.N.Y. 1966).

²⁰431 U.S. 666 (1977).

²¹577 F.2d 1163 (4th Cir. 1978).

In the recent case of *Vasina v. Grumman Corp.*,²² the appellate court upheld a jury verdict against the manufacturer of an airplane designed and manufactured for the Navy, in an action brought by the estate of a serviceman killed in the crash of the airplane. At trial it was established that the plane crashed as a result of the failure of a wing which had been damaged during service in Vietnam and had been subjected to extensive repair by the Navy. The trial judge instructed the jury that "it is no defense to Grumman merely that the negligence of the Navy contributed to the death of Lt. Vasina." Because Lt. Vasina was killed in the line of duty, his survivors had no cause of action against the government under the Federal Tort Claims Act, and therefore could move only against the commercial manufacturer. The jury returned a verdict against Grumman of over one million dollars, which was sustained on appeal.²³ But for the sovereign immunity and other special defenses available to the Federal Government the original plaintiffs in these cases would have had viable tort claims against the government.

The above cases also illustrate the development of the doctrine of strict liability in cases involving alleged defects in high technology products. Beginning with *Henningsen v. Bloomfield Motors, Inc.*,²⁴ and continuing with the 1963 California Supreme Court case of *Greenman v. Yuba Power Products, Inc.*,²⁵ through the present *Vasina* case the Courts have increasingly held manufacturers liable without proof of negligence.²⁶

D. Available Financial Protection

While the government contractor or supplier occupies a very exposed position in the event of a catastrophe; at the same time, members of the public injured by that same catastrophic accident have an uncertain remedy. This uncertainty is increased by the fact that a contractor may not offer protection to the public because reasonably priced insurance protection is limited in amount and does not approach the amount of coverage required to protect a company against a very large incident where claims in the aggregate might exceed \$500 million. Not many companies would be able to survive such a liability, and the injured public would, in such event, not be able to collect full, if any damages.

Whatever the maximum amount of insurance obtainable by the very largest companies today may be, it is evident that it falls far below the potential liability of companies engaged in hazardous government programs. This is made even more obvious by the size of jury verdicts in recent personal injury cases.

²²644 F.2d 112 (2nd Cir. 1981).

²³See also *Foster v. Day and Zimmerman*, 502 F.2d 867 (8th Cir., 1974); *Bar v. Brezina Construction Co.*, 464 F.2d 1141 (10th Cir., 1972).

²⁴161 A.2d 69 (N.J. Sup. Ct. 1963).

²⁵377 P.2d 897, 27 Cal. Rptr. 697 (1963).

²⁶See also *Goldberg v. Kollsman Instrument Corp.*, 12 N.Y. 2d 432 (1963); Prosser, *The Fall of the Citadel*, 50 Minn. L. Rev. 291 (1966), *Restatement (Second) Torts* § 402 A (1966).

Contractors are reluctant to engage in work for the government unless they are protected against the risks of damages and liability resulting from the work to be performed which is beyond the coverage of reasonably available insurance.

In many instances, it is impossible, to induce contractors to perform this type of work unless the United States agrees to hold them harmless for damages and liability beyond the level of their insurance coverage.

E. Current Statutory Framework

The problem discussed in the preceding sections was, of course, the primary reason why the Price-Anderson amendments to the Atomic Energy Act were made applicable to AEC (now Department of Energy) contractors and subcontractors as well as to licensees. The Price-Anderson provisions,²⁷ however, are limited to nuclear incidents arising out of, or connected with, contractual activities or joint programs of the Department of Energy.

1. "Research and Development" Indemnity Authority of DOD

The Department of Defense has had available to it since 1952 authority to indemnify its research and development contractors against claims arising out of direct performance of their contracts which result from risks defined in the contracts as "unusually hazardous".²⁸ This statutory authority embraces only the military agencies, and thus cannot be utilized for hazardous programs conducted by other agencies of the government. It has also proved troublesome in other respects. It extends only to research and development contracts, and not to follow-on production contracts, which has created problems of definition and application. The indemnification authority also depends on negotiation of both its applicability and the specific terms of indemnification coverage. This has led to inconsistent treatment among the different departments and even within the same department. This authority (Section 2354) also contains ambiguities both with regard to the limiting words that claims must "arise out of the direct performance of the contract" and with regard to the coverage of lower tier subcontractors and suppliers.

Moreover, there are no provisions comparable to the 1966 amendments to the Price-Anderson Act designed to provide prompt and assured compensation to injured members of the public.

2. Public Law 85-804 and the Reluctance of Agencies to Use It

The ambiguities and shortcomings of 10 U.S.C. § 2354 led the DOD to seek other legislative authority under which to provide contractors engaged in hazardous programs with broader indemnity. Initially, the Department utilized special authority which it

²⁷See *supra* note 2, at § 170 (d).

²⁸10 U.S.C. § 2354 (1975).

retained under the First War Powers Act. The law was eventually succeeded in 1958 by Public Law 85-804.²⁹

While the statute does not explicitly deal with indemnification of contractors, its legislative history clearly supports its use for this purpose. The Senate Committee on the Judiciary in its report on this legislation discussed the indemnity authority provided in Public Law 85-804 in these terms:

In addition to these two specifically authorized uses of this authority, the Departments authorized to use this authority have heretofore utilized it as the basis for the making of indemnity payments under certain contracts. The need for indemnity clauses in most cases arises from the advent of nuclear power and the use of highly volatile fuels in the missile program. The magnitude of the risks involved under procurement contracts in these areas have rendered commercial insurance either unavailable or limited in coverage. At the present time, military departments have specific authority to indemnify contractors who are engaged in hazardous research and development, but this authority does not extend to production contracts (10 U.S.C. 2354). Nevertheless, production of which may include a substantial element of risk, giving rise to the possibility of an enormous amount of claims. It is, therefore, the position of the military departments that to the extent that commercial insurance is unavailable, the risk of loss in such a case should be borne by the United States. The Atomic Energy Commission now possesses similar indemnification authority by virtue of the enactment of the Price-Anderson Act last year (Public Law 85-177).³⁰

Furthermore, the Department of Justice has stated: "The legislative history of Public Law 85-804 thus indicates clearly that one of the legislative purposes, if not the most important one, which prompted the enactment of the legislation was the desire to enable contracting officers. . . to indemnify their contractors against uninsurable risks. . .".³¹ The Memorandum went on to say that "agencies are presently vested with the power to enter into unlimited indemnity agreements"³² and that such agreements entered into under Public Law 85-804 authority "are consistent with the fiscal provisions contained in the Constitution and the statutes."³³

Executive Order 10789, as amended, implements Public Law 85-804 and deals with indemnification agreements specifically stating that the risks covered in such agreements must be defined as "unusually hazardous or nuclear in nature", for which commercial insurance is not reasonably obtainable. Actions taken, by the various heads of agencies provided the authority contained in Public Law 85-804, must facilitate the national

²⁹50 U.S.C. §§ 1431-35 (West Supp. 1981).

³⁰Sen. Rep. No. 2281 (August 9, 1958).

³¹Letter and attached Memorandum to writer, then General Counsel, National Aeronautics and Space Administration, from Acting Assistant Attorney General, Office of Legal Counsel, Department of Justice (August 11, 1967).

³²*Id.* at 20.

³³*Id.* at 5.

defense.³⁴ There is no uniform application of Public Law 85-804 authority, however, and some agencies are reluctant to use what they now have.

Some of the departments and agencies, such as military departments of the DOD, use the authority to indemnify contractors. Other departments and agencies³⁵ do not utilize, or are reluctant to use, this authority primarily because they do not want to characterize the work being performed under the contracts as "unusually hazardous". The designation of the work as "unusually hazardous" is required by the implementing Executive Orders.

NASA does not utilize the authority for its contracts. Similarly, the Federal Aviation Agency of the DOT, has been unwilling to utilize this authority to indemnify contractors in connection with its air traffic and navigation activities.

Because of the similar reluctance on the part of the Federal Railroad Administration, DOT, to employ this authority, the Congress recently passed and the President signed into law H.R. 12933, *Making Appropriations for the Department of Transportation and Related Agencies* which contains the following language: "... notwithstanding any other provisions of law, the provisions of Public Law 85-804 shall apply to the Northeast Corridor Improvement Program".³⁶ The Conference Report accompanying H.R. 12933 noted: "This provision will permit indemnification under the provisions of Public Law 85-804 without the necessity of any determination by the Secretary [of Transportation of unusually hazardous activity] and without referral to our consideration for any such agreement by either House of Congress."

It should be noted that the Intradepartmental Task Force in its recent report (January, 1982) discussed above, proposes an amendment to Executive Order 10789, as amended, which would permit for the first time an agency to authorize the indemnification of a contractor if the head of the agency determines that the risks under the particular contract give rise to the possibility of catastrophic losses. Catastrophic losses are defined as "losses which the particular contractor cannot reasonably protect against through private insurance or self-insurance by the payment of a reasonable premium or the establishment of or reliance on a reasonable self-insurance reserve."³⁷ If adopted, this would obviate the requirement for agencies to describe their activities as "unusually hazardous." Furthermore, the Task Force Report states:

[W]e believe that the heads of these Government agencies may, pursuant to 50 U.S.C. 1431, broadly exercise their delegated authority to provide for the indemnification of a contractor whenever . . . he deems that such an action would facilitate the national defense. . . . Where a contract may have a substantial connection with and facilitate the national health, safety, welfare or economy, we believe the head of an Executive Agency may determine based on the particular circumstances that the agreement to indemnify that contractor would facilitate the national defense.³⁸

³⁴50 U.S.C. § 1431 (West Supp. & annot. notes).

³⁵*I.e.*, Department of Transportation (DOT) and NASA.

³⁶45 U.S.C. § 851 (West Supp. & Annot. notes).

³⁷*Supra* note 14 at 14.

³⁸*Id.* at 13.

F. Existing Statutory Authority is Inadequate to Serve Contractors or to Protect the Public

The Columbia report, after a comprehensive analysis of the statutory and case law, arrived at the following conclusion: "We have found that under present law there is no assurance of compensation to the victims of a catastrophic accident, at the same time contractors are exposed to the danger of devastating liabilities with no sure means of guarding against them."³⁹

This conclusion remains valid today in spite of certain developments since the issuance of the report in 1963.

The inadequacies of present statutory authority can be summarized briefly:

First, there is no clear Congressional policy encouraging widespread uniform use of the indemnity power, comparable to that of the Price-Anderson Act. Because they do not operate within a clear framework of Congressional policy, agencies such as the military departments have treated indemnity as a matter of contract-by-contract bargaining. As a result, the use of 10 U.S.C. sec. 2354 and of Public Law 85-804 has been sporadic, limited, and inconsistent.

Second, because the use of the indemnity authority under existing law is a matter of contract-by-contract bargaining, it is next to impossible for subcontractors and suppliers to obtain indemnity protection. The technique of the Price-Anderson Act which automatically extends the coverage of prime contract indemnities to all subcontractors and suppliers of the project, has not been incorporated in the provisions of 10 U.S.C. sec. 2354 or Public Law 85-804.

Third, some agencies that conduct programs of a hazardous character do not avail themselves of the existing authority provided to them.

Fourth, neither the military research and development statute nor Public Law 85-804 has any provision for interim relief for the injured public. Unlike the Price-Anderson Act, neither statute provides for waiver of defenses, which means that the injured public has a far less certain remedy under these statutes.

Fifth, both statutes are silent with regard to the matter of contractually required financial protection. This places the important policy question as to required insurance entirely up to the decision of each individual government agency. Such a situation invites inconsistent treatment as among the various agencies.

G. A Legislative Solution is Needed

The salient elements of a statute that would provide effective protection against the risk of catastrophic accidents in government programs have largely been anticipated by the foregoing discussion of existing statutory authority and its inadequacies. However, certain of these main points are restated below to the extent they serve as the framework of the basic provisions of a statute which the writer proposes should be enacted. Most have already been drafted and exist in the form of the Price-Anderson Act. Any new

³⁹*Supra* note 5 at 71.

statute should be fitted into this mold in order to assure a consistent legislative approach that has been carefully formulated and tested by experience.

First, the new statute should be government-wide in scope and cover catastrophic accidents but, excluding the incidents covered by the Price-Anderson Act.

Second, the statute should only cover governmental programs conducted under contract or grant. The statutory remedies would be triggered by a Presidential determination that an incident which has occurred arose out of such a program and might involve in the aggregate claims exceeding \$60 million. This mechanism of Presidential determination would avoid the necessity of any *a priori* definition of what constitutes an "unusual hazard."

Third, the statute should be made as self-implementing as possible. To do this, the indemnities should flow directly from the statute and should cover all tiers of contractors and suppliers. The indemnities should also cover any other persons who might be liable, except where the incident occurs outside the United States. Providing indemnity by direct operation of law rather than by contract is necessary because of the complex contractual structure typically involved in DOD and NASA programs.

Fourth, the role of insurance and private financial protection in government programs should be dealt with in more detail than is the case in the Price-Anderson Act. Private insurance has long played a significant role in connection with DOD and NASA contracts. Many DOD and NASA contractors have carried general liability policies covering both civilian and government activities. The cost of such insurance is reimbursable under current DOD and NASA procurement policies where the coverage is required or approved by the contracting officer. Where a government contractor has been carrying such insurance - particularly for the total of its activities both commercial and government - it has long been NASA and DOD practice to approve the insurance for cost reimbursement purposes. As a result, a substantial portion of the cost of insurance currently maintained by government contractors is reimbursed by the government.

Insurance plays a vital role in assuring that the contractor will be diligent and use reasonable care in his contract performance. As a condition for indemnity coverage, contractors should be required to obtain insurance considering its availability, cost, and terms. What is reasonably available insurance must be determined on the factors to be considered when a contractor seeks the particular coverage.

Fifth, indemnity coverage should be for losses which a contractor cannot reasonably protect against through private insurance by the payment of a reasonable premium or the establishment of or reliance on a reasonable self-insurance reserve.

H. Conclusion

A statute following the above general model and incorporating the above features, would accord closely with the carefully considered conclusions of the 1963 Columbia report and the recommendations of the Procurement Commission. It is also believed that such a statute would present a practical approach and one that should be acceptable to the various interests which would be most affected - the government agencies, the industrial firms engaged in such hazardous programs, and the insurance industry. Such a statute would also provide adequate and effective protection to the public in response to the challenging conclusion of the Columbia report that "[t]he possibility of devastating accidents is real and must be faced."

SOME OBSERVATIONS ON THE EFFORTS
TO PREVENT A MILITARY ESCALATION IN OUTER SPACE.

*D. Goedhuis**

Introduction

When considering the present situation in outer space, the first thing to be noticed is that two of every three launchings of spacecraft serve military purposes. Military dependence on spacecraft is great and growing to a considerable extent. Although some efforts were made to arrive at a complete demilitarization in outer space in the first years after the launching of the first spacecraft, it soon was recognized that, as long as the world community was fragmented in sovereign States with conflicting interests, military competition was just as inevitable in outer space as it had been on land, sea and in the air. The world community was therefore faced with the dauntingly complex task of how to *contain* this competition at its most dangerous points and how to extend the rule of law governing international space activities.

As will be seen below, it is the development of anti-satellite weapons by the Soviet Union as well as by the United States, which has led to a clearer awareness of the dangers of a military escalation in space.¹ So far, outer space has remained free from "kill mechanisms" and the most important military applications in outer space have comprised the use of reconnaissance satellites which have provided valuable data on the course of military operations. In this context attention should be drawn to the increase in the satellite launchings during periods of conflict, such as those between China and the Soviet Union in 1969, between India and Pakistan in 1971, between the Arab States and Israel in 1973, between Greece and Turkey over Cyprus and between Iran and Iraq in 1980.

It should be recognized that the use of reconnaissance satellites offers one considerable advantage, namely that the very extensive information obtained by these satellites makes a surprise attack much more difficult.² This advantage would obviously

*Professor Emeritus, Leyden University; Chairman of Space Law Committee, International Law Association. The views expressed herein are those of the author and are not necessarily those of any organization of which he is a member.

¹The Soviets have tested satellites that intercept other satellites. It was reported in May 1980 that the C.I.A. believed that the Soviets had deployed a land based anti-satellite laser. The U.S. has plans to test a ground-based anti-satellite system in which a miniature homing intercept vehicle would be carried in the vicinity of a low altitude target satellite by means of a two-stage air-launched rocket, then home in on the infra-red signature of the target to collide with and destroy it. See T. H. Karas, *Implications of Space Technology for Strategic Nuclear Competition*, Occasional Paper 25 of the Stanley Foundation, Iowa (July, 1981).

²As Solly Zuckerman, however, rightly remarked "Space photographs on their own cannot be expected to generate a sufficient sense of security. Are those launchers that can be seen in such and such a place in a state of readiness? Or are they not? Photographs will not tell. Space cameras cannot see into factories where missiles are made, or into the sheds of ship-yards." See Collins, *Nuclear Illusion and Reality* 130 (1982).

be lost should States develop the possibility of intercepting and destroying them. However, as only the United States and the Soviet Union possess at present the capabilities of launching reconnaissance satellites, many non-space countries are concerned about the acquisition by the two main space powers of military information over their territories. As will be seen below, this concern has led to proposals aimed at the creation of an international satellite monitoring agency.

A. Present limitation on the use of arms in outer space

Up till now, six treaties have been concluded which contain provisions aimed at some form of arms control in outer space.

First, the Treaty Banning Nuclear Weapon Tests in the Atmosphere in Outer Space and Under Water³ which, in art. I, mentions outer space as one of the environments where such tests are prohibited.

Second, the Treaty on Principles Governing the Activities of States in the Exploration and the Use of Outer Space, including the Moon and other Celestial Bodies⁴ which can be considered as the present Charter of Outer Space, and which provides in art. IV:

States Parties to the Treaty undertake not to place in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner. The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the moon and other celestial bodies shall also not be prohibited.

Third, the Accident Measures Agreement⁵ in conjunction with the Prevention of Nuclear War Agreement⁶, which together oblige the Soviet Union and the United States to refrain from interference with the attack early-warning systems of either side, would include satellites that are components of such systems.

³Treaty banning nuclear weapon tests in the atmosphere, in outer space and under water, August 5, 1963, [1963] 14 UST 1313, TIAS 5433, 480 UNTS 43 (effective Oct. 10, 1963).

⁴Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (hereinafter "Outer Space Treaty"), Jan. 27, 1967, [1967] 18 U.S.T. 2410, T.I.A.S. 6347, 610 U.N.T.S. 205 (effective Oct. 10, 1967).

⁵Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War, September 30, 1971, [1972] 22 UST 1590, TIAS 7186, 807 UNTS 57 (effective Sept. 30, 1971).

⁶Agreement on the Prevention of Nuclear War, June 22, 1973, [1973] 24 UST 1478, TIAS 7654 (effective June 22, 1973).

Fourth, the Treaty between the United States of America and the USSR on the Limitation of Anti-Ballistic Missile Systems⁷ which in art. IV prohibits the development, testing, or deployment of ABM systems which are sea-based, air-based, *space-based*, or mobile land-based.

Fifth, the Interim Agreement between the U.S.A. and the U.S.S.R. on Certain Measures with Respect to the Limitation of Strategic Arms⁸ which provides in art. V (2) that "each party undertakes not to interfere with the national technical means of verification of the other party operating in accordance with par. 1 of this Article". By this Article the use of reconnaissance satellites in outer space is formally legalized.

Six, the Agreement Governing the Activities of States on the Moon and other Celestial Bodies⁹. Art. III of this Agreement provides:

1. The moon shall be used by all States Parties exclusively for peaceful purposes.
2. Any threat or use of force or any other hostile act or threat of hostile act on the moon is prohibited. It is likewise prohibited to use the moon in order to commit any such act or to engage in any such threat in relation to the earth, the moon, spacecraft, the personnel of spacecraft or man-made space objects.
3. States Parties shall not place in orbit around or other trajectory to or around the moon objects carrying nuclear weapons or any other kinds of weapons of mass destruction or place or use such weapons on or in the moon.
4. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on the moon shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration and use of the moon shall also not be prohibited.

Reference should also be made to the Convention on Registration of Objects launched in Outer Space¹⁰ which—although it does not contain any specific arms control measures—could, provided it would be interpreted in the right way, play a confidence-building role in the military sphere. Art. IV of this Convention requires States launching space objects to provide the Secretary-General of the United Nations information on a number of data, including "the general function of the space object". In this context, it should be noted however that, notwithstanding the fact that more than 70% of American and Soviet satellites launched so far serve military purposes, not one of these launchings registered has been described as having a *military* function.

⁷Treaty on the Limitation of Anti-ballistic Missile Systems, May 26, 1972, [1973], 23 UST 3435, TIAS 7503 (effective Oct. 3, 1972).

⁸Interim Agreement on Certain Measures With Respect to the Limitation of Strategic Offensive Arms With Protocol, May 26, 1972, [1972] TIAS 7504 (effective Oct. 3, 1972) (no longer in force).

⁹Draft Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, U.N. GAOR, 34th Sess., Suppl. No. 20 (Doc. A/34/20).

¹⁰Convention on Registration of Objects Launched Into Outer Space (hereinafter "Registration Convention"), January 14, 1975, [1978] U.S.T. 695, T.I.A.S. 8480 (effective Sept. 15, 1976).

B. *The divergencies on the interpretation of the meaning and the content of the main principles contained in these Treaties*

The scope of the present article does not permit me to give a survey of the many controversial opinions on the extent to which the rules so far adopted have constrained the military uses in outer space. Attention should be drawn however to some statements made in the last few years, which demonstrate the present misconceptions regarding the legal content of the present most important rules aimed at a limitation of these uses.

In the first place it has been asserted that under the terms of the Outer Space Treaty the *whole* of outer space has been established as the "common heritage of mankind".¹¹ In an article published in the *Columbia Journal of Transnational Law*, the present writer argued that this contention should be rejected.¹² Although the discussions both in the Law of the Sea Conference and in the U.N. Committee on the Peaceful Uses of Outer Space (COPUOS) have shown that the import of this term is far from agreed upon, one of its basic, generally recognized, implications is that the area to which the concept applies should be dedicated to exclusively peaceful purposes and, contrary to the opinion of some writers who have asserted that under the terms of the Outer Space Treaty of 1967 all military activities in outer space are prohibited,¹³ art. IV (2) of this Treaty makes it abundantly clear that this medium is only *partially* demilitarized. It is only regarding the moon and other celestial bodies that the principle of their use for "exclusively peaceful purposes" has been accepted.

In this context the crucial question arises whether this provision means that the moon is completely demilitarized. Since the conclusion of the Outer Space Treaty the interpretation of the term "peaceful purposes" has given rise to fundamental controversies. In the limited context of this article no critical analysis of the wide-ranging views on the meaning of this term can be given. However, as a great lack of awareness appears to exist on the harmful consequences of the conflicting views, some comments on these consequences may be made.

Two fundamentally different interpretations of the term "peaceful purposes" have come to the fore. Under one, this term means "non-military", while under the other it means "non-aggressive". The latter interpretation has been and is being followed by the United States.¹⁴

¹¹See Committee on Peaceful Use of Outer Space (COPUOS), U.N. Doc. A/AC.105/C.2/SR 314, at 4 (1979) (Statement by Swedish Delegate); U.N. Doc. A/AC.105/PV. 197, at 6 (1979) (Statement by Chilean Delegate).

¹²See D. Goedhuis, *Some Recent Trends in the Interpretation and the Implementation of the Rules of International Space Law*, 19 Colum. J. Transnat'l L. 218 *et. seq.* (1981). See also the observations made by S. Gorove, *Studies in Space Law: Its Challenges and Prospects* 65 ff. (1977) and those made by C. Christol, *The Common Heritage of Mankind Provision in the 1979 Agreement Governing the Activities of States on the Moon*, 14 Int. Law. 184 *et seq.* (1980).

¹³See, e.g., M. Marcoff, *Traité de Droit International Public de l'espace* 357, 370, 679 (Fribourg, 1973).

¹⁴See COPUOS, U.N. Doc. A/AC.105/PV 203, at 22 (1979) (Statement of American Delegate, S. N. Hosenball).

In an article published in 1968 the present writer drew attention to the damaging consequences of this interpretation and suggested that during the deliberations in the Outer Space Committee of the U.N., prior to the conclusion of the Space Treaty, the great majority of delegates insisted that the term "peaceful" should be interpreted in the sense of "non-military".¹⁵ The consequences of the former interpretation become particularly apparent in the context of the Moon Treaty of 1979.

Art. III (4) of this treaty, reiterating art. IV (2) of the Space Treaty, provides that the use of military personnel for scientific research or for *any other peaceful purposes* shall not be prohibited and that the use of any equipment or facility necessary for the peaceful exploration of the moon and other celestial bodies shall also not be prohibited. By virtue of art. IX of the Moon Treaty States may establish manned and unmanned stations on the Moon. As the use of military personnel on these stations for *peaceful purposes* is not prohibited, the interpretation of this term as "non-aggressive" would mean that the stations could be used for all types of military purposes so long as they could not be considered aggressive. But if one would follow this line of reasoning one would necessarily come into conflict with the provision laid down in the first sentence of art. III (4) by which the establishment of military bases has been forbidden.

Another example may be given of the dissensions which would result from permitting the use of the moon for non-aggressive purposes. It has been submitted that since defensive and *deterrent* capabilities serve the cause of peace, it is only when such devices are *intentionally* used for aggressive purposes that they lose their peaceful status. As all arms have deterrent capabilities, States—on the basis of such a contention—would be able to claim that any arms on the moon would constitute a use of the moon for peaceful purposes.

What about the position of the Soviet Union on this issue? In the treatise "International Space Law", edited by Professor A.S. Piradov, who acted as Soviet representative in several meetings of COPUOS, the following statement was made: "The principle of the partial demilitarization of outer space and the *total demilitarization of celestial bodies* (emphasis supplied) is formulated in art. IV of the Space Treaty."¹⁶ Another authoritative Soviet expert on space law, Professor G.P. Zhukov, in his lectures to the "Académie de Droit International" in 1978, remarked in the same sense: "Le Traité de l'Espace de 1967 établit pour la lune et les autres corps célestes *le régime de démilitarization complète*."¹⁷

From these statements the conclusion might be drawn that an important gap exists between the position of the two major space powers on this issue, the Soviet Union interpreting the term "peaceful" as "non-military".

¹⁵See D. Goedhuis, *An Evaluation of the Leading Principles of the Treaty on Outer Space* of 27th January 1967, 15 Neth. Int'l L. Rev. 17 at 25 (1968); See also M. Lachs, *The International Law of Outer Space*, Recueil des Cours de l'Académie de Droit International 90 (1964, III).

¹⁶See A. S. Piradov, *International Space Law*, 91 (Moscow, 1976).

¹⁷See G. P. Zhukov, *Tendances Contemporaines du Développement de Droit Spatial International*, Recueil des Cours de l'Académie de Droit International 257 (1978, III).

However, as mentioned above, not one of the launchings of Soviet satellites has been described in the Register maintained by the U.N. Secretary-General, as having a *military* function. The Soviet Union, like the United States, pretends that all its satellites serve peaceful purposes, apparently considering that none of their present military activities can be considered as "non-peaceful".

The second question which arises in the context of art. IV (2) of the Space Treaty and art. III (3) of the Moon Treaty, concerns the interpretation of the term "weapons of mass destruction". This notion, which also appears in the Treaty on the Prohibitions of the Emplacement of Nuclear Weapons and other Weapons of Mass Destruction on the Seabed, the Ocean Floor and the Subsoil Thereof (which was "commended" by the U.N. General Assembly on 7 December 1970), was discussed in the Conference of the Committee on Disarmament. At this Conference it became clear that the powers had a certain understanding about what was covered, including biological, chemical and radiation weapons, but speculation was extended to lasers, weather modifiers and anti-satellite devices.¹⁸

As the meaning and the content of this prohibition is elusive and may lead to disputes, it is important—especially in view of the uncertainty whether the emplacement of anti-satellite devices in outer space is covered by the term—that an attempt be made to clarify precisely what the notion implies. Insofar as the suggestion is concerned that antisatellite weapons may be considered to be included in the prohibition, the negotiations between the United States and the Soviet Union on this matter¹⁹ indicate that they reject the view that under the terms either of the Space Treaty or of the Moon Treaty, the emplacement of anti-satellite devices in outer space is prohibited. From the fact that, during the discussions in the last Session of COPUOS, a considerable number of the delegates made a strong appeal to the two main Space Powers to resume without delay their negotiations on a ban of anti-satellite weapons, the conclusion can be drawn that they also consider the term in question as not covering the emplacement in outer space of such devices. As to the question whether laser weapons should be considered to be covered by the term "weapons of mass destruction", some observations will be made below.

On the basis of the above considerations, it is submitted that the need to clarify the meaning and the content of the two terms referred to, can hardly be denied.²⁰

C. Present efforts to prevent an escalation of military competition in outer space

a) Negotiations between the United States and the Soviet Union on the control of anti-satellite weapons (ASAT's) in outer space

President Carter, concerned with the crucial military and political implications of

¹⁸See D. P. O'Connell, *The Influence of Law on Sea Power* 156 (1975).

¹⁹See F. Asbeck, *The Militarization of Space*, Armament and Disarmament Information Unit No. 2 (Apr.-May, 1980).

²⁰See S. Gorove *op. cit.* *supra* note 12.

the programs designed to develop a capability to interfere with reconnaissance satellites and other military space systems, proposed that the Soviet Union enter into negotiations aimed at maintaining outer space free from anti-satellite systems. The Soviet Union having responded favorably to this proposal, a first round of bilateral talks was held in Helsinki in June 1978, followed by discussions in Berne in February 1979. Further discussions took place in Vienna in April 1979 just prior to the SALT II summit.

Little information about these talks is available. Two main stumbling blocks appear to have emerged.

First, the Soviet Union wanted only satellites "owned" by the United States and the Soviet Union to be immune from interference, while the United States wanted to cover all satellites in which the other side "has an interest", thus extending protection to NATO spacecraft and other allies. Second, the Soviet Union wanted to exempt from protection any satellites performing "hostile and pernicious acts" that would infringe on national sovereignty, whereas the United States proposed to protect all kinds of spacecraft. In this context the question arises whether the Soviet proposal implies that direct broadcasting or remote sensing satellites which the Soviet Union *might* consider to infringe upon national sovereignty would *not* be protected.

The prospects of a resumption of negotiations on this issue are considered below.

b. *The Resolution taken by the Special Session of the U.N. General Assembly devoted to disarmament.*

On the initiative of the Italian Government this special session adopted the following resolution:

"In order to prevent an arms race in outer space, further measures should be taken and appropriate international negotiations held, in accordance with the spirit of the Treaty on Principles Governing the Activities of States in the Exploration and use of Outer Space, including the Moon and other Celestial Bodies".²¹

As a follow-up to this resolution, the Italian Government, on March 26, 1979, introduced in the Committee on Disarmament in Geneva a proposal for the elaboration of an additional protocol to the Space Treaty. The Italian delegate, Mr. La Rocca, in the 193rd meeting of COPUOS, specified²² that the purpose of the proposal was to ensure that outer space, including the moon and other celestial bodies, be used only for peaceful purposes and that States refrain from engaging in, encouraging or authorizing, directly or indirectly or in any way participating in any measure of a military or other hostile nature such as the establishment of military bases, installations or fortifications, the stationing of devices having the same effect, the launching into earth orbit or beyond of objects carrying weapons of mass destruction or any other type of devices

²¹See G. A. Res. S-10/2, par. 80.

²²See U.N. Doc. CD/9 (1979).

designed for offensive purposes, the conduct of military manoeuvres as well as the testing of any type of weapons.

When one analyses this proposal, the following question arises. On the one hand the proposal is directed towards a prohibition of *any* measure of a military or other hostile nature in the use of outer space including the moon and other celestial bodies but on the other hand the proposal, in its second part, refers to a prohibition of launching types of devices for offensive purposes. Does this mean that the launching in orbit or the stationing in outer space, including the moon, of devices for *defensive* purposes would be allowed? Does this not contradict the proposal to prohibit any measure of a military nature? In his explanation on the proposal, the Italian delegate stated that "of course, the use of reconnaissance, surveillance and communication satellites and, indeed, of any space system which would reinforce strategic stability by ensuring, *inter alia*, the verification of disarmament and other limitation agreements will not be prejudiced". Does the statement that any space system reinforcing strategic stability imply that by virtue of the proposal, measures in outer space, including the moon, which could be considered as reinforcing such stability would be permitted? Again one is faced with the crucial questions arising in the interpretation of the term "peaceful purposes", questions to which neither the Outer Space Treaty nor the Moon Treaty has given an answer.

c. The French proposal to establish an International Satellite Monitoring Agency (ISMA)

At the first Special Session of the U.N. General Assembly devoted to disarmament in May 1979, the French delegation, convinced of the need for establishing a satellite monitoring agency which could make an important contribution to the verification of arms control agreements, proposed the establishment of ISMA. At its 33rd session, the General Assembly requested the Secretary-General to undertake, with the assistance of qualified governmental experts, an in-depth study of the technical, legal and financial implications of establishing such an agency. In pursuance of this Resolution, the Secretary-General appointed a group of experts which prepared a comprehensive report in February 1981.²³

In considering the prospects of arriving at a universal agreement on the establishment of such an agency, it should be noted that whereas a considerable number of States were convinced of the need of creating an international convention on this issue, the two main Space Powers, the United States and the Soviet Union, objecting to the institution of an international monitoring agency, did not participate in the Government Expert Committee. Some comments on the apparent reasons for their opposition and on the question as to whether this opposition is likely to persist, are given below.

²³See U.N. Rep. SM/2-GE.81-61130 (April 19, 1981). On this issue, as well as on several other aspects of limiting the military uses of outer space, important discussions took place at a Symposium of the "Stockholm International Peace Research Institute" (SIPRI), 17-20 November 1981. The papers presented in this Symposium will shortly be published by the Institute.

d. *The Soviet Proposal to ban deployment of all types of weapons in outer space*

On August 10, 1981, the Soviet Foreign Minister, Andrei Gromyko, addressed a letter to the U.N. Secretary General Waldheim containing the following paragraph: "The Soviet Union believes that outer space should always remain unsullied and free from any weapons and should not become a new arena for armsrace or a source of strained relations between States."

Attached to this letter the Soviet Union submitted a Draft Treaty on the Prohibition of the Stationing of Weapons of any kind in Outer Space (See Annex I). This draft was considered by the 34th General Assembly of the U.N. and, although the urgent need to prevent an arms race in outer space was generally recognized, many States maintained that the draft in several respects fell short of satisfying this need. Attention was drawn to the following flaws in the Draft.

First, the proposal did not cover anti-satellite weapons that could strike their target directly from the ground. Second, the text said nothing about dismantling anti-satellite weapons which had already been acquired and deployed. Third, the Draft proposed that, to assure compliance with its provisions, each participating Nation should use the *national* technical control facilities at its disposal. At present only the United States and the Soviet Union possess the technology to perform this task, it is difficult to visualize that many nations would become parties to a treaty of this type unless an international verification agency (as proposed by France) was created.²⁴

The discussions of the General Assembly finally led to the adoption of a resolution entitled "Prevention of an Arms Race in Outer Space" (See Annex II) on which the following comments may be made.

First, the proposal did not cover anti-satellite weapons that could strike their target directly from the ground. Second, the text said nothing about dismantling anti-satellite weapons which had already been acquired and deployed. Third, the Draft proposed that, to assure compliance with its provisions, each participating Nation should use the *national* technical control facilities at its disposal. At present only the United States and the Soviet Union possess the technology to perform this task, it is difficult to visualize that many nations would become parties to a treaty of this type unless an international verification agency (as proposed by France) was created.

The discussions of the General Assembly finally led to the adoption of a resolution entitled "Prevention of an Arms Race in Outer Space" (See Annex II) on which the following comments may be made.

I. *The question of the most appropriate forum to study the problem of devising further arms control measures in outer space*

During the Twenty-Fourth Session of COPUOS held in New York from June 22 through July 2, 1981, the delegates from Sweden, Canada, Romania, Brazil, Chili, Austria, Egypt and India expressed the opinion that it would be the duty and

²⁴Cf. the observations made in the Report of a Space Group, chaired by Professor K. Tsipis and published in the Stanley Foundations' "Strategy for Peace Conference," October 16-18, 1981.

responsibility of COPUOS to prevent an arms race. The American delegate, however, stated that since arms control in outer space was inseparable from the complex question of security on Earth and arms control in general, the issue went well beyond the expertise and mandate of COPUOS.²⁵ Point 3 of the operative part of the U.N. Resolution shows that the American view prevailed. Instead of COPUOS, the Committee on Disarmament was requested to consider the question of negotiating effective and verifiable agreements aimed at preventing an arms race in outer space.

II. *The negotiation of an agreement to prohibit anti-satellite systems*

By virtue of Point 4 of the U.N. Resolution the General Assembly requested the Committee on Disarmament to consider as a matter of priority the question of negotiating an effective and verifiable agreement containing a prohibition against anti-satellite systems.

Because of the present stage of arms development in outer space, the problem of anti-satellite systems must be considered as the most paramount issue. The consensus to treat this issue as a matter of priority should be welcomed. However, reference was made above to the talks between the United States and the Soviet Union aimed at arriving at a ban of these weapons. Although these two powers are at present the only ones who have ASAT weapons programs, it can be assumed that by the end of this decade, a number of other States may have the capability of deploying such weapons. Moreover, it is clear that *all* States have an interest in the regulation of weapons competition in this field.

Nevertheless, there are strong arguments in favour of a resumption of the talks between the United States and the Soviet Union, at present the two states most directly affected by the ASATS' programs. These talks could proceed parallel with the negotiations in the Committee on Disarmament.²⁶

III. *The verification problem*

Under both Point 3 and Point 4 of the U.N. Resolution, the General Assembly urges the need of negotiating *verifiable* agreements aimed at preventing an arms race in outer space.

As mentioned above, the Soviet Draft Treaty contains the proposal that to assure compliance with a ban to deploy all weapons in outer space, States shall use the *national* technical control facilities at their disposal. Such a provision could not be expected to receive the support of all States which at present lack such facilities.

But what are the prospects of the Committee on Disarmament agreeing on some form of verification system? The opposition of both the United States and the Soviet Union to the creation of an international satellite monitoring agency, as proposed by France, demonstrates the obstacles to be overcome before an agreement on a verification

²⁵See U.N. Doc. A/AC.105/PV220 (1981).

²⁶*Id.*

system can be reached. However, from the fact that both Space Powers accepted the U.N. Resolution affirming the need for *verifiable* agreements aimed at a prevention of an arms race in outer space, it may be inferred that both powers recognize an interest in international regulation.

Their opposition to the creation of ISMA apparently was based *primarily* on the possible risks involved in the transfer to and contro¹ of the data gathered by their military reconnaissance satellites to an international organization.

One of the reasons which has led the United States and the Soviet Union to agree *in principle* to some verification system of a ban on anti-satellite weapons may be that they both realize that their present monopoly of anti-satellite capabilities will not continue. It is expected that by the end of the present decade France, the United Kingdom, India, Japan and China will possess such capabilities.

The question arises as to what *kind* of verification would offer the best prospects of being universally acceptable. In this context it may be suggested that the verification of the *deployment* of anti-satellite weapons, without an on-site inspection which the Soviet Union has always refused, would be practically impossible. However, a ban on the operational *testing* of such weapons *would* be verifiable. A negotiated verifiable ban on such testing would seem the best approach to be followed by the Committee on Disarmament.²⁷

Concluding Remarks

On the basis of the above observations some tentative conclusions may be drawn.

The awareness among politicians and space experts of the dangers of escalation of military competition in space has been growing considerably in the last few years. As previously mentioned, it is generally recognized that the present most important issue of arms control in outer space concerns the prohibition of the use of anti-satellite weapons.

Attention was drawn to the provision contained in the U.N. Resolution on the Preventing of an Arms Race in Outer Space in which the Committee on Disarmament was requested to consider, as a matter of priority, the question of negotiating an agreement to prohibit anti-satellite systems. In this context, although an approach aimed at a solution of this problem is indispensable, a resumption of the bilateral talks between the United States and the Soviet Union on banning anti-satellite weapons would be appropriate as a complimentary negotiation to the discussion in the Committee on Disarmament. In this context attention may be drawn to the following observation regarding negotiations on arms limitations. Barry M. Blechman stated that "there clearly must be a shift in emphasis from U.S.-Soviet negotiations to multilateral forums. There has been a tendency to seek U.S.-Soviet agreement as a first step, believing that once that nut has been cracked, wider agreement would follow. This has not only placed undue burdens on U.S.-Soviet relations, but has nurtured the fears of those who see arms control as an expression of U.S.-Soviet Condominium thereby aggravating the political problems already surrounding the negotiations."²⁸

²⁷In the same sense, the Report referred to *supra* note 24.

²⁸See, "Do Negotiated Arms Limitations Have a Future?", *Foreign Affairs*, Fall 1980 at 124.

The question arises as to whether the serious deterioration of Soviet-American relations might obviate an early initiation of the talks both between the two Super Powers as well as between the members of the Committee on Disarmament. Although at present, the Polish crisis has prevented the fixing of a date for the opening of the Strategic Arms Reduction Talks (START) by the United States and the Soviet Union, there are, insofar as a ban of the use of anti-satellite weapons is concerned, certain factors which might provide an incentive not to delay the negotiations on this issue.

Both countries appear to be firmly convinced that unconstrained anti-satellite activities could lead to a breakdown of the current strategic balance and to a space weapons race.

As outer space has up till now remained free from kill-mechanisms, the obstacles to be overcome on arriving at some limitation of the use of arms in outer space will be *comparatively* less arduous than those arising in other fields where an unbridled military competition has already taken place.

A delay in the discussions on the prohibition of the use of anti-satellite systems would very likely result in a further development of these systems and would consequently make an agreement on this issue infinitely more difficult to achieve. The present tension in Soviet-American relations has of course in no way diminished the overriding mutual interest of the super powers to contain the military competition in outer space at its most dangerous points.

Attention was drawn to the highly complex problem of the verification of a limitation of anti-satellite weapons. Verification is obviously fundamental in any control of arms. As a verification on the *deployment* of such weapons would practically be impossible to achieve, it was submitted that the only realistic way of attempting to restrain the use of these weapons would lie in seeking a ban on the *operational testing* of anti-satellite weapons.

An agreement on such testing can obviously only be considered as a first step in the achievement of the aim of preventing a military escalation in outer space. As was submitted in the introduction of the present article, efforts to arrive at a complete demilitarization of outer space are bound to fail, but there are several issues, connected with provocative acts of interference with satellites, to which the Committee on Disarmament should give attention. Apart from the systems which are being developed for the explicit purpose of being used as anti-satellite weapons, there are many systems deployed for other purposes which have anti-satellite capabilities. The great problem in this respect is that satellites used for civil purposes, such as communication satellites and meteorological satellites, can also exercise military functions.

In the Report of the Space Group referred to above,²⁹ an interesting distinction was made between "dedicated" and "non-dedicated" systems of potential anti-satellite weapons. It was suggested that one should concentrate on the testing and deployment of such "dedicated" systems which would provide time, negotiating experience, and a measure of mutual confidence that could permit the United States and the Soviet Union to proceed with the second part of the treaty that would devise verifiable "rules of the road" aimed at barring the use of "non-dedicated" systems in anti-satellite activities.

²⁹See *supra* note 24.

It should, however, be noted that the Space Group considered that an anti-satellite treaty in a multinational forum such as the U.N., would be very difficult to obtain: the two parties most directly affected could not, in the Group's opinion, satisfy their most urgent concerns, while many other parties would be likely to introduce extraneous and even damaging treaty provisions. The Group decided that a bilaterally-concluded treaty could make provision for later accession by other interested States.

However, from the fact that both the United States and the Soviet Union adopted the U.N. Resolution by which the Committee on Disarmament has been requested to consider the question of negotiating agreements on the prevention of an arms race in outer space, the conclusion can be drawn that they do not share the fears expressed by the Space Group. They appear to be confident that their decisive influence in the Committee's negotiations would counteract any proposals that they might consider contrary to their interests.

Earlier in this article, consideration was given to the harmful consequences of the divergence in the interpretation of the term "peaceful purposes" and the term "weapons of mass destruction", both contained in the Outer Space and Moon Treaties. To give an example of the crucial importance of clarifying the meaning of the term "peaceful", reference should be made to an article published in the Daily Telegraph on 12th November 1981, according to which the United States is studying a plan to site laser weapons on the moon. It was suggested that although there was as yet no clear evidence that the Soviet Union was contemplating a similar project, the military advantages of a lunar laser gun were so great that the Soviets seemed likely to do so.

There can however be no doubt that the execution of such a project would infringe the terms of the Moon Treaty aimed at a complete demilitarization of the moon.³⁰

The possibility of control measures of laser and particle beam weapons in outer space, which would lead to a profound change in the technological time scale of warfare these weapons would cause, should be another crucial subject for study in the Committee on Disarmament.³¹

Insofar as the future general approach towards arms limitations in outer space is concerned there is one highly important point which should be taken into consideration. Existing treaties prohibit certain kinds of activities. This implies that everything that is not prohibited is allowed. The problem here is that such treaties can only be effective during a limited period. As some writers have widely remarked, future technological advances will tend to create uncontrollable instabilities. The question arises whether it would be possible to follow a different approach that would provide for treaty-formulations by which certain activities would be allowed on the understanding that anything else is prohibited.³²

³⁰See Goedhuis, *Conflicts in the Interpretation of the Leading Principles of the Moon Treaty of 5th December 1979*, 28 Neth. Int'l. L. Rev. 72 (1981).

³¹Cf. T. H. Karas, *supra* note 1 at 21. "Finding a verifiable set of limitations on ground testing of laser weapons may be difficult, but an agreement banning space testing and development should be easier to frame. The time to plan for such negotiations is now, before billions are committed to test and deploy space laser weapons." *Id.*

³²Cf. S. Gorove, *op. cit.* note 12, at 91, proposes to identify types of activities which are permissible.

It should always be kept in mind that war has become increasingly a matter of competing technologies rather than competing armies. As Michael Howard rightly observed: "Arms races are in fact continuing and open-ended attempts to match power with power. To support that they in themselves are causes of war implies a naive, if not totally mistaken view, of the relationship between the two phenomena. Arms races can no more be isolated than wars themselves from the political circumstances that give rise to them."³³

To end the present article, some observations on the attitude of the world population towards the conquest of outer space may be submitted. This attitude demonstrates the crucial difficulties that arise in the human mind's attempt to adapt itself to revolutionary technological developments.

Shortly before the first Sputnik was put into orbit, the British Astronomer Royal made the earth-shaking remark: "Space travel is bilge."

A few months later, the Archbishop of Canterbury remarked: "The only people who are interested in this space business are people who have nothing better to think of, poor fellows." Soon after the start of human space activities, several military experts expressed the opinion that space developments would not be of any military value. An interesting parallel can be drawn here with the attitude of a number of their colleagues towards the military implications of the conquest of airspace in the first decade of this century. It was still in 1910 that the British Minister of Defense denied the importance of aircraft for military purposes.

Now, in the twenty-five year period that has elapsed since the first astronaut circled the earth, those *directly* concerned with space applications in the political, economic, and cultural fields have become aware of the enormous potential of these applications. The world population *as a whole* is—to a very great extent—still in the dark regarding the immense effect which space developments are going to have on all human life.

It is this lack of perception in the world of what is at stake in outer space which has an unfortunate effect on the aim of achieving arms limitations in this medium. Whereas one may be hopeful of the possibility of arriving at a ban on the testing of anti-satellite weapons, the chances of reaching a universal agreement on arms limitations in space *on a broader scale*, will—to a considerable degree—depend on a much more widespread public consciousness of the vital need to reach such an agreement.

The paramount importance of creating and arousing world public opinion on this matter is apparent.

³³See M. Howard, *The Causes of War, Historians and the Problem of Power*, Encounter, March 1982, at 28.

Annex I*

*DRAFT TREATY ON THE PROHIBITION OF THE STATIONING OF WEAPONS
OF ANY KIND IN OUTER SPACE*

The States Parties to this treaty,
Motivated by the goals of strengthening peace and international security,
Proceeding on the basis of their obligations under the Charter of the United Nations to refrain from the threat or use of force in any manner inconsistent with the Purposes of the United Nations,
Endeavoring not to allow outer space to become an arena for the arms race and a source of strained relations between States,
Have agreed on the following:

ARTICLE 1

1. States Parties undertake not to place in orbit around the earth objects carrying weapons of any kind, install such weapons on celestial bodies, or station such weapons in outer space in any other manner, including on reusable manned space vehicles of an existing type or of other types which States Parties may develop in the future.
2. Each State Party to this treaty undertakes not to assist, encourage or induce any State, group of States or international organization to carry out activities contrary to the provisions of paragraph 1 of this article.

ARTICLE 2

States Parties shall use space objects in strict accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and mutual understanding.

ARTICLE 3

Each State Party undertakes not to destroy, damage, disturb the normal functioning or change the flight trajectory of space objects of other States Parties, if such objects were placed in orbit in strict accordance with article 1, paragraph 1, of this treaty.

ARTICLE 4

1. In order to ensure compliance with the provisions of this treaty, each State Party shall use the national technical monitoring facilities available to it, in a manner consistent with generally recognized principles of international law.

*Taken from U.N. Gen. Ass. Doc. A/RES/36/97 (15 Jan. 1982), pp. 3-5.

2. Each State Party undertakes not to place obstacles in the way of the national technical monitoring facilities of other States Parties performing their functions in accordance with paragraph 1 of this article.

3. In order to promote the implementation of the purposes and provisions of this treaty, the States Parties shall, when necessary, consult each other, make inquiries and provide information in connexion with such inquiries.

ARTICLE 5

1. Any State Party to this treaty may propose amendments to this treaty. The text of each proposed amendment shall be submitted to the depositary, who shall immediately transmit it to all States Parties.

2. The amendment shall enter into force for each State Party to this treaty accepting the amendment when the instruments of acceptance of the amendment by the majority of States Parties have been deposited with the depositary. Thereafter, for each remaining State Party deposits its instrument of acceptance.

ARTICLE 6

This treaty shall be of unlimited duration.

ARTICLE 7

Each State Party shall in exercising its national sovereignty have the right to withdraw from this treaty if it decides that extraordinary events related to the subject-matter of this treaty have jeopardized its supreme interests. It shall notify the Secretary-General of the United Nations of the decision adopted six months before withdrawing from the treaty. Such notice shall include a statement of the extraordinary events which the notifying State Party considers to have jeopardized its supreme interests.

ARTICLE 8

1. This treaty shall be open for signature by all States at United Nations Headquarters in New York. Any State which does not sign this treaty before its entry into force in accordance with paragraph 3 of this article may accede to it at any time.

2. This treaty shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Secretary-General of the United Nations.

3. This treaty shall enter into force between the States which have deposited instruments of ratification upon the deposit with the Secretary-General of the United Nations of the fifth instrument of ratification.

4. For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Secretary-General of the United Nations shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification and accession, the date of entry into force of this treaty and other notices.

ARTICLE 9

This treaty, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations, who shall transmit duly certified copies thereof to the Governments of the signatory and acceding States.

Annex II*

PREVENTION OF AN ARMS RACE IN OUTER SPACE

The General Assembly,

Inspired by the great prospects opening up before mankind as a result of man's entry into outer space,

Believing that any activity in outer space should be for peaceful purposes and carried on for the benefit of all peoples, irrespective of the degree of their economic and scientific development,

Recalling that the States Parties to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies,⁴ have undertaken in article III to carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law and the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding,

Recalling also article IV of the said Treaty,

Recalling further paragraph 80 of the Final Document of the Tenth Special Session of the General Assembly,⁵ in which it is stated that, in order to prevent an arms race in outer space, further measures should be taken and appropriate international negotiations held in accordance with the spirit of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies,

Noting the important and growing contribution of satellites both for civilian purposes and the verification of disarmament agreements and aware of the possibilities of their use to promote peace, stability and international cooperation,

Mindful of the widespread interest expressed by Member States to ensure that the exploration and use of outer space should be for peaceful purposes, *inter alia*, in the course of the negotiations on and following the adoption of the above-mentioned Treaty and taking note of proposals submitted to the General Assembly at its tenth special

*Taken from U.N.G.A. Doc. A/36/192 (Aug. 11, 1982).

⁴General Assembly Resolution 2222 (XXI), annex. (Ed. note: original footnote number retained).

⁵Resolution S-10/2. (Ed. note: original footnote number retained).

session, devoted to disarmament, and at its regular sessions and to the Committee on Disarmament,

Aware of the need to prevent an arms race in outer space and in particular of the threat posed by anti-satellite systems and their destabilizing effects for international peace and security,

Convinced that further measures are needed to prevent outer space from becoming an area of military confrontation, contrary to the spirit of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies,

Considering it necessary for the international community to give attention to specific measures regarding the question of anti-satellite systems in the Committee on Disarmament,

Bearing in mind that the restraint of anti-satellite systems has already been a subject of negotiations between the Union of Soviet Socialist Republics and the United States of America,

1. *Considers* that further effective measures to prevent an arms race in outer space should be adopted by the international community;

2. *Urges* all States, in particular those with major space capabilities, to contribute actively to the goal of preventing an arms race in outer space and to refrain from any action contrary to that aim;

3. *Requests* the Committee on Disarmament to consider, as from the beginning of its session in 1982, the question of negotiating effective and verifiable agreements aimed at preventing an arms race in outer space, taking into account all existing and future proposals designed to meet this objective;

4. *Requests* the Committee on Disarmament to consider as a matter of priority the question of negotiating an effective and verifiable agreement to prohibit anti-satellite systems, as an important step towards the fulfilment of the objectives set out in paragraph 3 above;

5. *Requests* the Committee on Disarmament to report on its consideration of this subject to the General Assembly at its thirty-seventh session;

6. *Requests* the Secretary-General to transmit to the Committee on Disarmament all documents relating to the consideration of this subject by the General Assembly at its thirty-sixth session;

7. *Decides* to include in the provisional agenda of its thirty-seventh session an item entitled "Prevention of an arms race in outer space and prohibition of anti-satellite systems".

Delbert D. Smith* and
Martin A. Rothblatt**

The concept "via satellite" describes a system of interdependent parts. These parts are grouped into two fundamental categories—the earth segment and the space segment. The focus of this article is directed at the system components which comprise the space segment. Although terrestrial parts of the system will not be further discussed, it should be remembered that since the parts of a satellite system are interdependent, factors which influence the status of the space segment may also influence the status of the earth segment.¹

Space Segment Components

The components of the space segment are further placed into operational and support groups. The operational rubric includes those components which directly address the purpose of the system. For example, the operational components of a contiguous spot beam satellite,² include the transponder, antenna and switching subsystems. The operational space segment of an earth observation satellite includes data acquisition and recording subsystems.³ Other types of satellites—such as those

*Delbert D. Smith, Partner, Schnader, Harrison, Segal and Lewis, Washington, D.C.

**Martin A. Rothblatt, Associate, Covington and Burling, Washington, D.C.

J. Martin, *Communications Satellite Systems* 148-65 (1978).

²Contiguous spot beam satellites, which ably exemplify the next generation of large space communications systems, bring the advantages of focused satellite energy to a broad area. These satellites continuously cover a large area, such as the continental United States, with dozens of contiguous independent spot beams. The resulting ground pattern can be visualized as a map of the states covered with from 40 to 400 contiguous circles. The size, and hence number, of multibeam footprints is a function of several technical and demand-oriented trade-offs. Goldman, Jr., & Edleson, *On Several Communications Satellite Designs Using Large Space Antennas*, in *IEEE Pac. Telecom. Conf.* 3B-5 (1979). Interconnectivity between beams can be accomplished by combining a moderately sized switching matrix with use of beam trunking techniques for concentration of non-uniformly distributed traffic. Ohm, *System Aspects of a Multibeam Antenna For Full U.S. Coverage*, in 3 Int'l Conf. on Com. 49.2.1 (1979). Conservative spectrum utilization, coupled with wide-area coverage and simplified ground station design, make contiguous multibeam satellites very attractive as the backbone for broadly based all-digital communications networks. Staelin & Harvey, *Architectures and Economics For Pervasive Broadband Satellite Networks* in 3 Int'l. Conf. on Com. 35.4.1, 35.4.6 (1979); see also Yeh & Reudink, *The Organization and Synchronization of A Switched Spot-Beam System*, in *Digital Satellite Communications* 191, 191 (1978); Burgess & Schmidt, *Satellite Constellations Using Multiple-Beam Satellites with Onboard-Switched TDMA*, in *Satellite Communications: Future Systems* 468 (Jarett, ed. 1976).

³See generally, *Hearings on Earth Resources Data and Information Services Before the Subcomm. on Space Science and Applications of the House Comm. on Science and Technology*, 96th Cong., 1st Sess. (1979).

designed for broadcasting, meteorology, manufacturing, surveillance, defense or science—also have unique operational space segment components.

The support portions of the space segment provide indirect contributions to the purpose of the system. These "housekeeping" components normally include attitude control, structural/thermal control, electrical power, and propulsion subsystems. In contrast to the operational space segment, one may find that satellites engaged in providing very different services possess similar support components.

Meaning of Space Platform

The term "space platform" commonly encompasses some or all of the support components of a satellite system. Furthermore, the term "space platform" normally contemplates a set of support subsystems which may simultaneously interface with more than one set of operational subsystems. This is analogous to the manner in which physiological support systems such as circulation simultaneously facilitate "operational" systems such as vision, locomotion and comprehension.

However, it should be emphasized that the term "space platform" has not yet attained a positive legal status. The lack of a treaty or statutory definition for space platform in no way limits the application of law and policy to this set of support subsystems. Indeed, the law simply describes those functions of space platforms which are under regulation.⁴

Since a space platform is "an object which is beyond, intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere," any "transmitters or receivers," including "accessory equipment," attached thereto become subject to the comprehensive space station and space service regulations of the International Telecommunications Union.⁵ Since a space platform is, after launch, a "space object," it also becomes subject to the provisions of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space ("Outer Space Treaty")⁶ the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of

⁴D. Smith, *Space Stations: International Law and Policy* 89-184 (1979).

⁵ITU Radio Regulations, Jan. 1, 1981, art. I. The International Telecommunication Convention (Madrid, 1932), 49 Stat. 2391, TS No. 867, created an International Telecommunication Union (ITU) of irregularly convened "Plenipotentiary Conferences" to revise constitution-like conventions, periodically convened "Administrative Conferences" to revise the detailed Radio Regulations appended to Conventions, separate "Consultative Committees" to study telephony and radio, and the "Berne Bureau" (now the IFRB) to keep track of the rapidly growing number of frequency assignments being made. G. Codding, *The International Telecommunication Union* 131-64 (1952); For a close examination of early ITU space service definitions, see D. Smith, *International Telecommunication Control* 163-66 (1969).

⁶Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (hereinafter "Outer Space Treaty"), Jan. 27, 1967, [1967] 18 U.S.T. 2410, T.I.A.S. 6347, 610 U.N.T.S. 205 (effective Dec. 3, 1968).

Objects Launched into Outer Space ("Rescue and Return Agreement")⁷, the Convention on International Liability for Damage Caused by Space Objects ("Liability Convention")⁸ and the Convention on the Registration of Objects Launched into Outer Space ("Registration Convention")⁹. Regional and domestic legal authority bearing on space utilization also encompasses space platform functions. Notwithstanding the absence of a legal definition, space platforms are clearly surrounded by a substantial and growing legal milieu.

Traditional Legal Interest in Space Platforms

Traditionally, there has been relatively little interest in the separate legal status of space platforms and in legal issues pertaining to operational subsystem interface with space platforms. As a matter of historical technology development, satellite support subsystems ordinarily interfaced with only one set of operational subsystems. The one-to-one correspondence between sets of support and operational subsystems led to a tendency to imbue the space segment with a single legal personality and to ignore any "intrasatellite" legal issues.¹⁰

The historical lack of legal attention to space platform questions is not, however, demonstrably attributable only to the one-to-one physical correspondence between sets of support and operational subsystems. Satellite manufacturers ordinarily subcontract many space segment subsystems to other companies, many of which are in other countries.¹¹ Indeed, space segments are often initiated as joint ventures of entities within two or more countries.¹² Whether or not subcontracts or joint venture participation follows an operational/support division, it is clear that international as well as wholly domestic multi-party satellite manufacturing generates a multitude of legal questions. Legal problems arise because more than one entity or "party" has a judicially enforceable right to affect the character of a satellite system or subsystem.

The relatively well-known nature of legal rights and responsibilities incident to satellite development and production allow most of these legal issues to be solved by

⁷Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched Into Outer Space (hereinafter "Rescue and Return Agreement") April 22, 1968, [1969] 19 U.S.T. 7570, T.I.A.S. 6599, 672 U.N.T.S. 119 (effective Dec. 3, 1968).

⁸Convention on International Liability for Damage Caused by Space objects (hereinafter "Liability Convention"), March 29, 1972, [1973] 24 U.S.T. 2389, T.I.A.S. 7762 (effective Oct. 9, 1973).

⁹Convention on Registration of Objects Launched Into Outer Space (hereinafter "Registration Convention"), January 14, 1975, [1978] 28 U.S.T. 695, T.I.A.S. 8480 (effective Sept. 15, 1976).

¹⁰The history of U.S. satellite technology and policy development is documented in *D. Smith, Communications Via Satellite* (1976).

¹¹Ford Aerospace, for example, provides major satellite components to France's Aerospatiale, which is prime contractor to build three satellites for the Arabsat Consortium. *Av. Wk. & Sp. Tech.*, Nov. 9, 1981, p. 22.

¹²E.g., Franco-German TVSAT-TDF-1 program; ESA satellite program.

custom or contract. However, the legal rights and responsibilities of entities participating in an operational satellite system were by no means certain. It is in this arena of post-production satellite activity that recent events indicate sharp differentiation of legal rights and responsibilities along operational/support lines.

Contemporary Legal Interest in Space Platforms

Traditionally, one entity controlled the bundle of property rights to both the support and operational groups of system components. Intrasatellite legal problems were rare, as conflicting interests were nearly absent. Accordingly, interest in space platforms was low.

Recently, in the pacesetter fixed satellite service, there has been a clear trend toward carving multiple separate legal interests out of operational space segment components, while retaining unified control of support subsystems. Hence, transponders have been leased with varying degrees of preemptibility, judicially assigned, publicly allocated, openly auctioned, and privately sold. As a result, the bundle of satellite property rights are being diversified.

While distribution of legal interests in operational subsystems is very efficient risk-sharing, it is also generating certain legal issues which might not otherwise exist. One such set of issues concerns the entire nature of customary commercial practice involving entities which have obtained an interest in an operational space subsystem such as a transponder. This industry practice provides an essential frame of reference for measuring reasonable performance of contractual obligations. It also facilitates the prevention of subsequent legal disputes by providing parties with a reasonable basis upon which to negotiate and contractually plan for events which may interfere with performance.

The recent separation of operational and support subsystem property rights in the space segment has generated peculiar liability issues. There are no clear answers to questions such as whether the creation of separate transponder property rights frees the support subsystem owner from liability for libelous broadcasts, deceptive advertising, privacy claims and other media torts. Accordingly, no clear answers exist as to the extent of liability for direct and indirect damages incurred by the owner of a support subsystem when contractual obligations to operational subsystem lessees or grantees are not met in whole or in part.

The rising popularity of creating operational space segment property rights also creates new problems for the insurance industry. Previously, a single insurance contract covered all relevant satellite systems. Today, RCA Satcom and Western Union Westar satellites are receiving multiple layers of insurance. Owners and lessees of support and operational subsystems aboard these satellites are each seeking to reduce risk by procuring separate insurance policies. This trend is already challenging both the financial and legal creativity of the insurance industry.¹³

¹³See Margo, *Some Aspects of Insuring Satellites*, *Ins. L. J.*, Oct. 1979 at 555-597; *Space Flight and Insurance* (Munchener Rückversicherungs-Gesellschaft, 1980); Merrett, *Insurance and Space Projects* (Paper delivered at International Conference on Doing Business in Space, Smithsonian Institution, (Nov. 12, 1981, Washington, D.C.).

A particularly vexing consequence of the new trends in satellite subsystem ownership relates to the appropriate regulatory categories for ownership interests of less than a complete satellite. As satellite ownership becomes increasingly fragmented, it becomes correspondingly difficult to associate particular treaty and statutory obligations (e.g. coordination, tariffs, permissible business practices) with specific entities. This problem of pinpointing legal responsibility becomes still more problematic when subsystem owners are domiciled in different countries.

One consequence of the contemporary operational/support segmentation in satellite property interests is particularly far-reaching and encompasses all those issues mentioned above. This consequence entails a fundamentally new regulatory and business perception of the space segment as being comprised of a legally distinct satellite support subsystem, or "space platform," which interfaces with one or more legally distinct operational subsystems. It is becoming necessary to question the need of burdening the owner of a set of support subsystems, or "space platform," with legal considerations which only relate to separately ownable operational subsystems.

The development of new commercial norms, regarding transponder leasing, highlights this new type of interchange between platform and operational interests.¹⁴ The need for clarification and improvement of intrasatellite liability and insurance questions demonstrates the utility of distinct legal treatment for platforms and operational subsystems. In addition, regulatory ambiguities and contradictions which arise from treating diversely controlled satellites as under unitary control prompts separate legal consideration toward space platforms.

The traditional inattention to the legal aspects of space platform interface may be explained as due to a failure of the law to conceive of separate legal estates in a space platform and in an operational payload. Recent events, however, have ably demonstrated the attractiveness of severing spacecraft ownership.¹⁵ As innovative satellite ownership structures continue to evolve, they will certainly be accompanied, as the pioneer concepts now are, by a new body of space platform law and policy.¹⁶

A Space Platform Scenario

The nature of space platform legal and policy issues may be profitably explicated through examination of a plausible scenario. One may imagine the formation of a geostationary space platform company, *Geoplat, Inc.*, with the avowed aim of meeting demand for platform services, *i.e.*, satellite support subsystems, at any point in the

¹⁴*Transponder Leasing*, Satellite Communications, (Oct. 1981) at 34. See also Bockstiegel, *Present and Future Regulation of Space Activities by Private Industry*, in *Space Activities and Implications* 133-149 (1981) (Centre for Research of Air and Space Law, McGill University).

¹⁵RCA is attempting to auction seven C-band satellite transponders for a total of \$90 million. *Sat. Wk.*, Nov. 16, 1981, p. 2. Hughes reportedly sold 12 C-band transponders to four parties for \$117 million. *Sat. Wk.*, Nov. 30, 1981, p. 7.

¹⁶*Supra* note 4, at 63-88, 185-207; S. Gorove, *Studies in Space Law: Its Challenges and Prospects* (1977); Fuqua, *Space Industrialization: Some Legal and Policy Considerations for Private Enterprise*, 8 J. Space L. 1 (1980).

geostationary orbit. Such a firm could, very plausibly, be started by one of the existing international joint venture satellite groups such as Ford Aerospace/Aerospatiale or Hughes/Spar Aerospace. It is also possible, however, that such a firm could be created by a national space administration, individual satellite manufacturers, or investors from outside the aerospace industry.

Geoplat would quickly ascertain where demand for platform services was greatest and target those areas for early market development. The firm would announce its intention to provide platform services at specified orbital locations, and would encourage potential customers in areas which could be served from such a location to consider platform compatibility in choosing among bids to construct satellites.

Geoplat as an entity, could enter into joint bids with an operational subsystem provider. Alternatively, the company could sell any desired number of transponders while reserving for itself the right to provide platform services at a specified rate.

Geoplat would certainly give serious consideration to orbital locations capable of providing desirable service to the continental United States (CONUS). It might, for example, plausibly announce its intention to offer platform services at a favored location for supplying direct broadcast satellite (DBS) service to the Eastern Time Zone of the United States.¹⁷ Potential DBS firms could have clear incentives to plan for platform compatibility since this option might be much less costly than the alternative of maintaining one's own operational and support subsystems.¹⁸ *Geoplat* could, at the same time, attempt to interest other potential customers in North and South America at different frequency bands and, when sufficient isolation could be provided, in the same frequency band.

Additional platforms would be planned as customer needs push initial designs to their mass, power, structural, frequency interference, or system integration limits. The platform concepts of *Geoplat* and its competitors would, undoubtedly, vary greatly. An initial start might be made by selling standard transponders off of a production line satellite such as the Hughes HS-376. A more advanced platform would be capable of providing 25Kw of power to several different types of operational subsystems

¹⁷Five companies have expressed a desire to co-locate direct broadcast satellites at 95° West longitude to serve the U.S. Eastern Time Zone. See Applications filed in FCC Docket No. 80-603, Interim Authorization of Direct Broadcast Satellite Service (1981).

Developmental U.S., Indian and Canadian direct broadcast satellite projects are fully described and analyzed, with an emphasis on societal integration of government-sponsored technology development, in D. Smith, *Teleservices Via Satellite* (1978).

¹⁸For example, the Focus company plans to initiate a DBS service with only a \$9 million investment because it will lease platform services from Western Union's Advanced Westar satellite. Firms desiring to maintain their own operational and support subsystems for a DBS service will have to invest well over five hundred million dollars. See e.g., Applications of RCA Americom, Satellite Television Corporation, Direct Broadcasting Co. in FCC General Docket No. 80-603.

See also B. Bowman, GEO Stationary Platforms: The Concept and the Promise (Paper delivered at IEEE Eascon 1981); Katz & Donovan, *The Design of Communications Systems on Large Space Platforms*, in 1 Int'l. Conf. on Com. 9.4.1 (1980); Astrain, *Telecommunications and the Economic Impact of Communications Satellites* (Paper delivered at 31st Congress of the International Astronautical Federation, Tokyo, 1980); Fordyce & Stamminger, *The Use of Geostationary Platforms for Future U.S. Domestic Satellite Communications*, in 3 Int'l Conference on Communications 49.4 (1979).

transmitting at an array of frequency bands. Low earth orbit platform designs would support operational science, manufacturing and earth observation packages. Larger platform options would probably require astronaut deployment and payload mating from the Shuttle payload bay in low earth orbit. However, automated platform deployment and payload mating, even in geostationary orbit, is also technically possible.¹⁹

It would be very desirable to extend platform or operational subsystems life via the replacement of station-keeping propellant, degraded platform components and dysfunctional operational packages. Both automated and manned geostationary maintenance capabilities are under consideration, although neither has received firm budgetary commitments.²⁰ In low earth orbit, however, manned life-extending modifications to the Salyut and Skylab space platforms have been accomplished,²¹ and a manned mission to reinvigorate the Solar Maximum Mission scientific satellite is planned for late 1982.²²

This space platform scenario highlights several important legal issues. Among them are: interparty and third party liability limits to platform expansion in time and space under the Outer Space Treaty; appropriate state of platform registry under the Registration Convention; allocation of fault pursuant to the space-based harm provisions of the Liability Convention; necessary levels of state supervision, as well as which state shall supervise under the Outer Space Treaty; and comportment with a myriad of domestic trade, business and national security regulations. Perhaps the most immediate of these legal issues concerns frequency coordination obligations with the ITU and, to a lesser extent, with Intelsat. In order for *Geoplant* and its operational subsystem lessees or grantees to obtain some measure of international protection for the spectrum frequencies they employ, there must be radio frequency coordination and registration in accordance with ITU procedures.²³ Hence an immediate issue for resolution is whether *Geoplant* or its operational subsystem grantees should coordinate and register frequencies with the ITU.

¹⁹The European Space Agency (ESA) is exploring this alternative. *Av. Wk. & Space Tech.*, Dec. 21, 1981, p. 52.

²⁰Bekey, The Potential Evolution of the Space Transportation System (Paper delivered at 32d Congress of the International Astronautical Federation, Rome, 1981).

²¹See, e.g., N. Kidger, *Salyut 6 Mission Report*, Nos. 1-6. 22 *Spaceflight* 50, 97, 146, 343 (1980), 23 *Spaceflight* 42, 74 (1981).

²²*Av. Wk. & Space Tech.*, Jan. 18, 1982, p. 38.

²³The procedure of coordination involves the exchange of prescribed information between administrations whose communications services may cause mutual interference and, if necessary, a negotiation process whereby the technical or operational characteristics of one or both systems are altered in a way which eliminates potential harmful interference without sacrificing satisfaction of either administrations' communications requirements. D. Leive, *International Telecommunications and International Law: The Regulation of the Radio Spectrum* 228-34 (1970); Rothblatt, *International Regulation of Digital Communications Satellite Systems*, 32 *Fed. Comm. L. J.* 393; 410-26 (1980).

ITU matters take on still greater importance if the platform's operational packages are to operate in a planned frequency band such as a 12 GHz for the broadcast satellite service. At these frequencies the ITU's standard frequency registration procedures are replaced with a comprehensive orbit/spectrum assignment plan.²⁴ A very important question concerns which countries will be charged with occupying an orbit/spectrum assignment—the country with jurisdiction over *Geoplant* or the country with jurisdiction over a particular transponder purchaser. This problem is exacerbated by the fact that frequency assignments under an ITU plan are specified in such a manner that the only countries which can register a space service at a given orbit/spectrum location are the countries to which those space transmissions are primarily directed.²⁵ Furthermore, determining the proper jurisdiction for multi-party space estates may be very difficult.

It appears most sensible and most consistent with ITU regulations to impose frequency coordination and registration obligations upon operational subsystems which employ spectrum and not upon the platform operator. To conclude otherwise would cause serious contradictions under ITU plans and, in unplanned bands, would encourage platform operators to overregister frequencies, when selling or leasing transponders, as a means of assuring an ability to satisfy customers not yet identified. Efficient orbit/spectrum management is clearly encouraged by associating frequency coordination and registration obligations with the operational space segment and not with the space platform.²⁶

A frequent special case of the suggested approach exists when ownership of a satellite estate has not yet been severed into separate operational and platform estates. In such a case, the single satellite owner coordinates and registers a space service because of ownership of an operational space segment, not because of launching, or intending to launch, a satellite.

There are also practical advantages to regulatory acknowledgement of severed satellite ownership and operational space segment responsibility for frequency coordination and registration. One such practical advantage is that space platform

²⁴An assignment plan is accomplished by dividing the bandwidth allocated to Ku band broadcasting-satellite service into many channels of lesser bandwidth, associating this group of channels with each orbital position in the geostationary orbit, and then assigning to countries the right to specific channels at specific orbital positions. Countries have from 2 (Brunei) to 65 (Soviet Union) channel assignments, with most countries being assigned 4, depending on their size, population and foreseeable communication needs. Mill, *World Administrative Radio Conference For The Planning of the Broadcasting-Satellite Service in Frequency Bands 11.7-12.2 GHz (In Regions 2 and 3) and 11.7-12.5 GHz (In Region 1)*, Proc. 20th Colloquium on the Law of Outer Space 346 (1978).

²⁵See Final Acts of the World Administrative Radio Conference, Appendix 29A, art. 12.9.1, reprinted in U.S. Dept. of Comm., Nat'l Tech. Info. Service, II Final Acts of the World Administrative Radio Conference (1979); Butler, *World Administrative Radio Conference For Planning Broadcasting Satellite Service*, 5J. Space L. 93, 98 (1977).

²⁶"[R]adio frequencies and the geostationary satellite orbit are limited natural resources that must be used efficiently and economically. . . ." International Telecommunications Convention (Malaga-Torremolinos, 1973) art. 33(2). See generally, Gorove, *The Geostationary Orbit: Issues of Law and Policy* 72 Am. J. Int'l L. 448-9 (1979); Sarkar, *International Telecommunication Convention And Its Impact on Institutions*, Proc. 17th Colloquium on the Law of Outer Space 82 (1974).

construction will be far less stifled by law and policy relating to operational subsystems than is now the case.²⁷ Space platform development can proceed while those interested in creating operational estates fight the bureaucratic battles. Strong economic incentives will arise to standardize compatibility aspects of platform and operational subsystem design. This will help to insure survivability in an uncertain market and regulatory environment.

Conclusion

A great amount of intellectual thought is needed with regard to the legal, economic and engineering implications of severed estates in space. Given current attempts at satellite transponder auctioning, even the casual observer of space affairs must be struck by the presence of a strong trend toward severed ownership of operational and support satellite subsystems. The creation of these severed estates in space marks, in many respects, a new plateau in the growth of space law and policy. For it is now very clear that one should frequently expect more than one entity to acquire a judicially enforceable right to affect the character of a space segment system. Accordingly, space segment legal rights and responsibilities may be associated with different parties and space law may become a critical management concern.

Thought must be given to the economic implications of separate platform and operational package ownership, so that space platform policy may be developed in such a manner as to encourage efficient investment in space hardware. Significant engineering development is needed with regard to system integration of separately designed support and operational space segment components. But, perhaps most importantly, additional legal and policy analysis is needed concerning the implications of severed satellite ownership for optimal utilization of the valuable space and spectrum resources upon which society so vitally depends.

It is, to a very great extent, space law and policy which regulates the flow of new space hardware. Additional study of the legal and policy implications of severed estates in space will uncover regulatory options which greatly encourage multiple satellite property interests, including independent space platforms. One such regulatory option²⁸ which limits frequency coordination and registration obligations to owners of operational subsystems, will free the platform owner from many legal burdens and, undoubtedly, encourage platform deployment. Other regulatory options should also be critically examined so that the legal artifacts of historical satellite development do not impede the ability of the law to support contemporary differentiation of operational and platform estates in space.

²⁷Direct broadcast satellite applicants feel they may not legally even make launch reservations, much less construct platforms, until their applications for authority to construct a satellite are officially granted. *Opposition of United States Satellite Broadcasting Co., FCC Gen. Docket 80-603 at 20; UA-Columbia Cablevision Inc., 55 F.C.C. 2d 656 (1975).*

²⁸*Id.*

A. Past Events

(a) Reports

1. *The Work of the United Nations Committee on the Peaceful Uses of Outer Space in 1982**

This year marked the 25th anniversary session of Committee on the Peaceful Uses of Outer Space (UN-COPUOS). The Chairman of the Committee, Ambassador Peter Jankowitsch of Austria reviewed the Committee's work and looked to the future in his opening statement to the Committee. In doing so, he stated the following:

Even if this happens to be an anniversary event, even if there is much reason for satisfaction, anniversaries should not be an excuse for complacency or self-congratulation or an occasion for passive contemplation of past achievements, magnificent as they might have been. . . . Of course the record of this Committee remains even in a critical analysis, a credible and impressive one.

We have given much attention to the orderly growth of space activities and it has therefore been our primary concern - and it remains our primary concern - to create the international legal framework for this purpose. Thus, important international legal instruments, beginning in 1967 with the outer space Treaty, which continues to be our *Magna Carta*, have been developed by this Committee. It is indeed a tribute to its work that during the short span of 25 years it has indeed been possible to lay down a sound legal foundation for the exploration and uses of outer space, which, as we know, in the case of other environment took many centuries to build.

Thus the Committee has, I believe, established a commendable record of itself during the last 25 years. This is no doubt the result of the cooperation, understanding, and also the political wisdom of each and every member of this Committee - old members and new ones. And as we look to the future we must face developments in space with some vision and fortitude. We cannot afford to concentrate only on problems of the moment or to regard them in the light of short-term interests, coloured by criteria of a basically national character. . . .

We can, by insisting on the values of peaceful cooperation in outer space among as many actors as possible, by consciously blurring in this new environment the frontiers of east and west, of north and south, and by making every effort to create new and different perspectives, reduce what appears most distinctly as a new menace, as a new danger, which might threaten the human race from outer space.

And all this appears even more important in the face of an unprecedented pace of development in space science and technology. We must therefore be innovative and forward-looking, as well as forward-thinking. We must bear in mind the interests of all States and indeed of the entire international community and seek to chart a course that will allow us to look at the next 25 years without anxiety and with the same confidence we had when we started the work 25 years ago."¹

*The views expressed herein do not necessarily reflect those of the United Nations.

¹U.N. Doc. A/AC. 105/PV. 230, pp. 7, 8 (1982).

With the UNISPACE 82 Conference scheduled in August 1982, the primary concern of UN-COPUOS, also acting as the Preparatory Committee for the Conference, and that of its Scientific and Technical Sub-Committee, acting as the Advisory Committee to the Preparatory Committee, was the consideration of the draft report of the Conference.

The consideration of the one hundred page document, dealing with questions of political, legal, scientific and economic sensitivity with wide ranging implications to many members of the 53 member Committee, proved to be a demanding task.

The original draft of the report² was prepared by the Secretary-General of the Conference. It was divided into three sections dealing with the three agenda items of the Conference: State of space science and technology; Applications of space science and technology; and International cooperation and the role of the United Nations. It dealt with such sensitive matters as military implications of space activities, the geostationary orbit, regulation of the frequency spectrum, transfer of space technology, cooperation between space powers and non-space powers, establishment of international systems for space applications, and mechanisms for international cooperation in this field.

Although all delegations expressed support for the general thrust of the draft report as prepared by the Secretary-General of the Conference, the space powers preferred a less ambitious report while the third world nations would have preferred it to be more ambitious.

The Scientific and Technical Sub-Committee, which acted as the Advisory Committee to the Preparatory Committee, met in New York from 11 to 22 January 1982 to consider the draft and requested the Secretary-General of the Conference to revise it for consideration by the Preparatory Committee, taking into account the comments and observations made by the delegations.

The revised draft³ was considered and revised by the Preparatory Committee which met from 22 March to 6 April 1982 in New York.

The Preparatory Committee considered the draft, as had the Advisory Committee, through an open-ended working group. On both occasions, a single fundamental point of contention emerged: the scope of the mandate of the Conference. The difference between broad and narrow interpretations of the mandate appeared on a number of occasions; with regard to the nature of the Conference, the view that it should be purely scientific and technical was expressed as opposed to the view that it should be all-encompassing in nature. On the closely related question of whether or not the Conference is mandated to make recommendations on substantive, organizational and other aspects of the United Nations machinery, that is, beyond deliberations of scientific matters, both positive and negative views were also heard. In general the space powers preferred the narrower definition and argued for a more technical report, while the developing countries preferred a broader political and legal document. What emerged was a compromise document. It remains to be seen however what kind of impact this point of contention might have on the final document to be adopted at the Conference.

In spite of these fundamental differences and the initial pessimism regarding the possibility of achieving a consensus on the broad issues contained in the draft report,

²U.N. Doc. A/CONF. 101/PC/L. 17 (1982).

³U.N. Doc. A/CONF. 101/PC/L. 20 and Add. 1 and 2 (1982).

intensive negotiations resulted in a successful revision of the report, leaving only 15 out of 430 paragraphs on which consensus has not been reached. It needs to be recognized, however, that this numerical presentation may not adequately convey the complexity of the subject matters which remain to be dealt with at the UNISPACE Conference. One of the most contentious issues concerns four of the remaining paragraphs⁴ dealing with the military implications of outer space. Although an informal drafting group met for a considerable amount of time, no agreement could be reached on this matter. The space powers would like this aspect to be de-emphasized in the report while the others, particularly the developing countries and Nordic countries, would like greater emphasis. Thus, this might be one of the contentious issues that will occupy the attention of the Conference.

Once again the major accomplishments were no doubt due to the strong spirit of cooperation of the members that has characterized United Nations activities in the field of outer space, as well as to the informal consultation mechanisms which the members have consistently used in UN-COPUOS.

Nevertheless, a strong correlation can be found between most of the unresolved issues in the draft report which did not meet with consensus and basic and enduring points of contention in the UN-COPUOS, such as the questions relating to the dissemination of remotely sensed data and information or the questions relating to the geostationary orbit. Thus some of the enduring problems in UN-COPUOS will figure in the centre of discussions of UNISPACE 82, and if the Conference is unable to resolve them, it may at least provide guidance as to how they should be dealt with in the future discussions of UN-COPUOS.

With the draft report of UNISPACE 82 occupying much of the time of COPUOS and its Scientific and Technical Sub-Committee, the other issues on their agenda did not receive detailed consideration. One exception however was the consideration by UN-COPUOS of the item relating to the "Question of Draft Principles Governing the Use by States of Artificial Earth Satellites for Direct Television Broadcasting" (DBS), a subject that has been normally considered by the Legal Sub-Committee. The General Assembly in 1981 decided in a resolution⁵ that further attempts to complete their elaboration should be made by COPUOS during its 1982 session and their adoption should be considered at the 1982 session of the General Assembly. Although some informal consultations were undertaken during the Legal Sub-Committee session, they did not yield any result.

UN-COPUOS, through an informal working group, undertook intensive discussions and negotiations on this item. The extensive discussions of the working group focused on what appeared to be the last major remaining point of contention: the principle of consultation and agreement between States. But once again this item has eluded a successful conclusion in spite of the hopes raised by the compromise formula proposed by the Greek delegate in his personal capacity and a proposal by India.⁶ As a result, the subsequent handling of this issue is now left to the General Assembly, which

⁴*Id.* Paras. 13, 205, 231 and 419.

⁵U.N. Doc. A/Res. 36/35 (1981).

⁶U.N. Doc. A/37/20 para. 53 (1982).

at its last session already decided to "consider the adoption" of draft DBS principles at its 1982 session.

The third world nations served notice last year that if no consensus was found this year in UN-COPUOS, they would press it to a vote in the General Assembly. It is difficult to predict whether they will indeed make good on this threat or give it another chance during the sessions of UN-COPUOS and the Legal Sub-Committee in 1983. To some extent it may depend on how they fare on issues of concern to them at UNISPACE 82, as the mood might be set in Vienna for future activities in COPUOS. If, however, it is pressed to a vote, there might be some repercussions in COPUOS as to its consensus rule by which it has adopted all previous legal instruments, although some fears in this direction seem somewhat exaggerated.

The other legal issues were discussed at the twenty-first session of the Legal Sub-Committee held in Geneva from 1 to 19 February 1982. The results of these discussions are to be found in the report of the 21st session of the Legal Sub-Committee⁷ and its summary records.⁸

In connexion with the item related to the legal implications of remote sensing with the aim of formulating draft proposals which was given priority consideration by the Sub-Committee a detailed discussion took place through the working group established on this item. The two areas of concentration related to the question of access to remotely sensed data⁹ and the dissemination of data and analysed information¹⁰.

With regard to the former, an agreement emerged that in principle sensing states should provide a sensed state with timely and non-discriminative access to primary data pertaining to its territory obtained through remote sensing. A proposal by Greece¹¹ on the subject, presented a possible basis for a compromise on this issue, although it was not readily accepted by all delegations.

With regard to the question of dissemination of data and analysed information, once again the well-known positions of states prevented any possible agreement in this area. On the one hand a group of states including the United States, feel that there should be no restriction on the free dissemination of data and analysed information as it is neither desirable nor practical. On the other hand, another group of states which includes the developing countries, maintain that certain restriction on dissemination of data and analysed information is necessary to maintain national security as well as sovereignty of the sensed state. Some of these states prefer to see the dissemination of such data and information subject to the prior approval of the sensed state. The Soviet Union re-introduced a working paper it had submitted earlier¹² in which it advocated

⁷U.N. Doc. A/AC/105/305 (1982). It should be noted that all working papers submitted to the Sub-Committee are annexed to the above report.

⁸U.N. Doc. A/AC. 105/C.2/SR/360 to 380 (1982).

⁹*Supra* note 7, Annex I, Art. XIII.

¹⁰*Supra* note 7, Annex I, Art. XIV.

¹¹U.N. Doc. WG/RS (1982) WP 13.

¹²U.N. Doc. WG/RS (1982) WP/4.

that data which had resolution of finer than 50 meters should be subject to the consent of the sensed state while data with the resolution of coarser than 50 meters should be freely disseminated. In the view of others, however, for technical and practical reasons, such a criteria is not feasible.

Although there was discussion of these and other principles relating to the subject, no consensus was reached and it is envisaged that the Sub-Committee will continue consideration of this item on a priority basis at its next session in 1983.

With regard to the item relating to the question of the possibility of supplementing the norms of international law relating to the use of nuclear power sources (NPS) in outer space, the discussion was still on a general level and began with the question of assistance to states affected by the re-entry of a space object with an NPS on board. Several working papers were presented and the discussion concentrated on a Canadian proposal made at the previous session¹³ and a new proposal also made by Canada¹⁴. While some delegations supported Canadian ideas, other delegations felt that the Outer Space Treaty and the Liability Convention provide adequate provision for dealing with this matter. They further felt that a separate regime outside the Liability Convention is not required to deal with nuclear damage. In this context, some discussion also took place concerning "direct" and "indirect" damage and here again, some delegations did not wish to go beyond the provision of the Liability Convention which had not used the term "indirect" damage. It was, however, agreed that as a humanitarian measure, all states and the launching state in particular should be prepared to render assistance, to the extent practical, to states affected by the re-entry of an NPS. While the above discussion and other more general aspects of this matter were considered within the working group established to deal with this subject in the Legal Sub-Committee, the discussions did not reach the stage of drafting any legal principles on this question. The discussions will continue at the next session of the Legal Sub-Committee and perhaps the Sub-Committee might have to decide whether to draft legal principles and if so, in what form.

The final subject considered by the Legal Sub-Committee this year related to definition and/or delimitation of outer space and outer space activities, bearing in mind, *inter-alia*, questions relating to the Geo-Stationary Orbit (GSO), where again the well-known positions of delegations were re-stated. One group of states advocated the need to have a definition of air space and outer space and some of these delegations supported a proposal previously made by the Soviet Union¹⁵ to establish a boundary at 100-110 kilometers. Some of these delegations also felt that the use of air space by space objects need regulation as well. But other delegations including the United States, felt that there was no need for such a definition and that a spatial definition would only lead to an arbitrary boundary without any scientific basis and leaving a considerable area of air space over which states cannot have effective control. Some delegations also felt that

¹³U.N. Doc. A/AC. 105/C. 2/L. 129 (1982).

¹⁴U.N. Doc. A/AC. 105/C. 2/L. 135 (1982).

¹⁵U.N. Doc. A/AC. 105/L. 121 (1982).

the definition of air space and outer space should only be considered along with the definition of space activities.

With regard to the GSO, once again the differing views expressed by delegations previously were re-stated without any progress being made in the consideration of this item. The equatorial countries in particular, insisted that the GSO was a limited natural resource over which certain countries have a special physical relationship and thus had sovereignty over it. While others argued that the GSO derived its special features from the earth as a whole and in accordance with the Outer Space Treaty, all states must have equal access to this orbit. These questions will also be further considered at the next session of the Legal Sub-Committee in 1983 which will be held in New York from 21 March to 8 April.

As all these items are under consideration in one way or the other in the context of UNISPACE 82, the discussions at the Conference will naturally give a clearer focus and perhaps sufficient guidance to assist the Legal Sub-Committee in resolving some of these perennial problems in a more expeditious manner.

Finally, a matter that was not specifically on the agenda of COPUOS and the two Sub-Committees, but was referred to in all three bodies, related to the military implications of space activities. A number of delegations expressed their concern regarding the growing danger of military use of outer space, and pointed to the urgent need to prevent an arms race in outer space. Some of these delegations expressed the view that the question of militarization of outer space should be dealt with by UN-COPUOS. But other delegations including the space powers pointed to the fact that the General Assembly at its 1981 session had requested the Committee on Disarmament to consider this matter including the question of concluding a treaty on the prohibition of stationing of weapons of any kind in outer space, following the proposal made by the Soviet Union to the General Assembly and a related proposal made by the Western European states relating to general and complete disarmament.¹⁶

In conclusion, one might note that after the 25th session, UN-COPUOS finds itself perhaps on the verge of accepting new challenges and new initiatives arising from the possible recommendations of UNISPACE 82.

N. Jasentuliyana
Executive Secretary of
UNISPACE 82 and
Chief of Section,
Outer Space Affairs
Division, United Nations

¹⁶See U.N. Docs. A/36/192, 756 and 758; A/RES/36/97 and 99 (1982).

*2. Current Issues Before Congress Affecting Space Activities—Checklist and Summary**

The United States is facing a great many issues concerning space activities in 1982, perhaps the broadest in scope since the very beginning of the space age. The questions have not changed very much either—we are still discussing basic issues of space policy such as what goals and programs are needed to ensure a healthy space program, the relationship between civil and military space activities, and the role of the Federal Government versus the private sector in research and development (R&D). Newer issues include what regulations may be needed for private companies who wish to operate in space (and what Government agency should be in charge of those regulations), and what the United States must do to make its launch services competitive on the world market.

These questions are taking on increasing importance as the budgetary situation worsens, and difficult choices must be made between social programs to meet the near term needs of the populace, and activities such as research and development which are viewed as long term commitments to the future of the Nation. The Reagan Administration's proposal to increase defense spending is also impacting non-military R&D funding, which includes the National Aeronautics and Space Administration (NASA). In fact, one issue which is raised ever more frequently is whether the military and civil space programs should be combined.

These issues are dealt with both in the Executive Branch and in Congress. Thus, while the Reagan Administration is conducting its review of space policy (results are expected in the summer of 1982), Congress also is proceeding with its actions on these matters. The issues are many and varied, and a definitive list would be very long. This report will describe those issues which seem most likely to be dealt with in the first half of the current session of Congress, and therefore primarily concern funding bills. A future report will describe congressional activities on other topics such as the transfer of the LANDSAT remote sensing satellite program to the private sector, who should operate the space shuttle, regulatory issues concerning private operations in space, and revisions to patent laws which may affect the space business.

Funding for NASA Space Activities

The NASA request for fiscal year (FY) 1983 is \$6.6 billion, an increase of 11% over the FY 1982 appropriation (if adjusted for inflation, the increase is only 2%). The space shuttle will consume 52% of the entire NASA budget, or 64% of the budget for R&D. The other activities funded by NASA (space science, space applications, and aeronautics¹) have had a difficult time for the past several years because of the amounts required to support the shuttle program, and FY 1983 is no exception. At the present time, the country has in development only one planetary mission (the Galileo mission to Jupiter), two earth orbital telescopes (the Space Telescope and the Gamma Ray Observatory), and one applications program which involves launching satellites (Landsat

*The views expressed in this report do not necessarily reflect those of the Congressional Research Service (CRS), Library of Congress, Washington, D.C.

¹This report will not address NASA's aeronautics programs, other than to say that the request for such programs is \$232 million for FY 1983.

D). Since the total NASA budget request shows an increase, it will be difficult for Congress to add funds for NASA this year, although attempts may be made to redistribute the funding requested by the Administration.

The issues which appear to be of the most concern to Congress in NASA's FY 1983 budget request include:

Choice of Upper Stage for the Space Shuttle

NASA has reversed its decision to develop a high energy upper stage (called Centaur) instead of the Inertial Upper Stage (IUS) for use with the space shuttle to send space probes into deep space trajectories. The IUS is being developed by the Air Force, which requires a two-stage IUS for its earth orbital missions, while NASA requires a three-stage version for planetary spacecraft.

Last year NASA argued that the more capable Centaur upper stage was required for the Galileo mission to Jupiter and for launching the European spacecraft for the International Solar Polar Mission (ISPM),² both scheduled for launch in 1985. The agency announced that it would cease support for development of the three-stage IUS, and proceed with development of Centaur instead. This year, NASA is arguing that because there are only two currently planned missions for use with Centaur, it is not cost effective to build that vehicle at this time. Reports in the trade press at the beginning of 1982 indicated that the Air Force might build Centaur if NASA did not,³ but the Air Force has decided not to fund the program now because it does not have any need for a high energy upper stage until at least 1987.

NASA's arguments last year were so convincing, however, that Congress is having a difficult time knowing what to do about the IUS versus Centaur controversy. NASA and the Air Force agree that a Centaur upper stage (or something similar to it) will be needed eventually, but NASA does not have the money available to fund the program now. Therefore, Galileo and ISPM will be sent on their planetary trajectories with the less capable IUS which will be augmented by a kick stage. As a result, the transit time to their respective destinations will be much longer—for example, Galileo will require an extra 30 months to reach Jupiter, and once there, the orbiter will not be able to make as many orbits of the planet, thus reducing the scientific return.

Development of the IUS is expected to cost \$700 million (individual units will cost \$50-60 million), and it will be able to carry a payload of 5,000 pounds (2,250 kilograms) from low earth orbit (LEO) to geosynchronous orbit (GEO)⁴. Centaur would cost

²Originally, the ISPM program would have also involved the launch of a U.S. spacecraft as well as the European one, but NASA had to cancel its plans for the mission because of budgetary constraints.

³*Air Force Mulls IUS-To-Centaur Switch*, Aerospace Daily, Jan. 13, 1982, p. 57.

⁴The space shuttle can carry payloads into low earth orbits (up to 1,100 kilometers), but an upper stage is required to take satellites to higher orbits. Geosynchronous orbit is 35,800 kilometers above the equator, and a satellite placed there will retain the same relative position to any point on the surface of the planet. Thus many satellites (particularly those for communications) are placed in GEO.

approximately \$230 million to develop⁵ (individual units would cost \$35-40 million), and could carry 10,600 pounds (4,770 kilograms) from LEO to GEO. Some Members of Congress have pointed out that IUS will cost twice as much to develop, but can accommodate only half as much payload. NASA and the Air Force respond that over \$500 million has already been spent on the IUS (versus \$16 million that has been spent on Centaur), and that IUS will be ready next year whereas Centaur would have to be placed on a "fast track" in order to have it ready by 1985.

Space Science

Another issue of special interest to Congress is the state of the U.S. planetary program. After White House intervention, NASA was able to include the Galileo mission in its FY 1983 request (the Office of Management and Budget wanted to cancel it), but the Venus Orbiting Imaging Radar project was terminated. In addition, funds have been cut for analysis of data that has already been returned from planetary spacecraft, and for mission operations which support planetary spacecraft which continue to return data. Although NASA has assured Congress that it will support the Voyager 2 spacecraft which is now enroute to Uranus, there is concern that NASA will no longer acquire data from several of the older Pioneer spacecraft (such as the Pioneer Venus orbiter, and Pioneer 10 and 11 which are on their way out of the solar system). NASA has also indicated that it may have to shut down at least temporarily, the Lunar Curatorial Facility in Houston where the lunar samples returned by the Apollo crews are stored.

NASA also has decided to shut down its operations at the InfraRed Telescope Facility (IRTF) at Mauna Kea, Hawaii. The telescope only began operations two years ago, and NASA had hoped that the National Science Foundation (NSF) would pick up the telescope in its budget, but NSF has indicated that it will not do so voluntarily because of its own funding constraints.

Advanced Communications Satellite Demonstration

In 1973, NASA withdrew from activities to support the demonstration of advanced technology for communications satellites on the basis that this was properly a function of the private sector. In 1979, NASA reentered the field because the private sector did not pursue these activities.

NASA's program is called the 30/20 Gigahertz (GHz) project, because it is intended to demonstrate new technology which would allow communications satellites to operate at frequencies around 30 GHz (for Earth-to-space transmissions) and 20 GHz (for space-to-Earth transmissions). Satellites operating at these frequencies are expected to be the wave of the future because lower frequency bands are very congested. The Japanese launched the first experimental 30/20 GHz demonstration satellite in 1977 and they plan to launch the first operational satellite in this frequency range in 1983.

The NASA FY 1983 budget request terminates NASA plans to fly a 30/20 GHz demonstration satellite on the basis, once again, that the private sector should fund such

⁵The shuttle-compatible Centaur upper stage costs less to develop than IUS because it is only a modification of an existing upper stage that is used now with the Atlas launch vehicle.

a program. NASA will continue to perform basic R&D in the field. Congress is concerned that the private sector will not be able to afford such a program, and that the United States will be left behind in an important area of space technology.

Funding of the Fifth Shuttle Orbiter

The issue of how many space shuttle orbiters will be required to support mission demands in the future has been debated in Congress for many years. Four flight worthy orbiters have been authorized, but NASA and the Air Force feel there should at least be five. The issue is of critical importance this year, because in order to keep the production lines operating at full capacity, the decision on whether or not to purchase a fifth orbiter must be made in 1982.

One option being considered by NASA is a "block-buy" approach in which the fourth and fifth orbiters would be purchased together, in the hope of saving money at the subcontractor level. A decision on the block buy approach is expected in the summer of 1982. Another option is an offer made by a private company, Space Transportation Co., to purchase the fifth orbiter and then hand it over to NASA, or whatever entity ultimately operates the space shuttle. In return, the company would be given all marketing rights for non-government users of the shuttle system. An informal proposal has been presented to NASA on this concept.

Some Members of Congress feel that since the Air Force wants to have exclusive rights to at least two shuttle orbiters, that agency should be required to pay for more of the shuttle costs,⁶ possibly by paying for the fifth orbiter.

Funding for Department of Defense Space Activities

The Department of Defense (DOD) has engaged in space activities since the beginning of the space age, but its budget for space programs exceeded that of NASA for the first time only in FY 1982—NASA's appropriation was \$5.94 billion, while DOD's space activities were funded at \$6.4 billion. This trend continued in FY 1983: the DOD space program request totals \$8.5 billion, compared with NASA's \$6.6 billion (including aeronautics).

DOD's space activities have traditionally involved the launch of satellites for communications, reconnaissance, meteorology, navigation, and geodesy. At the present time, DOD is developing an antisatellite (ASAT) device which could be used to destroy satellites, as well as space-based lasers. DOD is also requesting funds to construct a Consolidated Space Operations Center (CSOC) near Colorado Springs, Colorado from which it will control military flights of the space shuttle and other potential military operations in space.

The issues which appear most likely to be of concern to the current session of Congress regarding DOD space activities include how much the Air Force should contribute to the shuttle program (discussed previously), and the following:

⁶The Air Force has agreed to pay for preparing a shuttle launch site at Vandenberg Air Force Base, California, for development of the Inertial Upper Stage, and for modifications related to launching military payloads on the shuttle. In return, the Air Force will be given a lower price than commercial users for its shuttle launches.

The NAVSTAR Navigation Satellite System

Although navigation satellites are utilized primarily by non-military users, the existing Transit and Nova satellites were developed and launched by DOD. Similarly, the NAVSTAR system which is now under development is being funded by DOD, even though it is expected to be used by both the military and civil sectors.

The NAVSTAR program has suffered cost overruns and schedule slippages which have resulted in several changes in the overall NAVSTAR program. Originally, NAVSTAR would have consisted of 24 satellites in six co-planar orbits, providing continuous three-dimensional (latitude, longitude, and altitude), world-wide navigation coverage (Transit provides only two-dimensional data, and as many as four hours can elapse while a satellite is not in view). Now, plans call for only an 18 satellite system. The date for initial operational capability (IOC) was originally planned for 1984, but now has slipped to 1988.

Congressional concern has centered on the slip in the IOC date, as well as on the cost increases. Last year, the House Armed Services Committee denied all funding for the NAVSTAR program on the basis that it was a "nice to have" but not an "essential" program.⁷ Although the program was restored in conference with the Senate, all funding for procurement of the NAVSTAR satellites was eliminated. The conference report cautioned DOD that continuing congressional support of NAVSTAR would depend on the priority which DOD assigned to the program, and that the Congress would not accept further slippages in the IOC. The conferees also directed DOD to develop a plan whereby DOD can recoup some of the costs of developing NAVSTAR from the civil sector.⁸

For FY 1983, DOD is requesting enough funding for NAVSTAR to make up for the loss in procurement funding in FY 1982. Congress is very likely to maintain a keen interest in this program in FY 1983.

Consolidated Space Operations Center

As noted previously, DOD is planning to build a Consolidated Space Operations Center (CSOC) in Colorado from which it will control military space missions. The General Accounting Office performed a study of the CSOC proposal during 1981, and concluded that DOD should not be given permission to build CSOC until there is a definitive space policy for the Nation, including military and civil programs, and that an interim facility should be constructed instead.⁹ The issues of military space policy and CSOC are both likely to receive considerable attention in the 97th Congress.

⁷House Comm. on Armed Services, *Dept. of Defense Authorization Act*, H.R. No. 3519, 97th Cong., 1st Sess., 127 Cong. Rec. H. 4486 (1981).

⁸Senate Comm. on Conference, *Dept. of Defense Authorization Act*, S. 815, 97th Cong., 1st Sess., 127 Cong. Rec. S. 5058 (1981).

⁹*Consolidated Space Operations Center Lacks Adequate DOD Planning, Report to the Congress by the Comptroller General of the United States*, U.S. GAO, MASAD - 82 - 14 (1982).

Space-Laser Development

The issue of when space-based lasers might be available has been controversial both in official Washington and the scientific community for some time. Many scientists claim that space-based lasers cannot be made available for at least ten years because of technology constraints, while certain Members of Congress contend that the problem can be remedied by increasing funding for the program.

The concern over space-based lasers has been prompted by reports that the Soviet Union is developing such weapons, and that they may deploy them in the early 1980's. An article in the March 3, 1982 *Washington Post*, reportedly based on classified information made public by a Member of Congress, claims that the Soviets may orbit a space laser in 1983.¹⁰

The twin issues of how far along the Soviets are in their space-laser program, and how much the United States should spend on similar efforts, will receive continuing attention this year.

UNISPACE '82—The U.N. Conference on Exploration and Peaceful Uses of Outer Space

From August 9-21, 1982, the United Nations will sponsor the Second U.N. Conference on the Exploration and Peaceful Uses of Outer Space, called UNISPACE '82 (the first was held in 1968). Congress is interested in U.S. preparations in this conference for the same reasons it has been concerned about U.S. participation in other U.N. conferences. These meetings have become increasingly politicized in the past decade, but the United States (and other countries continue to insist that they are technical meetings for the discussion of technical issues. Regardless of this approach to these meetings, political and legal issues are usually raised.

For the UNISPACE '82 meetings, some of the political/legal issues which might arise include: the militarization of outer space, prior consent as it relates to direct broadcast satellites and remote sensing, use of nuclear power sources in outer space, providing technical assistance to the less developed countries, and rights of countries to natural resources in space (such as geostationary orbit).

Space Policy

Issues involving space policy as a general topic include everything that has been discussed previously, as well as broader issues such as what should be the goal(s) of the U.S. space program, the separation of military and civil space programs, and how the Department of Defense is organized to deal with space matters.

Goals of the U.S. Space Program

U.S. space policy is set forth in 1958 National Aeronautics and Space (NAS) Act which is now 24 years old. The NAS Act provides general guidance to the U.S. space

¹⁰Wilson, *Soviets Reported Ready to Orbit Laser Weapons*, *Washington Post*, Mar. 3, 1982, A 1, 6.

program, such as stating that the United States should remain preeminent in space, and that military and civil space activities should be conducted separately, but no programs were identified. Decisions on what programs to pursue were left to individual Presidents.

During the mid-1970's, concerns about the lack of clear U.S. space goals led to a reexamination of the NAS Act by President Carter. He issued two space policy directives in 1978, one dealing with the relationship between military and civil space activities, and the other concerning the civil space program.¹¹ These directives were subsequently criticized for not outlining specific programs, and four bills were introduced in the 96th Congress designed to provide those programmatic goals.¹² None of these was reported from committee, however.

Two space policy bills have been introduced so far in the 97th Congress—by Congressman George Brown of California (who introduced a similar bill in the 96th Congress), and by Congressman Newt Gingrich of Georgia.¹³ Although hearings on future space programs and policy were held by the House Science and Technology Committee in 1981, they did not address these bills. No companion measure has been introduced in the Senate yet. It seems likely that space policy will receive continued attention in Congress this year, especially once the Reagan Administration releases the results from its space policy review.

Separation Between Military and Civil Space Programs

The United States separated its military and civil space programs at the very beginning of the space age because it wanted to show the world that it was interested in the peaceful uses of space, while also recognizing that there were valuable military uses of the new arena as well. The decision has been controversial from that time forward, and is no less so today.

The arguments in favor of combining the two types of space activities today focus on budgetary matters since many of the programs seem duplicative. In addition, the space shuttle is blurring the lines between military and civil since it will be used for both purposes and is the single major space activity in the United States right now. The disadvantages of combining the two activities include concerns that the civil activities would have to take a back seat to military space programs, and that it might lessen the desire of other countries to cooperate with us in space missions.

The scenario most often painted in discussions of this issue is that DOD would be given control of the shuttle program, space science activities would be either cancelled or given to another agency (like NSF), and the aeronautics and applications program would be terminated with the expectation that the private sector would fund whatever R&D activities need to be pursued. No move has been made either in the Administration or

¹¹The Carter directives are sometimes referred to as PD-37 for the first and PD-42 for second. Press releases issued by the White House on June 19, 1978 and October 11, 1978 respectively describe the policies set forth by President Carter on these topics.

¹²S. 212 (Schmitt), S. 244 (Stevenson), H.R. 5304 (G. Brown), H.R. 4316 (Dorman), 96th Cong., 1st Sess. (1980).

¹³H.R. 3712 (G. Brown) and H.R. 4286 (Gingrich), 97th Cong. 2nd Sess. (1981).

in Congress to effect any sort of transfers such as those just described, and it seems unlikely that such a proposal would be introduced in the near future (the Reagan Administration is trying to abolish two other agencies—the Departments of Education and Energy—at this time and is running into stiff opposition already.)

DOD Space Policy

Another part of the debate over space policy concerns DOD's organization for determining its space priorities and carrying them out. At the present time, there is no central point for discussing space options within the Air Force, which is DOD's executive agent for most of its space activities. A bill has been introduced in Congress by Congressman Kramer of Colorado (H.R. 5130) to change the name of the Air Force to the Aerospace Force, and to have the Secretary of the Aerospace Force submit to Congress a study on the feasibility and desirability of establishing a "Space Command" within the Air Force. It would be on the same level as the Strategic Air Command, the Tactical Air Command, and the several other command-level units in the Air Force structure.

The idea of a Space Command is not new—there are references to it as far back as the early 1950's. The increasing use of space by the military, however, makes it more likely that this concept will receive high level attention in the next several years, especially as DOD gains experience with using the space shuttle. Hearings may be held on this concept in 1982.

Small Business Innovation Development Act

Another measure being considered by Congress is the Small Business Innovation Development Act which is designed to increase small business participation in Federal R&D endeavors, and to increase private sector commercialization of Federal R&D. Under the terms of the proposed Act, Federal agencies with R&D budgets over \$100 million (which would include NASA, DOD, and NSF)¹⁴ would be required to establish Small Business Innovation Research (SBIR) programs which would be funded through a set-aside of funds from the agencies' R&D budgets. The measure is premised on the concern that although small business has been responsible for a large share of innovations, Federal agencies have been reluctant to contract with small firms. The idea is based on an experimental SBIR program in NSF, which has been funded at \$5 million per year since 1977.

The set-aside idea is very controversial. The money for SBIR programs would be taken from funds which otherwise might be available to universities and research centers, and representatives of those sectors have argued that small business should have to compete on merit with everyone else. Other arguments against the measure include: (a) the dispute over what percentage of Federal funds already go to small business (advocates of the measure say 3.5-4%, while opponents claim it is 6.8% and add that small businesses employ only 5.5% of the scientists), especially since subcontractors are

¹⁴The House version of the bill would include agencies with R&D budgets over \$300,000 instead of \$100,000.

not included in the available information; (b) whether a mandated set-aside would subvert the intent of Congress by taking money from one area authorized and appropriated by Congress and put it into another, based on the decision on an SBIR program manager; and (c) whether the NSF program, which is for general research, is applicable to mission oriented agencies (like NASA) which are more concerned with development than basic research.

The Senate passed its version of the bill (S.881) in the first session of the 97th Congress by a vote of 90-0. This version of the bill stipulates a 1% set-aside and an amendment sponsored by Senator Schmitt limits to 1% the amount of funds that can be taken from basic research (as opposed to development funds) for the SBIR programs. Four committees in the House now have a companion measure (H.R. 4326) under consideration; the bill has already been favorably reported from the House Small Business Committee.¹⁵ The House version would require a 3% set-aside, and does not limit the amount of the money which could be taken from basic research. One House committee (Veterans Affairs) reportedly plans to recommend exempting the agency over which it has jurisdiction from the terms of the SBIR act, and other committees in the House may follow suit.

Conclusion

The foregoing list of issues only touches upon the broad areas of inquiry Congress is likely to address in 1982 concerning space activities. As noted earlier, a future report will describe other issues, and update the status of those discussed here.¹⁶

Marcia S. Smith
Specialist in Aerospace and
Energy Systems, Congressional
Research Service, Library of
Congress, Washington, D.C.

¹⁵The House committees now considering the measure are Armed Services, Energy and Commerce, Science and Technology, and Veterans Affairs. The Small Business Committee reported the bill on Sept. 25, 1982, *H.R. Rep. No. 194*, 97th Cong., 2nd Sess. 5341 (1981).

¹⁶Information in this report is current through March 5, 1982.

3. XXIV Colloquium on the Law of Outer Space, Rome, Sept. 6-12, 1981

The XXIV Colloquium on the Law of Outer Space was held during the XXXII Congress of the International Astronautical Federation in Rome, Italy, September 6-12, 1981. The Colloquium had a good attendance from the United Nations and participants from all over the world.

In the first session, chaired by *Professor Pompeo Magno*, the legal implications of economic activities in space were treated.

During the general discussion following the presentation of papers, *Mr. Rothblatt*, prompted by *Dr. Kolossov* and *Dr. Vereshchetin*, explained the principle of "Maximum Value Dispersion." Value dispersion, according to *Mr. Rothblatt*, covered the two major components of space resources development, i.e., the extraction of resources and the distribution of resources. Maximized value dispersion was in accordance with the universal expectations and mutual tolerances derived from customary international space law. Since the principle's application during the last 20 years, there has been a spectacular growth in space resources exploitation, accompanied by greatly increased benefits for millions of people. Maximum value dispersion was the principle on which Intersputnik had, for instance, ungraded satellite channel capacity and brought Algeria into the global communication network.

Answering a question from *Dr. Vereshchetin* about international law being a part of American law, *Mr. Dula*, with a reference to two Supreme Court cases, the "Lola" and the "Habana Paquette," said that international law and treaty law were indeed part of the fundamental law of the United States, but that the Constitution was the supreme law of the United States: it could not be superseded by treaty, agreement or international law. Provisions in treaties entered into by the United States were the juridical equal to federal statutes. The Space Treaty being vague, with no U.S. statutes implementing it, pre-existing federal and state law had to be resorted to for guidance on private economic activities in space, and it was clear that these were not prohibited in either law. *Professor Christol* supported the view of *Mr. Dula*, stressing the Supreme Court's role in declaring unconstitutional any treaties not consistent with the Constitution.

The next point at issue during the second session of the Colloquium, chaired by *Dr. Kolossov*, was the legal status of artificial space objects. *Dr. Kolossov* wondered whether "debris" was to be classified under "celestial bodies" or as "artificial space objects". *Professor Diederiks-Verschoor* favoured classifying debris as artificial space objects, the main characteristic of celestial bodies being that they are not man-made. She also referred to the related problem of determining the period of time during which the state should be held liable for damage caused by debris. *Ms. Sterns* supported *Professor Diederiks's* view, but *Kolossov* felt that debris should either be put into a special category or be regarded as a subcategory. *Rothblatt* recommended making a clear distinction between space objects and celestial bodies, adding that this was also most relevant for celestial bodies with a man-made proportion. *Mr. Smith* suggested a distinction between manned, unmanned and temporarily manned man-made objects.

The legal implications of space transportation systems were also discussed. Some doubts were expressed concerning the legality of NASA using the Shuttle to assist private corporations in space activities. *General Menter* pointed to the analogy with aviation, where the Federal Aviation Administration is responsible for aircraft and their

safety in private operations, and where public aircraft are often used for commercial purposes of private organizations. Similarly, the Shuttle may thus be used for the commercial purposes of private industry. *Dr. Kolossov* wondered whether the landing of space objects by private entities and/or the stationing in space of private satellites was permissible under the Space Treaty and international law. He personally believed it was not. *Dula* and *General Menter* took the opposite view, arguing that treaty law stipulated that non-governmental activities be conducted under supervision of the launching state and were, consequently, covered by existing law, even when U.S. law was silent on the matter. The latter opinion was shared by *Dr. Okolie*.

Reverting to earlier discussions, *Professor Christol* asked first whether the term "exploitation" equalled "commercial use." Next, *Professor Christol*, in a reference to *Professor Diederiks'* paper on the subject, wondered whether the definition of a space object applied to man-made as well as natural objects in space. He questioned seriously the benefits to be derived from defining these objects, drawing an analogy with the problems encountered by the U.N. in defining outer space. He clearly preferred the descriptive approach customary in Anglo-Saxon law. *Professor Diederiks* pointed out, in reply, that a proper definition of debris vis-a-vis space object was a matter of urgency due to its decisive impact on liability. The same case could be made for determining precisely the point in time at which a space object becomes "debris".

During the last two sessions papers were presented on the Institutional arrangements for space activities. The third session was chaired by *Professor Gorove* and the fourth session by *Dr. Jasentuliyana*. This subject provoked a lively exchange of views, extending also to a wider range of topics, especially in the last session, when time allowed more discussion. *Dr. Vereshchetin* felt that the time had come for a general agreement about the problems of man and man's activities in space; present international norms were difficult to apply. Besides, the era of Shuttle and Salyut 6 made further agreements necessary.

Professor Böckstiegel, in a comment on *Professor Gorove's* paper and with the liability aspects in mind, expressed the opinion that the terms "launching State" and "procuring state" would have to be altered in the Liability Convention. He further asserted that the Shuttle might be regarded as an "aircraft" because it travels through the airspace, and not as an "airplane" in the sense contemplated in the Chicago Convention. *General Menter*, in his reaction, felt that the time had come to look at what was required in the future rather than trying to adapt the laws of the past, adding that no changes were needed in U.S. law, as all vehicles navigating or moving through space were satisfactorily covered by existing legal arrangements. *Professor Gorove*, questioned by *Professor Christol*, affirmed that international organizations may be regarded as "launching states".

While on the subject of COPUOS, *Professor Gorove* expressed support for this organization and the consensus procedure as it stands, and wondered what the exact status was of Interkosmos if this was not, as *Dr. Vereshchetin* asserted, an international organization. *Professor Christol* also showed appreciation for COPUOS achievements, unlike *Dr. Matte*, who considered its work unsatisfactory. Both *General Menter* and *Professor Böckstiegel* expressed confidence in the organization, the latter mainly for its useful role in achieving agreements of a general nature.

Turning the attention to the issue of private activities, *Dr. Vereshchetin* stressed that they are permissible only under strict supervision. In the case of OTRAG, treaty

mandates have not been complied with, according to him, as neither West Germany nor Libya were clearly responsible. *Professor Christol*, however, considered Libya responsible. *Professor Gorove*, on the other hand, felt that West Germany was also liable because no national law could abrogate international law by a unilateral act. *Böckstiegel* noted that OTRAG was a private organization and that responsibility was not the same thing as liability. The most pressing problem was to determine who or what is to be regarded as a "launching state". He felt that Libya, being a member of the Outer Space Treaty, was responsible for OTRAG activities.

Commenting on freedom of space activities in the context of the Space Treaty, *Dr. Kolossov* expressed disagreement with a doctrine to that effect but accepted the existence of qualified freedoms. *Dr. Vereshchetin* did not entirely share *Dr. Kolossov's* view on this matter. *Dr. Kolossov* stressed that in years to come economic activities in space would increase considerably. When agreements in connection with these developments are being discussed the different forms in economic structure and ownership in the world will have to be taken into account. There should be freedom of scientific investigation and research and qualified freedom of exploration and use of outer space. It was doubtful, according to *Dr. Kolossov*, whether there was a need to establish an overall international organization to govern the latter activities; this would depend on whether states would be able to agree on adopting a treaty prohibiting the stationing of any weapons in outer space. According to *Dr. Kolossov*, space activities are global problems, with a political angle, which should not be decided without the consent of three important world groupings, i.e., the socialist states, the Western states, and the developing states.

In connection with private activities in space, *Dr. Vereshchetin*, commenting on *Professor Gorove's* paper on OTRAG, said that this was a typical case of joint and several liability. *Mr. Dula* noted that in case of liability incurred by U.S. private corporations, the U.S. Government would be liable.

Dr. Okolie said that Libya could be indicted under the U.N. Charter: international law, and not private law, should be applied. *General Menter* agreed, sharing the point of view in matters of liability no distinction should be made between article 6 of the Space Treaty and article 4 of the Liability Convention. West Germany should be held responsible for the activities of its nationals, even when they were in Libya. *Professor Christol* suggested that the term "procuring" implied a prior request, and the point was to decide whether the German activities in Libya could be regarded as "launchings" when no request had obviously been made. *Professor Böckstiegel* insisted on a distinction to be made between responsibility and liability, and said that West Germany was responsible under the Space Treaty and liable under the Liability Convention. *Mr. Dula*, in a reference to manned space flights, said *Dr. Vereshchetin's* position regarding the return of military personnel was not in accordance with the Rescue Agreement. This was a matter quite distinct from damage, where the Liability Convention was applicable. *Dr. Vereshchetin* agreed that astronauts must be returned.

Regarding artificial space objects, *Dr. Kolossov* supported the view that the limitation was urgent because reusable spacecraft can manoeuvre in airspace as well. Such a definition should in his opinion run parallel to a definition of space objects. He regretted that a USSR proposal to include this issue in the agenda of the UNCOPUOS Legal Committee had failed. The main criterion to be applied here was, in his opinion, the ability of an object to move into outer space. *Professor Gorove* found the Soviet

proposal interesting but said the intention of going into space should also be an element in any definition. *Dr. Okolie* also agreed with *Dr. Kolossov* on the matter of definition, unlike *Dr. Gal*, who considered that reusable launchers did not introduce any difference between a satellite and a shuttle. Space activity was not just going into outer space, but going in orbit; potential conflicts between space and air law were easy to solve, because in the case of the shuttle, space law must prevail.

Professor Woetzel referred to his paper on "Implementation Mechanisms for Conflict Resolution." He considered that individual and corporate responsibility in different environments had to be elaborated in the absence of any general agreement on the responsibility of states, and that new institutions might be useful for this purpose. *Mr. Sedie* drew attention to the lack of cohesion in the definition of space objects in space law, and *Mrs. Galloway* mentioned two possible criteria, (geographical or functional) for delimitation between air and space law. After *Professor Gorove* had suggested that various questions connected with space debris could be usefully studied by the IISL, the Chairman brought the discussions to an end, expressing his appreciation for the fact that IISL had provided an appropriate forum for an extensive and amicable exchange of views.

In her closing address, *Professor Diederiks*, the President of IISL, expressed satisfaction that the Colloquium had been so well attended. Finally, she extended her warmest thanks to the Chairmen and Rapporteurs, the authors of the various papers, and all others who took part in the discussions.

I.H.Ph. Diederiks-Verschoor
President, International Institute
of Space Law (IISL)

4. *Symposium on "Earth-Oriented Space Activities and Their Legal Implications,"*
McGill University Montreal, October 15-16, 1981

The Centre for Research of Air and Space Law, McGill University, hosted a Symposium on "Earth-Oriented Space Activities and their Legal Implications" at Montreal, Canada, October 15-16, 1981. It was the second event of its kind organized in the framework of a research project on "Space Activities and Emerging International Law" which the Centre is currently undertaking on behalf of the Social Sciences and Humanities Research Council of Canada* The occasion also marked the thirtieth anniversary of the Institute of Air and Space Law, founded in 1951 by *John Cobb Cooper*, and the fifth anniversary of the Centre for Research, established in 1976 by its present Director, *Nicolas M. Matte*.

The meeting was organized in the form of four panels, each of which attempted to provide answers to one though-provoking question.

Panel 1 dealt with the topic "Direct Broadcasting Satellites: Freedom or Control?" under the chairmanship of *Nicolas M. Matte*. *Yash Pal*, Secretary-General of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 1982), attempted to show the potential benefits of a worldwide direct

*For a report on the first Symposium, held from October 16-17, 1980, see 8*J. Space L.* 206-07 (1980).

broadcasting system in terms of increased communication, interaction and what he called "new cosmic religion," meaning a new consciousness of human relatedness in cosmos. He therefore pronounced himself strongly against state control, but believed "consultations and agreements" among states were necessary for exchanges to occur, in particular in view of the results achieved by the ITU World Administrative Radio Conferences.

Gerard Perrin, Vice-Chairman of the International Frequency Registration Board, ITU (Geneva), presented a detailed review of the existing ITU mechanisms of frequency allocation concerning satellite services; he also discussed the question of frequency planning and the results achieved by the World Administrative Radio Conference of 1979, with respect to Regions 1 and 3 for direct broadcasting services. His presentation raised the important question, to what extent the "technical" coordination within ITU left a real need for additional "political" control by States in terms of specific agreements on DBS services.

John M. Logsdon, Director of the Graduate Program in Science, Technology and Public Policy at George Washington University (Washington D.C.) analyzed the political and socio-economic factors which are underlying the international controversy on direct broadcasting. He expressed his view that DBS development, including development of a legal framework, was much more likely to be motivated by economic factors than by others and that legal rules would develop on the basis of initial applications of this new technology. Influence on the development on such rules may already have bypassed the U.N.

Christos A. Siocos, Director of Engineering in the International Relations Department, Canadian Broadcasting Corporation, presented a view from the technological and operational perspective. He discussed the present regulatory framework as developed in the ITU, and saw only limited room for further discussion within COPUOS on political aspects of direct broadcasting services.

Panel 2 dealt with the subject: "Remote Sensing: Who Benefits?" under the chairmanship of *Karl-Heinz Böckstiegel*, Director of the Institute of Air and Space Law, Cologne University. *Frank B. Henderson*, Chairman of the GEOSAT Committee, San Francisco, gave an introductory presentation, illustrated by slides, on the present-day variety of uses of remote sensing satellites, and the future potential of an operational system. *John R. Parry*, Professor of Geography at McGill University, Montreal, discussed the historical development of space science, the actual costs of developing and launching spacecraft, and the benefits with particular view to remote sensing.

Per M. Wijkman, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts and *Clas Wihlborg*, Professor of Finance and International Business, New York University, discussed in a joint paper the economic factors underlying international remote sensing activities, and suggested regulatory models based on economic analysis.

Eugeniusz Wyzner, Ambassador, and Director of the Department of International Organizations in the Ministry of Foreign Affairs of Poland, gave a careful and thought-inspiring analysis of the present state of the discussions in the Legal Subcommittee of UNCOPUOS concerning international remote sensing activities, and their legal regulation. Despite the seemingly irreconcilable views as regards the need for limitations to be placed on such activities, he expressed some optimism that in view of past experience, the Legal Subcommittee will be able to reach a compromise acceptable to all delegations.

Panel 3 was concerned with the question: "Energy from Space: Advantages or Disadvantages?", and was chaired by Ambassador *Eugeniusz Wyzner*.

Peter Foldes, Manager of Antennae Engineering, General Electric Space Division, Valley Forge, Pennsylvania, gave a breath-taking survey of the present plans for in-orbit construction of large-size solar power platforms by U.S. industry. He also explained the platforms' technical capabilities and degree of economic efficiency in relation to conventional power sources.

Fred H. Knelman, Professor of Science and Human Affairs at Concordia University, Montreal, attacked these plans rigorously and in a provocative manner, on the grounds that they were too costly, that their side-effects were unknown, and that they were an adventure in "upsetting" the ecological environment to an unknown extent.

Karl-Heinz Böckstiegel presented a concise legal analysis of the question, if, and to what extent, states and private enterprises may engage in launching and operating solar power satellite systems. He also discussed the various limitations in law and in fact, as well as the question of risks and liability regarding energy from space. He reached the conclusion that, apart from these limitations, no legal rules prevented private or public bodies from launching and operating such satellite systems.

Lionel Boulet, Director of the Institut de Recherches of Hydro Quebec, Montreal, discussed the question of solar power satellite systems in perspective with other power sources and from the angle of an Electrical Power Corporation. In view of the many aspects of solar energy generation yet to be explored, the electrical utilities must, in his opinion, continue to develop all available conventional energy resources within their own territory.

Panel 4 dealt with the "classical" question: "Delimitation of Air Space and Outer Space: Is It Necessary?" in the form of a debate chaired by *Thomas Pavlasek*, Professor of Electrical Engineering, McGill University, Montreal.

Bin Cheng, Dean of the Faculty of Law, University College, London, and *Lubos Perek*, Astronomical Institute, Czechoslovak Academy of Sciences, Prague, argued in favour of the "spatialist" view that a delimitation was necessary. *Mr. Perek's* paper was presented by *Eugene Pepin*, Honorary President of the International Institute of Space Law of the IAF. *Cheng* presented a particularly thought-provoking analysis of the difference in presumptions pertaining to sovereign air space, on one hand, and to the regime of outer space under the Space Treaty of 1967, on the other. His argument that the present state of general international law necessitated a delimitation, found approval among many participants and was answered with long applause. *Perek (Pepin)* argued along similar lines, but emphasized particularly the need to avoid further uncertainties, so as to avoid further arguments as advanced in the Bogota Declaration to the effect that the geostationary orbit belonged to the territory of subjacent equatorial states.

Mircea Mateesco-Matte, Director of the Centre for maritime and air law, University of Nantes, *Michel Bourelly*, Legal Adviser of the European Space Agency, and *Neil Hosenball*, General Counsel of NASA, defended the view that a delimitation was not needed. *Mateesco-Matte* supported the functionalist view and on this basis regarded efforts of delimitation as futile since necessarily based on fictitious grounds. *Bourelly* argued mainly on the basis of a lack of suitable criteria for delimitation while *Hosenball* attempted to show that no reasonable argument for delimitation could be found, and

that a premature delimitation may, on the contrary, have negative effects on future technological developments. The ensuing open discussion showed that both opposing positions had supporters in the audience. It also showed strong concern over the lack of legal regulation of military activities in earth orbits and other parts of outer space.

The closing banquet was marked by a presentation by the *Honorable John Roberts*, Canadian Minister of State for Science and Technology (represented by D.I.R. Low, Chairman of the Interdepartmental Committee on Space), on the role of the Federal Canadian Government in the shaping of a Canadian space policy and in particular the efforts to the creation of an institutional central focus within the government for space activities and their development.

The proceedings of the Symposium are planned for publication in 1982.

Dr. Ludwig Weber,
University Lecturer,
McGill University

5. *International Conference on "Doing Business in Space: Legal Issues and Practical Problems", Smithsonian Institution, November 12-14, 1981 Washington, D.C.*

The First International Conference on "Doing Business in Space: Legal Issues and Practical Problems" was held November 12-14, 1981 in Washington, D.C., coincident with the second successful voyage of the Space Shuttle "Columbia". The Conference, co-sponsored by the Smithsonian Institution, the American Law Institute, the International Bar Association, and the American Law Institute American Bar Association Committee on Continuing Professional Education, brought together for the first time an international faculty and participating audience of space business experts, including scientists, engineers, insurance brokers, risk managers, bankers/investment houses, top-level businessmen and Government officials, academicians, and lawyers. They exchanged ideas and discussed mutual problems ranging from private ownership, operation, and management of the various space transportation systems available, including the Shuttle, to risk management necessary to induce and protect greater financial investment, principally by the private sector in a broad spectrum of space activities.

The first panel included *Dr. Karl-Heinz Böckstiegel*, University of Cologne who discussed the impact of the Outer Space Treaty of 1967 and the 1971 Liability Convention on space activities conducted by private industry; *Santiago Astrain*, Director General of INTELSAT who addressed the past and future challenges of that organization; *Jean Arets*, Head of International Affairs at the European Space Agency who characterized that organization's cooperative efforts with both industrialized and developing nations; and *Bert Cowlan*, a well-known New York based communications consultant who presented an overview of the impact of various international conventions and treaties on such areas of concern as human rights, free flow of information, the right to communicate, and the influence of these documents on world communications today. *Mr. Cowlan* also emphasized his concern about the initial decision of the United States Government not to attend the upcoming UNISPACE Conference to be held August, 1981 in Vienna.

Discussions at the second session were stimulated by very practical and instructive presentations by *Art Dula*, a Houston attorney, who spoke about the private sector's concern regarding the present status of intellectual property rights relating to the development and use of the U.S. Space Transportation System; *George van Reeth*, Director of Administration at the European Space Agency, who compared that organization's policies and laws dealing with intellectual property rights and patents with those of the United States; and *Gerald J. Mossinghoff*, formerly Deputy General Counsel at NASA and presently U.S. Commissioner of Patents and Trademarks who rebutted *Mr. Dula* on a number of salient and pressing points.

The third and fourth sessions dealt with use, ownership, control, and management of space-related facilities by the private sector, *i.e.*, ground facilities/satellites, and various space transportation systems, respectively. *Dr. Bockstiegel* recounted some of the lessons learned from the OTRAG experience and their relationships to West German Law and Government attitudes. *John B. Gantt*, Vice President and General Counsel of COMSAT General Corporation emphasized that organization's existing pressing legal issues and problems, and *Joel R. Alper*, Vice President for Operations of COMSAT General addressed what he termed "INTELSAT's Other Half," *i.e.*, the global systems Earth segment. *Sidney Topol*, President of Scientific-Atlanta, Inc., probably the fastest growing ground station owner/fabricator in the United States, discussed the problems relating to the present communications growth area which he characterized as video entertainment via cable and broadcasting, followed closely by business communications which will establish the "Office of the Future" via satellite ground stations. *Mr. Topol* asserted that the opportunities for doing business in space far outweigh the need to fear any legal or practical obstacles, and believes the DCC "open skies" policy and recent broadcast satellite decision, the deregulation of receive-only Earth stations, and the prevailing Government attitude about deregulation all will increase dramatically the opportunities for doing business in the satellite communications markets.

The session dealing with the private sector's direct involvement in the ownership, control, and operational management of space transportation systems offered an excellent in-depth analysis of divergent views expressed by government and private sector interests. *Raymond Orye*, Head of ESA's Ariane launch vehicle program office, spoke about the Ariane project and the research and development role of ESA. He then addressed the growing role of Arianespace as a non-governmental entity in marketing Ariane launching services. *John F. Yardley*, former Associate Administrator of NASA for STS acquisition and operations, and presently President of the McDonnell-Douglas Astronautics Co., spoke emphatically about the myths and realities of private sector ownership, management, and operational control of the U.S. space transportation system, and asserted that there will be no private ownership or control of the operational phase during the first generation of the Shuttle vehicle. *Gilbert W. Keyes*, Manager of Customer Requirements, Advanced Space Systems of Boeing Aerospace Co., was somewhat less negative in describing the possibilities of a private company becoming directly involved in the high-risk endeavor of space shuttle operations, although he believes it is not economically feasible under the present circumstances. *William A. Good*, President of Earth Space Transport Systems Corp., provided a positive counterpoint by asserting that the issue of whether the private sector can or will own, manage, or operationally control the shuttle rests primarily on calculated, but imaginative, entrepreneurial decisions.

The panel dealing with insurance, liability, and risk management focused principally on liability risks of space shuttle contractors and manufacturers. *Gerald E. Frick*, Senior Vice President of the Marsh and McLennan brokerage, emphasized the pressing problems precipitated by the current NASA Launch Services Agreement for all Shuttle payloads. *Stephen Merrett*, of Merrett Dixey Syndicates, Ltd., the largest independent underwriting agency in London, spoke about the unpredictable risks and huge liability exposures for the private sector involved in space projects; and *Paul G. Dembling*, former General Counsel at NASA and presently in private practice in Washington, D.C., analyzed U.S. legislation covering natural disasters, and noted that except for the Price-Anderson Act, certain relatively minor statutes, and NASA's coverage for users of the Shuttle, there is no comprehensive statute dealing with man-made catastrophic accidents arising from Government projects. *Lawrence P. Stich*, Assistant General Counsel for IBM's Federal Systems Division emphasized some of the very pressing liability risk problems of shuttle contractors in dealing with NASA and other Governmental entities. His pointed observations prompted heated rejoinders and defenses by various NASA officials.

The last panel session dealt with structuring and financing of space ventures. At present, satellite communication has been the only commercially successful space venture by the private sector, and *Professor Clas Wihlborg* of the New York University Graduate School of Business Administration spoke of the impact of international law on the profitability and financial risk of future space ventures by the private sector. *Donald L. Flexner*, formerly Deputy Assistant Attorney General of the Anti-Trust Division at the Department of Justice, and presently in private practice in Washington, D.C., reviewed large-scale Government-industry enterprises and the impact of anti-trust laws, and *Arnold W. Sametz*, Director of the Salomon Brothers Center for the Study of Financial Institutions, New York University, stated that the problems of investing in space are not financial. Rather, they are problems of accounting and economic organization. The truth of this observation may be reflected in the results of a meeting between Government officials and representatives of the New Jersey based Space Transportation Co., which took place at the same time as the Conference. That meeting involved the commitment of \$500,000,000.00 of private funds to finance a fifth Shuttle-Orbiter. If there is Congressional approval of this effort, the private sector may have a firmer practical "foot in space" then many are prepared to recognize, along with all the attendant legal issues and practical problems.

One interesting footnote: a representative from the Soviet Embassy in Washington concluded the Conference with the observation that, while the USSR was not the greatest supporter of private enterprise in space, his government was willing to listen to any possible joint endeavors proposed by private industry in the United States and Europe. There undoubtedly is much careful consideration behind that statement, and many policy and legal problems would have to be resolved, but it does provide an interesting alternative.

George S. Robinson
Assistant General Counsel,
Smithsonian Institution,
Co-chairman of the Conference

6. Session on "Outer Space, International Law, International Regimes and the Common Heritage of Mankind", Association of the Bar of the City of New York, New York, N.Y., November 14, 1981.

"Outer Space, International Law, International Regimes and the Common Heritage of Mankind" was the subject of a panel discussion at a session of the Association of the Bar of the City of New York on November 14, 1981. It was cosponsored by the American Branch of the International Law Association, the American Society of International Law and the American Foreign Law Association. Panel members in the order of presentations were *Edward R. Finch, Jr.*, chairman, *Professor Stephen Gorove*, *Dr. Boris Khabirov*, *Dr. Amanda L. Moore* and *General Martin Menter*.

Mr. Finch, a member of the International Astronautical Academy and former Chairman of the Aerospace Law Committee of the International Law Section of the American Bar Association, introduced the speakers and then made the following statement:

There are six basic principles in outer space international law of which we should all be aware as a matter of law, economics, politics and science. This is an interdisciplinary discussion and science is very important in the evolution of the law of outer space. Outer space has made the greatest progress of any branch of international law during the last two decades.

What are these six basic principles?

The first is that outer space requires long range consistent policy planning to be successful with minimum five-year programs and preferably longer.

The second is that outer space is inherently international by its very nature.

The third is that outer space holds an important solution to global resources and shortage conflicts.

The fourth is that outer space is one of the principal factors for world peace, world information and world trade.

The fifth basic is that the greater number of nations participating in outer space policy or a particular project, the greater the assurance of non-threat to any nation's national security.

The sixth basic truth is that outer space is big and vast both from a scientific and a legal point of view, and many of the scientists are asking us lawyers today if Einstein and outer space are not really the true keepers of world peace.

Those are six very broad principles, but I think they are principles that we should consider and keep in mind as we deal with these controversial topics which face us, particularly in the fifth treaty arising from the U.N. Committee on the Peaceful Uses of Outer Space (UNCOPUOS) namely the 1979 Moon Treaty to which we will be addressing ourselves this morning. To the best of my knowledge, 12 nations have now signed that treaty, but the Soviet Union and the United States have not yet signed it and are still officially in the process of studying the same. I would like to put before you six points that were made by the United States delegate in UNCOPUOS at the time the consensus agreement was reached with regard to that treaty.

The first is that the differences between 1979 Moon Treaty and the law of the seas are significant; in Washington, I made the point from a policy point of view, that outer space should continue to lead the way in international law rather than having the principles of the law of the sea and its various proposed authorities and regimes point the way for outer space.

Second, the United States introduced the "common heritage" terminology and the Soviets were on record as opposing it. Therefore, the 1979 Moon Treaty is not some hurry-up convention that was designed to meet particular problems arising from evolving scientific outer space technology, particularly, solar power satellites.

Third, whatever future interests are at stake can be well protected by the treaty and I must lay out for you the exact language of the treaty which clearly says that the "international regime" is a matter that will be discussed during the ten-year life of the 1979 Moon Treaty. It does not say that the Soviet Union or the United States have agreed in advance to any particular type of "international regime."

Fourth, "common heritage" does not mean the same thing in the moon treaty because the words in the moon treaty, by the expressed terms of that treaty, are limited to common heritage as used therein.

Fifth, to tell the lesser developed countries by the United States refusal, or any country's refusal to sign the 1979 Moon Treaty that the US will not participate or discuss an "international regime" in a future conference is not in the best interests of world peace.'

May I close my opening remarks by indicating that your chairman has also recently proposed in Washington a Shuttle-Salyut Project. The reasons for this you can see from the list of principles that I recently enumerated, and also because of the link-up of USSR permanent space stations Salyut 6 and 7 with Cosmos 1267. As you know from the remarks of Mr. Yardly of NASA and others, it is perfectly possible for us to carry an entire Salyut in the bay of the shuttle if we should ever decide, in the interest of world peace and the progress of outer space, to have a Shuttle-Salyut project on the basis of an international Executive Agreement, similar to what we had in Appolo-Soyuz which was so successful.

Professor Gorove, President of the U.S. Association of the International Institute of Space Law and I.A.F. delegate to UNCOPUOS and UNISPACE 82 was the next speaker. His remarks centered on the phrase, "common heritage of mankind" which he noted was addressed and partly circumscribed, for the first time, in a specific provision in the Moon Agreement. *Professor Gorove* observed that the phrase "common heritage of mankind" has developed from a mostly philosophical notion to a legal concept with political and economic overtones. According to *Professor Gorove*, the Moon Agreement requires a good faith effort by the parties to establish an "international regime" at such time as the exploitation of resources of the moon and other celestial bodies is about to become feasible and practical. He discussed certain questions that might be raised by these provisions, including limitations on solar energy and the rights of public and private entities vis-a-vis certain exploitable resources under the "common heritage" concept. In concluding his remarks, *Professor Gorove* alluded to the requirement of "equitable sharing" that is placed on the international regime's handling of the exploitation of resources. *Professor Gorove* found this to be indicative of a trend reflecting an increasing demand on the part of developing countries to receive a larger share of the world's material resources. He concluded, "that as lawyers and legal technicians, our task is to follow the ever-changing patterns of formal authority reflected in legal instruments, identify their ramifications and draw attention of the drafters, negotiators and policy makers to the relevant changes and their implications."

The questions which followed *Professor Gorove's* presentation largely were concerned with the equitable sharing requirements of the treaty. Members of the panel elaborated on this concept. In particular, it was noted that "equitable sharing" is not the same as "equal sharing" and *Professor Gorove* indicated that one of the questions was whether the research and development costs of exploitation could be recovered before any benefits had to be shared.

Next, *Dr. Boris Khabirov*, from the Office of Legal Counsel of the United Nations, spoke. *Dr. Khabirov* focused his remarks on the international regime of outer space.

Subsequently, he summarized his statement in the following way, emphasizing that the views expressed by him were his personal views:

In accordance with the 1967 Treaty on principles governing the activities of States in the exploration and use of outer space, international law including the United Nations Charter extends to outer space, the moon, and other celestial bodies (Art. III). But principal provisions of international law are applicable not only to outer space but to all kinds of space or all categories of territories, in general, where man conducts his activities. In this connection it should be pointed out that outer space has its own features, its own characteristics which clearly distinguish it from, for example, the state territory. There are certain fundamental principles established in the 1967 Treaty and of these, two principles are of particular importance. Article I of the 1967 Treaty reads: "Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all states without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies." We might refer to this principle briefly as the principle of *common (equitable) use*. It has also found its reflection in articles XI, 5, 4, VI, 5, 4, VI, 5, 1, VII and IX of the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies.

Article II of the 1967 Treaty reads: "Outer Space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other use." This principle which was confirmed and further elaborated in the Moon Agreement (article XI, 5, 5, 2 and 3) might be formulated in short as the *principle of non-appropriation*. Closely related to this is the principle of indivisibility of outer space.

It is on these foundations that the legal regime of outer space does in fact rests. The existence in international space law of these principles substantially makes this branch of law distinct from air law or law of the sea. Different terms of the ancient Roman law are used for defining outer space and its regime: *Res Nullius*, *Res Communis*, etc. It seems more appropriate to consider the outer space and celestial bodies as *Res Extra commercium*, which means that the outer space and celestial bodies are for common (equitable) use but they are *not common property Res Communis* which might be appropriated. As to the provision of the 1967 Treaty according to which the exploration and use of outer space are the "province of all mankind" it should be said that the treaty recognizes as the "province" only the exploration and use of outer space - in other words the results of the activities regarding exploration and use of outer space - but not outer space itself.

It would be interesting to make some comparisons between the Law of the Sea and the Law of Space. In accordance with the 1958 Convention on the High Seas the freedom of the high seas contains, as a matter of fact, a number of freedoms - freedom of navigation, freedom of overflight, freedom of fishing, freedom to lay submarine cables and pipelines, etc. In other words, neither the law of the sea nor air law contains the principle of the freedom of the seas and the principle freedom of the air in their absolute meaning, but they rather recognize certain freedoms defined by international law. In analogy with the Law of the Sea as regards space law, we can also speak not about the freedom of outer space, but about the certain freedoms of outer space which are also determined by international law and beyond which we can find restrictions rather than absolute freedom. The following freedoms of outer space could be distinguished - equal right of all states to use outer space and celestial bodies, right for scientific research in any area of outer space, right to use any equipment and military personnel for scientific research of outer space for peaceful purposes, right to use space technique for practical purposes etc.; and at the same time, the restrictions are - non-appropriation of outer space, prohibition to put certain objects into orbit, prohibition to use space technique in prejudice to sovereignty and other legitimate rights of states, etc.

In any case the modern trends of development of the law of outer space show that the new norms which were worked out or are being worked out are directed towards

restrictions in the field of use of outer space and do not increase the number of recognized freedoms of outer space. An explanation for this could be found in the recognition of indivisibility of outer space which constitute the basis of its legal nature.

The principle of the common heritage of mankind which was first put forward with respect to seabed in 1967 found its expression in the 1970 Declaration of Principles Governing the Sea Bed and Ocean Floor and the Subsoil Thereof, Beyond the Limits of National Jurisdiction. The Declaration stated that the seabed and its resources are the "common heritage of mankind". In accordance with Article 136 of the Draft Convention on the Law of the Sea contained in document A/CONF.62/L.78 of 28 August 1981, international seabed area and its resources are the common heritage of mankind. And finally this principle has been reflected in the Moon Agreement - the first international treaty introducing the principle of the common heritage of mankind. In none of these documents is a definition of the common heritage of mankind to be found. This leads to the conclusion that the common heritage of mankind principle or concept is a developing one, which will have to be elaborated by States in a future international regime taking into account purposes and objectives that, for example, article XI of the Moon Agreement provides.

The third panelist was *Dr. Amanda Moore*, a member of the New York Bar and vice-chairman of the NGO group to UNISPACE '82. *Dr. Moore* found two categories of information on the subject matter under discussion to be of primary interest: The first was the intellectual challenge involved in dealing with the concept of the common heritage of mankind and the conflicting aspirations and interests relevant to it. The other was the information helpful in properly serving a client.

Dr. Moore reviewed the positions of the United States and other States as to the "common heritage" language beginning in 1972 and moving to the present. She remarked that the United States and developing nations were early supporters, with the socialist states being opposed, although the latter are now realizing that it is in their interest to support this sort of language, as they did by consensus in the new Moon Treaty. *Dr. Moore* touched briefly on the present U.S. position vis-a-vis the "common heritage" language and the fact that those arguing against the 1979 treaty in Congress are the same persons reanalyzing the Law of Sea negotiations, suggesting that the outcome will be indicative of the outcome on the 1979 Moon Treaty.

Dr. Moore noted that international negotiations would be required for establishing facilities on the moon. She observed that there would probably be development of the deep sea bed prior to the existence of moon facilities and the sea bed arrangements would be looked to as an example.

The final speaker was *General Menter*, Vice President of the International Institute of Space Law. *General Menter* first spoke briefly on the organization and activities of the International Institute of Space Law. Turning to the subject under discussion, *Gen. Menter* observed that U.S. Executive and Legislative pronouncements, and subsequent U.N. General Assembly (UNGA) declarations and recommended treaties to govern space activities, envisaged cooperation among nations for the peaceful exploration and use of all nations. Further, in the hope of keeping outer space free from international conflict, they rejected in space exploration application of the historical concept that recognized claims of sovereignty over newly discovered and explored lands on Earth.

Gen. Menter noted the differing views as to whether the 1979 UNGA sponsored so-called "Treaty on the Moon" ("TOM") intended to permit or preclude exploitation of the natural resources of the moon and other celestial bodies. He recognized that the Article 11(3) recital that "natural resources in place" shall not become the property of

any person, organization or nation, would appear at first blush to preclude exploitation. However, he believed that perusal of the negotiated history of such wording clearly reflected the drafter's intention to permit exploitation. The insertion of the words "in place" was expressly recited by its proponent "to indicate that the prohibition against assertion of property rights would not apply to natural resources once reduced to possession through exploitation. . ." (see 7 J. Space L. 95, 103). He went on to state that as other recitals in the TOM (Art. 11 (5), (6) and (7)) speak of establishment of an international regime for development, management and an "equitable sharing by all States Parties in the benefits derived from those resources. . .", resort to the negotiated history for clarification of the intended meaning is appropriate under both customary international law and Articles 31 and 32 of the recent Vienna Convention on the Law of Treaties which became effective on January 17, 1980, but to which the U.S. has not yet become a party. The true intent of the drafters could be set forth in "Understandings" by the U.S. in signing and/or in the Senate Ratification of the TOM to assure construction in accord with the negotiated history. Such acceptance would obviate doubt expressed by some attorneys, prior to the advent of the TOM, as to authorization in space law for exploitation of natural resources of celestial bodies.

General Menter stressed that an examination of the negotiated history of the TOM further clarifies the drafters' intent that the exploitation of moon resources need not await establishment of the international regime, and that the nature of such regime—which could vary from an agreed set of governing principles to establishment of an operating, governing international institution—would be the subject of a subsequent international agreement. The terms "equitable sharing" and "common heritage of mankind" ("CHM") also are left for later clarification. However, the TOM negotiated history does give guidance as to a narrowing encompassment intended by the CHM phrase by the compromise which added words of limitation immediately following the CHM recital, viz: "which finds its expression in the provisions of this agreement. . ." This compromise permitted employment of the CHM phrase, but limited its meaning to be derived from its use in the TOM and not from its use in other possible documents such as the proposed Convention on the Law of the Sea. Finally, *General Menter* noted that the TOM does not provide for "equitable sharing" by all nations under the CHM concept, but by "all States Parties" to the TOM.

At the conclusion of *General Menter's* remarks, there followed a lively question-and-answer period, following which Chairman Finch thanked all for coming and brought the meeting to a close.

Stephen Gorove
President, Association of the United States
Members of the International
Institute of Space Law

7. "Private Enterprise in Outer Space" Program, Association of American Law Schools, Philadelphia, January 9, 1982

The "Aviation and Space Law Section" of the Association of American Law Schools sponsored a program on "Private Enterprise in Outer Space" during the Association's annual meeting in Philadelphia, on January 9, 1982. The program dealt with the legal aspects of "Private Enterprise in Outer Space" and was chaired by *Professor Stephen Gorove* of the University of Mississippi Law Center who currently serves as President of the U.S. Association of the International Institute of Space Law. Panelists included *Professor Aldo Armando Cocca*, Ambassador at Large of Argentina, *Paul G. Dembling*, former General Counsel of NASA and the General Accounting Office, currently in private practice in Washington, D.C. and *Delbert D. Smith*, former Senior Vice President of COMSAT, and currently also in private practice in Washington, D.C.

In his introduction *Professor Gorove* gave a brief overview of some of the relevant provisions of international space agreements including the Outer Space Treaty of 1967, the Liability and Registration Conventions and raised a number of questions for possible discussion. Following *Professor Gorove's* introductory remarks *Professor Cocca* presented the following statement:

At a meeting of lawyers, held in an Association of Law Schools, it is essential to determine whether the activity of a private enterprise in space is to be considered legitimate. The answer is decidedly in the affirmative. This is so not only because in the field of international law everything which is not prohibited is permissible, but also because such activity has been expressly recognized as such in the context of the international documents and the practice of States.

In fact, the proposal of the USSR whereby it was stated in May 1962 that "all activities of any kind pertaining to the exploration and use of outer space shall be carried out solely and exclusively by States" (U.N. Doc. A/AC.105/C.2/L.1, 1962), has been totally overridden by the categorical drafting of article VI of the Space Treaty.

As regards State practice, all countries having a minimum international telecommunication traffic are members of the INTELSAT, which provides the best example of private activity in space and which, neither in the provisional stage nor at present, has offered any difficulty concerning its operation, functioning and management.

In spite of the difficulties from the theoretical point of view which could be foreseen regarding the legal and economic structure of the INTELSAT, three Soviet stations retransmitted TV programmes to America, Australia and the Middle East during the 1980 Olympic Games. Furthermore, the Soviet station Lvov is connected to the INTELSAT system by means of a direct liaison with the INTELSAT-IV; similarly, the ground station Moskva may provide a direct connection with the INTELSAT system in lieu of Lvov. In a word, the permanent functioning of two direct and independent connections are ensured through satellites Molnya-3 and INTELSAT-IV-A. This kind of international cooperation was not even thought of in 1969.

However, economic activities in outer space, the Moon and other Celestial Bodies, have specific characteristics. It is not the case of an exploitation of resources under a determined domestic legislation nor does it come under a determined system for sharing the benefits. It is not a question of transferring, directly, an operative commercial system to these new areas conquered for Mankind. Such a course of action would be extremely easy and would imply a lack of capacity on the part of lawyers to achieve a new formula for a new world.

Quite the contrary, the regime governing outer space is based on the principle of *res communis humanitatis* (not *res communis omnium*) ever since 1967 which, in more precise terms, may be seen as the common heritage of Mankind after the adoption of the Moon Treaty (1979). No innovation has been introduced to the system established in 1967 by the Moon Agreement. The expression "the province of all mankind" included in the 1967 Treaty is, substantially, equivalent to that of the "common heritage of mankind".

The idea of this legal principle is exceedingly generous. It excludes nobody, unless someone takes such expression as a synonym of monopoly being, as it is, just the opposite. In all the legislations of the Western world monopoly is ruled out and severely punished, both at domestic and international levels. Monopoly may involve private enterprises and, where the State is concerned, it reaches extremes. How can monopoly be avoided and ruled out when it is about to be established? Normally, by a common enterprise. In the case of INTELSAT it is undeniable that it consists of an enterprise open to everybody. The existence of a private activity is equally beyond question—namely INTELSAT—as well as the benefits arising therefrom.

Cooperation is a true fact in outer space. It is mandatory and, in practice, cannot be carried out in any other way. But international cooperation may be provided in different forms. In communications, for example, it is spoken of two ways. No State or peoples may remain passive in this sense. All must assume the responsibility of sharing the effort before the benefits—which is to be expected if there really has been a constant effort on the part of all. Pursuant to the international texts in force, benefits are to be shared. But it is necessary to determine what should be understood to be a benefit, when does it become possible to speak with precision of a benefit and when—in spite of the efforts—a benefit has not been truly achieved.

Economic activities in space are indeed a challenge. They entail risks. Perhaps the greatest risks in the history of international commercial relations so far. But, should we feel discouraged for such a reason? Benefits may be equally great according to the formula: the greater the risk, the greater the benefit. These activities should be considered as a first priority by law and, consequently, by States and the international community as a whole.

As is known, at the 1968 New York Round Table organized by the Scientific-Legal Liaison Committee between the International Academy of Astronautics and the International Institute of Space Law, outer space activities were divided into three groups: (a) those encouraged by law; (b) those tolerated by law and (c) those forbidden by law.

Undoubtedly, private enterprises are encouraged by space law and by international law and no State shall try to stop its private enterprises from undertaking activities which may result in a benefit, because that benefit will be both for the enterprise and for Mankind.

Many an option appears in the exploitation of outer space resources since these activities cannot confine themselves to the more simple ones, i.e., free enterprise and state planning. Should those prepared for a venture await protective regulations on the part of the State. They are—perhaps without realizing—moving to the other extreme. If they delay, they run the risk of the State activity of some party to the 1967 Treaty and the Moon Agreement beginning an activity and creating a precedent. It is well known how precedents weigh in international law, particularly in space law. The expectations of the free world could be frustrated for a lack of decision at the right time.

It is not a question of expecting laws from the State to protect, guarantee or, in some way, sponsor activities in outer space. It is perhaps more advisable to adopt the principle embodied in the Swedish legislation concerning communications: "Everything is public which has not by law been declared secret" (as opposed to the U.K. Official Secrets Act, where everything is secret which has not been declared public). Thus, all commercial activities in space undertaken by a private enterprise are public and legally recognized for not having been declared neither secret nor clandestine.

Following *Professor Cocca's* presentation, the discussion by *Paul G. Dembling* touched upon questions of indemnification and liability associated with major catastrophic accidents and elaborated on the status of relevant legislation and jurisprudence. The last speaker, *Delbert D. Smith* projected slides on different types of large space structures emphasizing that the private sector will be the proving ground or disproving ground for many theories and ideas associated with such structures and pointing out the role of space policy legislation. During the ensuing question-and-answer period, the discussions centered around the concept of the "common heritage of mankind", the role of the telecommunications industry and provisions of international space law pertaining to private enterprise.

The session was taped and the cartridges may be ordered from Audio Stats, 3221 Carter Ave., Marina Del Ray, CA 90291.

Stephen Gorove
Chairman, Section on Aviation
and Space Law, Association of
American Law Schools

(b) Short Accounts

8. ABA Endorses Moon Treaty Subject to U.S. Interpretations, Chicago, January 26, 1982

The section of International Law and the Section of Natural Resources Law developed a joint recommendation to the American Bar Association House of Delegates, urging United States ratification of the "Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,"* subject to a number of specific declarations and interpretations. The recommendation** was approved by the House of Delegates in a voice vote at its mid-year meeting in Chicago on January 26, 1982. The debate and decision indicated strong support for an affirmative policy by the United States to ensure that future international law in this area is compatible with U.S. national interests. The ABA action included a statement that "the content of international law governing the peaceful uses of outer space, including the Moon and other celestial bodies, is a matter of substantial importance to the national interests of the United States." In addition to its principal focus on the natural resources issues, the ABA resolution recognized the importance of the Agreement's provisions on international cooperation in space activities, protection of the lunar environment, safeguarding of life and health of persons in outer space, and arms control.

Ronald F. Stowe
Chairman, Aerospace Law Committee,
International Law Section,
American Bar Association

*For a text of the agreement, see 7J. Space L. 165-174 (1979).

**For a text of the recommendation, see 9J. Space L. 90 (1981).

9. AIAA Ninth Communication Satellite Systems Conference, San Diego, March 9, 1982.

The AIAA Ninth Communication Satellite Systems Conference was held in San Diego, California from March 7, 1982 through March 11, 1982. A panel on the legal implications of satellite applications was held on March 9th and was chaired by *Dr. Delbert D. Smith*, a partner in the law firm Schnader, Harrison, Segal & Lewis. Speakers included *Phillip L. Radoff*, Vice President and General Counsel of the Space Communications Company (SPACECOM) of Gaithersburg, Maryland, and *Arthur Dula*, an attorney in private practice in Houston, Texas.

Mr. Radoff's presentation dealt with the negotiated settlement that had been reached in February 1982 between NASA and SPACECOM dealing with a number of major contract disputes, all of which had been in litigation for more than two years. These disputes, which grew out of SPACECOM's \$1.5 billion contract to construct and operate the TDRS system, involved conflicting interpretations of the systems specification regarding support to user spacecraft during orbital transitions; calculation of certain economic price and interest adjustments under the contract; and claims by SPACECOM to which NASA was asserting certain entitlement defenses arising out of program delays caused by slippage of the space shuttle schedule. The settlement resulted in contract prices increase in the amount of \$35 million plus interest. The settlement was achieved, reported *Mr. Radoff*, through a novel "mini hearing" process in which trial counsel for the government and the contractor team exchanged written briefs and presented oral arguments of high ranking officials of both sides. These officials who were formerly delegated the requisite authority to bind the respective organizations, reached agreement shortly thereafter. The success of the "mini hearing" procedure in this case suggests that it may have wider applicability in the resolution of government contract disputes than heretofore has been recognized.

Mr. Dula's remarks dealt with private sector alternatives to launch capabilities and included a statement of the presenter's beliefs that more should be done in seeking alternatives to government launch vehicle systems. *Mr. Dula* also discussed the history of private launch activities and their implications for the United States space program. He also commented on the importance of the U.S. space program when viewed in a global context. *Dr. Smith* presented remarks on large space structures and the potential institutional and legal arrangements for their successful launch and operation. A spirited question and answer session followed these presentations.

Delbert D. Smith
Chairman, Legal Panel AIAA
Communication Satellite System Conference

10. Western Political Science Association Meeting, Moffett Field, California, March 26, 1982

At the meeting of the Western Political Science Association on March 26, 1982, a panel, chaired by *Harry H. Almond, Jr.*, Professor of International Law and Strategic Studies at the National War College, reviewed the emerging policies and trends with respect to outer space. *Mr. Jack Glazer*, NASA Counsel at Moffett Field, California,

noted that there was a growing interest of lawyers in outer space because of the possibility of increased liability associated with space activities. He reviewed existing legislation in the United States and indicated that if this legislation is applied without change it would make many of those activities subject to onerous regulations.

Professor Carl Q. Christol of the University of Southern California noted the new developments with respect to communications and the regulation of communications in outer space by the ITU and through the outcomes of the WARC conferences. He believed that there would be a substantial increase in the use of outer space for communications among nations and directly to the peoples within nations.

Professor S. Houston Lay of California Western Law School provided a valuable introduction with respect to developments in outer space. He noted that the "common heritage of mankind" principle that appears in the draft treaty on the moon would inhibit the United States in exploiting the moon and other resources in outer space.

Harry H. Almond, Jr.
Panel Chairman
Western Political Science
Association Meeting

11. Session on "Arms Control in Outer Space", American Society of International Law, Washington, D.C. April 23, 1982

"Arms Control in Outer Space" was the subject of a panel discussion during a packed annual meeting of the American Society of International Law in Washington, D.C., on April 23, 1982. It was cosponsored by the Association of the U.S. Members of the International Institute of Space Law (IISL) and chaired by *Professor Gorove* of the University of Mississippi Law Center. Panelists included: *Edward R. Finch, Jr.*, Attorney at Law, member of the District of Columbia, Florida and New York bars; *Benjamin Sanders*, Chief of Information and Studies Branch of the U.N. Centre for Disarmament; *David Small*, Assistant Legal Adviser, U.S. Department of State; and *Brigadier General Donald Vogt* (USAF), Principal Military Assistant to Deputy Under Secretary of Defense for Strategic and Theatre Nuclear Weapons. *Jonathan J. Rusch*, Washington attorney, served as rapporteur.

In his introduction *Professor Gorove* reviewed briefly relevant provisions of international agreements on outer space, pointing out some of the issues and ambiguities. He stressed the importance of reliable means of verification and recommended possible approaches and measures. The ensuing discussions by panelists touched upon the role of the United Nations, the U.N. Committee on the Peaceful Uses of Outer Space (COPUOS), UNISPACE 82, and the implications of arms control from a military perspective.

Following animated questions from the floor and discussions, there was a short, business meeting of the Association of U.S. Members of the IISL during which *Helen Kupperman*, Association Secretary and a member of the U.S. delegation to the Legal Subcommittee of COPUOS reported her personal, unofficial views on the Subcommittee's 1982 session in the following manner:

The Legal Subcommittee (LSC) of the U.N. Committee on the Peaceful Uses of Outer Space met in Geneva, Switzerland for three weeks, February 1-19, 1982. Remote Sensing, the only priority item on the agenda, was discussed for six days in a working group, with particular emphasis on Article XII. No changes in the remote sensing principles resulted.

The remaining time of the LSC was divided between the Nuclear Power Sources (NPS) in Outer Space and the Definition and/or Delimitation of Outer Space and Outer Space Activities, Bearing in Mind Questions Relating to the Geostationary Orbit (GSO). NPS was discussed in a working group which concentrated on the issue of assistance to states. The Definition/Delimitation and GSO discussion focused on the 1979 USSR proposal for 100/110 km boundary and the interest of some states in establishing a regime to govern the use of the GOS. There was no agreement on any of these issues.

The LSC is expected to meet for three weeks next year, March 21-April 8, 1983.

The session on "Arms Control in Outer Space" was recorded and the tapes may be ordered through the American Society of International Law, 2223 Massachusetts Ave., N.W., Washington, D.C., 20008. The session presentations and discussions are also expected to be published in the annual proceedings of the American Society of International Law.

Stephen Gorove
Session Chairman, American
Society of International Law,
1982 Annual Meeting

12. *Workshop on "Law and Security in Outer Space", University of Mississippi Law Center, May 22-23, 1982*

A law professor Workshop on "Law and Security in Outer Space" was held at the University of Mississippi Law Center under the joint sponsorship of the Standing Committee on Law and National Security of the American Bar Association and the University of Mississippi and its Law Center. The program was organized by *Professor Stephen Gorove* in cooperation with *Bernard A. Ramundo*, ABA consultant of Washington, D.C. The program dealt with "International Perspectives", "National Considerations", "Security-Related Issues" and "Implications for Private Enterprise".

Under the broad category of "International Perspectives" *Professor Stephen Gorove* spoke on "The United Nations Committee on the Peaceful Uses of Outer Space: Major Unresolved Issues", and *Roy Gibson*, former Director-General of the European Space Agency and President of the International Astronautical Federation addressed the "International Regional Role: Focus on the European Space Agency." Additionally, *Kenneth S. Pedersen*, Director of International Affairs of NASA dealt with "International Cooperation and Competition in Space".

Addressing "National Considerations," moderated by *Bernard A. Ramundo*, *Eilene M. Galloway*, honorary director of the International Institute of Space Law, reviewed "The Role of U.S. Congress in Space Law and Policy" and *David H. Small*, Assistant Legal Adviser for United Nations Affairs, Department of State, elaborated on the "Security Implications of the U.N. Space Law Agenda". Other presentations under the same general heading included statements by *Ronald F. Stowe*, Director of

Government and International Affairs of Satellite Business Systems on "U.S. Interests in the 1985 Space WARC" and by *Norman A. Wulf*, Deputy General Counsel of the Arms Control and Disarmament Agency, on "Arms Control and Outer Space."

The "Security-Related Issues" were moderated by *Professor Gorove*. Speakers included *Paul G. Dembling*, former General Counsel of NASA and the General Accounting Office, who focused on "Solar Power Satellites", *Peter E. Wagner*, Vice Chancellor for Academic Affairs, University of Mississippi, who dealt with "Capturing the Sun: Nuts and Bolts of Solar Cells for Satellite Power" and *Professor Bin Cheng* of the University of London who addressed "The Status of Outer Space and Relevant Issues".

The "Implications for Private Enterprise" session was moderated by *Edward R. Finch, Jr.*, a member of the D.C., Florida and N.Y. Bars. It featured *Irwin M. Pikus*, Director of the Division of Planning and Policy Analysis of the National Science Foundation, who spoke on "Private Sector Involvement in International Cooperation". Addressing the same general subject was *Roger K. Hoover* Division Counsel of Lockheed Missiles and Space Company, who focused on the "Implications of Security from the Viewpoint of Private Industry."

Luncheon and dinner speakers included *Michel Bourély*, Legal Adviser to the European Space Agency, *Lt. Gen. Daniel O'Graham* (U.S. Army, ret.), director of High Frontier Inc. and NASA Astronaut *Major Bryan D. O'Connor* (USMC) who were introduced by the Vice Chancellor for Student Affairs *T. Gordon Beasley*, Chancellor *Porter L. Fortune, Jr.* and *Professor Stephen Gorove* of the University of Mississippi, respectively.

The conference had a large attendance and many interesting questions were raised and stimulating discussions developed. The detailed proceedings of the conference are expected to be published in a forthcoming issue of the *Journal of Space Law*.

Stephen Gorove
President, Association of the U.S.
Members of the International
Institute of Space Law

13. *ABA Conference on "Litigation in Aviation and Space Law", Washington, D.C., May 27-29, 1982*

The ABA Tort and Insurance Practice Section (TIPS) sponsored a three day ABA National Institute at the Sheraton Washington Hotel, Washington, D.C., May 27-29, 1982, on Aviation Litigation and Space Law. The first two days of the program were devoted to aviation litigation and the third day to Space Law. The program was well attended with over 300 registrants.

The National Institute was conceived by *John J. Kennelly*, Chairman of the Tips Aviation and Space Law Committee who lauded the Space Law presentations. The Space Law panelists and the subject of their presentations were: *Mrs. Eilene Galloway* (Washington, D.C.; Honorary Director, International Institute of Space Law, I.A.F.)—"The History and Development of Space Law", *Martin Menter* (Of Counsel, Haffer & Alterman, Washington, D.C.)—"Legal Aspects of Commercial Space Activities", *Prof.*

Stephen Gorove (University of Mississippi Law Center)—“Legal Issues before the United Nations Committee on the Peaceful Uses of Outer Space” and *S. Neil Hosenball* (General Counsel, NASA, Washington, D.C.)—“The Role of Government in Space Activities.” A Q. & A. period followed the panel presentation.

The Luncheon Speaker was *Dr. Hans Mark*, Deputy Administrator, NASA, Who spoke on the subject “NASA-Today and Tomorrow.”

Martin Menter

Vice President, International
Institute of Space Law, I.A.F.

14. Other Events

On October 22, 1982, *Eilene M. Galloway*, honorary director of the International Institute of Space Law was the moderator of a Symposium on the “Peaceful Purposes of the Space Shuttle and its Military Implications in Outer Space” which was sponsored by the International Law Society of the University of Akron with the participation of *Professor Harry H. Almond* of the National War College, *Lt. Col. Jerry Butler* of the International Law Division of the Office of the Judge Advocate General, U.S. Air Force Headquarters and *Dr. George D. Baker*, senior staff engineer of the Space Transport Systems Utilization Program, NASA Headquarters.

The theme of the 1981 Electronics and Aerospace Systems Conference (EASCON 81), held on November 16-19 in Washington, D.C. was “Government-Industry Interchange.” It featured classified and unclassified technical papers, as well as a tutorial program and professional interchange panels under the general chairmanship of *Dr. Delbert D. Smith*.

A number of experts reported on present and proposed Pacific telecommunications systems, including technology, business and policy developments at the 1982 Pacific Telecommunications Conference which was held in Honolulu, January 17-20.

The 20th Goddard Memorial Symposium was convened in Washington, D.C. March 17-19, 1982 and focused on goals and requirements of the next generation of civil space missions involving the Spacelab, space platforms and stations, space transportation and perceptions of the future in the light of history.

“The 1982 Government/Industry Conference on National Space Outlook” (June 22-23, 1982, Tyson Corner, Va.) organized by the National Space Club included discussions and presentations by NASA, DOD and NOAA senior officials on current space programs, future plans and technology requirements.

15. Brief News

There has been concern on Capitol Hill that decreasing NASA funding levels would take the leadership in space out of the control of the United States. . . Space Transportation Company, the subsidiary of a large U.S. investment banking firm, may provide NASA down-payment on a \$1 billion investment to finance private construction of the fifth Shuttle Orbiter. If approval is granted, the company will begin marketing the space transportation system to commercial and foreign users. . . Ball Aerospace

Systems Division and Martin Marietta will compete for a potential \$30 million contract to develop a tether system to trail small payloads at a distance of about 65 miles from the Space Shuttle. . .

Successful launch of the European Space Agency's Ariane poses a competitive challenge to the NASA/McDonnell Douglas Delta vehicle to orbit communication satellites in the 2,000-2,500 lb. weight class. . . Arianespace, the marketing organization for Europe's Ariane launcher, hopes to capture orders for almost one-third of the approximately 200 satellites expected to be orbited during the remainder of the 1980s. . . Growing competition can be expected from Japan in the manufacturing of satellites, rockets and various products in space. . .

Voyager-2-evidence points to the existence of several new satellites of Saturn. . . The United Nations General Assembly proclaimed the year 1983 World Communications Year. . . "Telecommunications and international cooperation" was the theme for the 14th World Telecommunication Day which the 157 member countries of the International Telecommunication Union celebrated on May 17, 1982. . .

The test flights of the Space Shuttle Orbiter "Columbia" demonstrated its excellence as a platform for scientific and application research in Earth orbit. . . the test flight and recovery of a reusable spacecraft, the Soviet version of a space shuttle, has been reported.

B. Forthcoming Events

The Thirteenth International Symposium on Space Technology and Science will take place in Tokyo June 28-July 2, 1982.

The UNISPACE 82 Conference will be held in Vienna, Aug. 9-21, 1982 and its agenda will be divided into three broad categories: (1) State of space science and technology; (2) Applications of space science and technology and (3) International cooperation and the role of the United Nations.

The 25th Colloquium on the Law of Outer Space organized by the International Institute of Space Law will be held during the XXXIII Congress of the International Astronautical Federation in Paris, September 21-29, 1982. The following subjects will be discussed:

1. Protection of the Earth and Outer Space Environment. (Under this an author may take up legal problems of space debris, disposal of nuclear waste, etc.);
2. Legal Aspects of the Peaceful Uses of Outer Space in the Light of Article IV of the 1967 Space Treaty;
3. Determination of Applicable Law to Living and Working in Space;
4. Legal Aspects of Direct Broadcast Satellites.

The fifth annual conference of the Pacific Telecommunications Council will be held in Honolulu, Jan. 16-19, 1983.

The 24th Colloquium on the Law of Outer Space will be held in Budapest during the 34th Congress of the International Astronautical Federation, Oct. 9-15, 1983.

United States Space Law—National and International Regulation, by Stephen Gorove (Oceana Publications Inc., Vol. 1, 1982, looseleaf service), pp. 856. \$85.

This comprehensive work was long awaited by governments, international governmental and non-governmental organizations, academic institutions, universities and everybody interested in and related to the subject.

The U.S. National Regulation comprises not only the relevant Acts but selected cases, reports, launch agreements and supplements as well.

The operation, structure, organization and general information relative to NASA, and other U.S. National Space Regulation and Policy are thus within reach of concerned readers.

There are also three selected cases which present valuable lines of thought in this new field of jurisprudence.

As regards data for the scientific community and a step forward to international cooperation, therein is also enclosed the U.S. Report to the U.N. on civil programs for the exploration and uses of outer space during 1980.

And, last but not least, this work is a "must" both for those nations which are already engaged in space activities and those who are ambitioning to enter and participate in this great adventure of man.

Professor Aldo Armando Cocca
Ambassador-at-large of Argentina

Between Sputnik and the Space Shuttle: New Perspectives on American Astronautics, edited by F. C. Durant III (American Astronautical Society, History Series vol. 3, 1981), pp. 333. \$40.

In this volume Frederick Durant has compiled a collection of essays from two symposia sponsored by the History Committee of the American Astronautical Society in March 1979 and 1980. Each of the eight chapters offers a historical perspective of some segment of the total U.S. space program, from its beginning under President Truman to the development of the Space Shuttle.

For example, in the first chapter the NASA History Program's founder, Eugene M. Emme, discusses the presidential role in America's space program, from Eisenhower to Carter, examines the Sputnik crisis, the race to the moon, and the Space Shuttle program. Of particular interest to policy makers is Eilene Galloway's paper, which deals with the function of Congress as an overseer of the goals of the space program and with Congressional control of the funding of authorized programs. Mrs. Galloway also examines the trends resulting from the placing of space in a subordinate position in the post-Apollo era. In another essay, Stephen Doyle gives an overview of the juridical problems which have accompanied the development of the space program from the beginning.

Utilization of Outer Space and International Law, by C.G.M. Reijnen (Amsterdam: Elsevier Scientific Publishing Co., 1981), pp. 179. \$63.75.

In this book the author devotes eight chapters to the following subject matters; the concept of sovereignty in both international law and space law; the status of international organizations in space law in contrast to classical international law; the role of space law in the first nongovernmental space research organization known as COSPAR (committee on Space Research); the questionable safeguards against certain types of nuclear power sources in outer space; the legal implications of remote sensing of the Earth by satellites; the future of direct broadcasting satellites; the status of space law rules in relation to private enterprise in the exploitation of space; and the incorporation of space franchises in Dutch municipal law.

The author concludes that space legislation is in an embryonic form. This embryonic form must be extensively elaborated if it is to adequately meet the needs of the planned commercialization of outer space.

Space—Enhancing Technological Leadership, edited by Lawrence F. Greene (Advances in the Astronautical Sciences, vol. 44, San Diego: Univelt, Inc. 1981), pp. xv, 613.

This volume contains the principal technical contributions to the 1980 annual meeting of the American Astronautical Society. It covers recent research in communications and navigation; space exploration; energy and space power; defense applications; earth resources observation; materials processing in space; guidance, control, and data processing; large space structures; environmental observation; and space exploration.

Several articles focus on shuttle technology and the frontiers that it has opened for the space industry. One author discusses its possible use in depositing nuclear wastes in a low earth orbit as an alternative to the land disposal of these deadly materials. In the section "Energy and Space Power", several authors delve into the very real possibility of putting nuclear power systems in space as well. Another article examines the possible earthbound application of many alternatives to nuclear energy that have been developed in the space program to date.

One critical area of space technology that receives much attention is the use of satellites to improve communications, navigation, meteorology, and space exploration. While several papers are concerned with the highly technical aspects of satellite design, others contemplate which designs may be best in the construction of larger space stations, a primary goal of the space program today.

Although most of the papers are written for the space engineer, the volume does communicate to the layman some of the long-term objectives of the space program in America. It exposes a significant portion of the iceberg underlying the rather spectacular tip that the public sees when a new spacecraft is launched.

The remaining sections include a concise history of the development of manned space flight technology, a discussion of the importance of liquid-hydrogen propulsion for the lunar-orbital mode of Apollo-Saturn V, a treatment of political economy and astronautics, and an interesting look at "space art".

Bezposrednia Telewizja Satelitarna, Studium Prawnomiedzynarodowe, (Direct Broadcast Satellites, A Study of International Problems) by Krystyna Wiewiorowska (Polska Akademia Nauk, Panstwowe Wydawnictwo Naukowe, Warszawa-Lodz, 1981), pp. 127.

In this book the author discusses the development and foreseen utilization of DBS, the existing divergence of opinions as to the "free flow of information concept", and the extent to which DBS is regulated by existing international law. She focuses on certain new problems demanding specific legal regulation and the question of regulating direct broadcasting to third states. This study also touches upon the international responsibility of states and international organizations and notes that the principle of prior consent is the only one of basic significance which does not exist in international law, thus necessitating an international agreement regulating it.

The book contains a summary in English.

Communications With Extraterrestrial Intelligence, edited by J. Billingham & R. Pesek (published as a special issue of *Acta Astronautica*, vol. 6, Pergamon Press, 1979), pp. 225, \$47.

This volume is a result of a steadily growing interest in the possibility that intelligent species may be widely distributed in the Universe. Because of major advances in the sciences over the past twenty to thirty years it is now believed that planets are the rule rather than the exception, that life will arise in suitable planetary environment, and that in many cases life will evolve to the stage of intelligence, given several billion years of comparative stability of the planetary environment.

This book is devoted to the subject of Communication with Extraterrestrial Intelligence (CETI). The challenge is whether or not there is any way in which we can establish communication with other civilizations. The challenge has been seized by a small but growing number of investigators of widely differing disciplinary background. The papers in this volume are the results of a rich variety of approaches to the challenge dealing with concepts and studies related to the science, technology, and observational techniques of SETI. The book's relevance to the international community and policy makers stems from one of its conclusions that "SETI is an international endeavor in which the United States can take a lead".

The book includes information that will be of interest to a wide range of people, because of the world-wide implications and the impact that CETI could have on everyone.

Consejo De Estudios Intenacionales Avanzados, (The Council of Advanced International Studies), Estudios Internacionales Avanzados, (Advanced International Studies), Solucion de Controversias En Derecho Espacial, (Settlement of Space Law Disputes), -Monograph No. 1, Cordoba, Argentina, 1981, pp. 82.

In his brief monograph, which contains a full English translation of the Spanish text, Professor Bockstiegel, Director of the Cologne University Institute of Air and Space Law, considers first the growing need for compulsory procedures for the settlement of space law disputes. He calls specific attention to the lack of sufficient procedures in "positive space law" and suggests that certain arbitration and adjudication provisions of international air law should provide the guidelines for space law, given their interrelationship and similarity. The sequel panel discussion by Professor K. Bockstiegel, A.A. Cocca, M.A. Ferrer, Jr., B.K. de Orchansky, and S.M. Williams, concludes that every future space agreement should contain a clause providing for the compulsory settlement of disputes with all judgements and awards being final and binding.

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I.

REPORT OF THE CHAIRMAN OF THE WORKING GROUP ON REMOTE SENSING*

1. The Sub-Committee, at the first meeting of its present session on 1 February 1982, re-established its Working Group on remote sensing.
2. The Working Group noted that the Legal Sub-Committee was required, under paragraph 5 of General Assembly resolution 36/35 of 18 November 1981, to continue on a priority basis its detailed consideration of the legal implications of remote sensing of the earth from space, with the aim of formulating draft principles relating to remote sensing.
3. The Working Group held its first meeting on 2 February 1982 and concluded its work on 9 February 1982, having held a total of 11 meetings. There were also informal consultations.
4. The Working Group had before it the report of the Legal Sub-Committee on its twentieth session in 1981 which contained the report of the Chairman of the Working Group and, in the appendix to the report of the Chairman, the texts of the draft principles as they appeared at the conclusion of the twentieth session (A/AC.105/288, annex I, appendix).
5. The Working Group noted that the subject of remote sensing was an item on the agenda of the Scientific and Technical Sub-Committee at its nineteenth session in January 1982, and that chapter III was the relevant section of the Scientific and Technical Sub-Committee's report on that session (A/AC.105/304).
6. As to the organization of its work, the Working Group agreed that it would, beginning with principle I, review the texts of the draft principles set out in the appendix to the report of the Chairman of the Working Group at the twentieth session of the Sub-Committee (A/AC.105/288, annex I, appendix). Principles II to X, however, in which the words "[shall] [should]" alone appeared in square brackets, would not be reviewed unless a delegation wished a particular principle considered. The Working Group noted that a working paper entitled "Principles relating to remote sensing of the earth, its natural resources and its environment (WG/RS/(1981)/WP.2) had been submitted by the delegation of Mexico to the Working Group in 1981 but had not yet been considered by the Working Group. The Working Group agreed that it would when discussing particular principles consider the relevant provisions of the Mexican working paper and the working paper submitted by the delegation of Colombia to the Working Group in 1981 (WG/RS(1981)/WP.1) as well as other proposals that may be made.
7. The Working Group conducted a first review of the draft principles in accordance with the procedure mentioned in paragraph 6 above. Thereafter, the Working Group focused in particular on principles XII and XV and considered more closely in an informal group the provisions of principle XII and related working papers.
8. The following working papers were submitted in the course of the discussions of the Working Group at its present session: a working paper submitted by the delegation of Greece (WG/RS(1982)/WP.1) with respect to principle XI; a working paper submitted by the delegation of the USSR (WG/RS(1982)/WP.2) with respect to principle XI of the Mexican working paper; a working paper submitted by the

*Taken from U.N.Comm. on the Peaceful Uses of Outer Space, Report of the Legal Sub-Committee on the Work of its Twenty-First Session (1-19 February 1982). Doc.A/AC.105/305, Annex I, pp. 1-6 (1982)

delegation of the United States (WG/RS(1982)/WP.3) with respect to principle XIII; a working paper submitted by the delegation of the USSR with respect to principle XV (WG/RS(1982)/WP.4); a working paper submitted by the delegation of the USSR with respect to principle IV, paragraph 1 (WG/RS(1982)/WP.5); a working paper submitted by the delegation of the USSR with respect to principle V (WG/RS(1982)/WP.6); a working paper submitted by the delegation of the USSR with respect to principle VIII (WG/RS(1982)/WP.7); three working papers submitted by the delegation of the USSR with respect to principle XII (WG/RS(1982)/WP.8; WG/RS(1982)/WP.9 and WG/RS(1982)/WP.10); a working paper submitted by the delegation of Brazil with respect to principle XII (WG/RS(1982)/WP.11); a working paper submitted by the delegation of China with respect to principle XII (WG/RS(1982)/WP.12); and a working paper submitted by the delegation of Greece with respect to principle XII (WG/RS(1982)/WP.13).

9. The working papers submitted at the twentieth session of the Legal Sub-Committee by the delegation of Colombia (WG/RS(1981)/WP.1) and by the delegation of Mexico (WG/RS(1981)/WP.2) as well as the working papers submitted in the course of the discussions of the Working Group at its present session and listed in paragraph 8 above are set out in the appendix to this report.

10. The views expressed in and the results of the discussions of the Working Group are summarized below.

11. Principle I. The Working Group referred briefly to foot-note 1 to the present text. The Working Group agreed that the foot-note, which concerned the question of the application of the principles to international intergovernmental organizations, should be considered at a later stage when questions relating to the other principles had been resolved. The Working Group discussed foot-note 2 to the present text and considered the formulation "with respect to remote sensing of the natural resources of the earth and its environment" which was set out in the foot-note. Certain suggestions were made for a change in this formulation. The view was expressed that though foot-note 2 could be retained the formulation could be changed to "the remote sensing of the natural resources of the earth and its environment from outer space". There was also a reference to the corresponding formulation in principle I of the Mexican working paper, namely "remote sensing of the earth, its natural resources and its environment from outer space". The Working Group reached no conclusion on the matter. The Working Group discussed at some length foot-note 3 to the present text relating to the definition of the term "remote sensing of the earth". Reference was made to the USSR working paper (WG.III(1979)/WP.9) which contained a detailed definition of the expression "remote sensing of the earth from outer space". There was also reference made to the definition contained in principle I of the Mexican working paper and the proposal contained in the Colombian working paper (WG/RS(1981)/WP.1). There was an exchange of views on the question whether there should be a fuller definition of the space object conducting the sensing, the manner in which sensing is conducted, and what was covered by the sensing. A number of suggestions were made but the Working Group reached no conclusion on the matter. The view was expressed that the scope of the remote sensing principles included only civil remote sensing. As to the definition of the term "remote sensing of the earth", it was suggested that the Scientific and Technical Sub-Committee could take up this question; the view was then expressed that if the two Sub-Committee had held their annual sessions at the same time, the Scientific and Technical Sub-Committee would have been able at the request of the Legal Sub-Committee to consider a definition of this expression during the same session and perhaps would have succeeded in completing the definition before the end of the session. Still another view was expressed that since the whole set of principles has not been finalized the Scientific and Technical Sub-Committee can undertake this task at its next session and hence no changes in the schedule of meetings of the two Sub-Committees are required. In this connexion, the view was also expressed that the problem of definition of "remote sensing" for the purpose of these principles was not a scientific or technical problem but, rather a political and legal one of defining the appropriate scope of the principles.

12. Principles II to X. Those principles were not specifically discussed, although references were made by some delegations to some of these principles in the course of the discussion of other principles. No time was allocated by the Working Group to examine either Principles II to X of the Mexican Working Paper (WG/RS(1981)/WP.2) or Principles IV, V and VIII of the USSR working papers (WG/RS(1982)/WP.5, 6 and 7). The view was expressed that the Working Group could have done otherwise in the light of paragraph 6 of General Assembly resolution 36/35.

13. Principle XI. The views expressed at previous sessions of the Working Group were reaffirmed in the course of discussions at the present session. Some delegations compared the present text to the corresponding text in the Mexican working paper and expressed the view that the proposal by Mexico concerning State responsibility was more complete and should therefore, though with some modification, be given preference. Consideration was also given to the working paper of Greece (WG/RS(1982)/WP.1) which in the view of some delegations represented a positive step. Some delegations spoke in favour of a principle which would provide for the responsibility of the sensing State for remote sensing related activities, and expressed the view that responsibility for such activities includes responsibility for the dissemination of results. Other delegations were of the view that principle XI was unnecessary in view of the provisions of principle III which provided for the application of international law including the Outer Space Treaty. They referred in particular to article VI of the Treaty. Other delegations could not accept this principle going beyond the legal régime of article VI of the Outer Space Treaty and the existing principles of international law regarding State responsibility and thus they were of the view that it would be unrealistic to expect consensus on this point. It was also stated that if the principles being elaborated were to be given, after their final elaboration, the status of rules of international law, their violation by a State could then involve its international responsibility.

14. Principle XII. Considerable efforts were undertaken in the Working Group and in an informal group to identify whether there were certain areas for compromise on the issues covered by this principle. In the course of discussions, reference was made to the proposals contained in: the Mexican working paper (WG/RS(1981)/WP.2, principle XIV); the working paper of the USSR (WG/RS(1982)/WP.10), which was later amended by the USSR in light of discussions; the working paper of Brazil (WG/RS(1982)/WP.11); and the working paper of China (WG/RS(1982)/WP.12). There was agreement that in principle sensing States should provide a sensed State with timely and non-discriminatory access to primary data concerning its territory obtained by remote sensing. Although the discussions on principle XII focused mainly on the same questions that had arisen at previous sessions of the Working Group, some delegations felt that some elements of the discussions at the present session could be viewed as a somewhat new approach. These delegations therefore welcomed a drafting effort made by the delegation of Greece, which submitted a new compromise proposal on principle XII (WG/RS(1982)/WP.13). In the view of some delegations, this proposal might present a wording susceptible to a compromise solution. Other delegations, however, expressed reservations with respect to the proposal of Greece and drew attention to the approach to principle XII reflected in the Working Group's text, and a reference was also made in this connexion to the Mexican proposal:

15. Principle XIII. The Working Group considered the provisions of principle XIII and also, in this connexion, the following proposals: the proposal in the Mexican working paper (WG/RS(1981)/WP.2, principle XIV); the proposal of the USSR (WG.III(1979)/WP.3); and the proposal of the USA (WG/RS(1982)/WP.3). The suggestion was made by some delegations that principle XIII should logically precede principle XII. The Working Group, however, agreed that possible rearrangement of the order of the principles could be considered at a later stage when substantive discussions on all the principles were concluded. Some delegations expressed the view that prior information on remote sensing programmes was important to offer States an opportunity to have access to data regarding their territories and to

consider if and how they could participate in such programmes. Other delegations, while sharing the view that prior information on remote sensing programmes may in fact increase the opportunity for States to participate in such programmes, stated that such information might not be useful from the point of view of providing access to data and that such access might be provided on the basis of publicizing the list of States in relation to whose territories such information is at the disposal of the sensing State or States with receiving ground stations. It was also stated that such prior information would be necessary in order to enable access to primary data and analysed information which might exist. The view was expressed that the provisions of principle VII, which provide for notifications to the Secretary-General in compliance with article XI of the Outer Space Treaty would adequately cover the question of notification of remote sensing activities. The view was also expressed in this connexion that, in light of the global nature and the technicalities of remote sensing activities, individual notification of sensed States was in fact not practicable, and therefore notifications to the Secretary-General would be a reasonable solution.

16. Principle XIV. This principle was not discussed.

17. Principle XV. A broad spectrum of views, still divergent in essence, characterized the discussions on this principle. Some delegations found this principle necessary and spoke in favour of its retention, while other delegations favoured the deletion of this principle. Some delegations, reaffirming views expressed at previous sessions of the Working Group, stated that the dissemination of data obtained by remote sensing and analysed information derived therefrom should not be subject to any restriction. They were of the view that unrestricted dissemination of data and information is fully consistent with international law, and that the application of restrictions on dissemination was not practical and would impair further development of remote sensing programmes. Some delegations which favoured the unrestricted dissemination of data and information also pointed out that no complaints had so far been raised about such dissemination and they pointed out that such dissemination was beneficial to all States. Some delegations were of the view that a restrictive system for dissemination would be an obstacle to international co-operation regarding, and participation in, remote sensing activities. These delegations also expressed concern that a restrictive system for dissemination would lead to a more dominant position of sensing States which had, or could acquire, data relating to all States with their satellites. Some delegations expressed the view that such wide dissemination of data and analysed information was acceptable only if the correlative obligation was established for sensing States to provide, on an equal footing, data and analysed information to all those so requiring.

18. Other delegations, however, also reaffirming views expressed at previous sessions of the Working Group, stated that certain restrictions on the dissemination of primary data and analysed information were necessary to protect the national interests of sensed States. Some of these delegations however stated that it was necessary that the dissemination of data and information about natural resources be made subject to the prior approval of the sensed State as dissemination without such prior approval was contrary to the sovereignty of sensed States. Some delegations were of the view that unrestricted dissemination may in certain cases be detrimental to the interests of some States and that international legal regulations should not be confused with the establishment of restrictive systems of dissemination. Still other delegations felt that while wide dissemination was desirable, a State conducting remote sensing activities should be held responsible for the dissemination of any primary data or analysed information that might adversely affect the national interests of a sensed State. Some of these delegations believed that the proposal made in the working paper of the USSR (WG/RS (1982)/WP.4), which would provide for unrestricted dissemination of primary data and analysed information subject to a sensed State's being entitled to declare that data and information with a resolution finer than 50 metres shall not be disseminated except on the conditions stated in the declaration, was a proposal that they could support.

19. Other delegations expressed the view that, while only the wide dissemination to third parties of primary data and analysed information obtained by remote sensing could contribute to the development of States, it was essential that the dissemination of certain data to such third parties should be subject to the prior consent of the sensed State. In the view of these delegations, an objective criterion, such as resolution, should make it possible to draw the line between data which could be freely communicated and data whose dissemination should be subject to the prior consent of the sensed State. In any event, any solution in this field must necessarily, according to these delegations, take account of existing technical realities, of the importance and current expansion of international co-operation in this field, and of the legitimate aspiration of sensed States to control the dissemination of certain data to third parties.

20. Some delegations which favoured the unrestricted dissemination of data and information stated that the application of a criterion of spatial resolution would not be feasible in remote sensing activities in view of technical and practical difficulties.

21. Principle XVI. Some delegations, reaffirming the views expressed at previous sessions of the Working Group, stated that principle XVI was necessary and the concept of permanent sovereignty over wealth and natural resources applied to data and information, obtained by remote sensing of the territory of a sensed State, and formed part of international law. The view was also expressed that in this particular field it was necessary to link the principle of freedom of use of outer space with the concept of State sovereignty over natural resources. Other delegations, however, reaffirming views expressed at previous sessions of the Working Group, stated that while the concept of permanent sovereignty over wealth and natural resources was accepted, provided it necessarily entailed due regard for the rights and interests of other States and their natural and juridical persons in accordance with international law, the concept did not extend to sovereignty over information about wealth and natural resources of States; that consensus on principle XVI was not possible; and that the principle should be deleted. The view was also expressed that, as consensus on principle XVI was not likely, the contents of the principle might be placed in the framework of a preamble to the principles.

22. Principle XVII. There was a brief discussion of this principle. Some delegations expressed doubts as to the usefulness of a principle concerning settlement of disputes if it were not to include institutionalized settlement procedures. These delegations felt that a discussion of the principle should be deferred until a decision had been taken on the legal nature of the entire set of principles. The view was expressed that a provision on prompt and obligatory consultations was a useful and important element of this principle.

23. While no modification or further elaboration of the provisions of the draft principles was made at the present session of the Working Group, the discussions of the Working Group were extensive, detailed and constructive. The texts of the draft principles are set out in the appendix to this report.

24. The Working Group held its final meeting on 18 February 1982 when it considered and approved the present report.

II.

REPORT OF THE CHAIRMAN OF THE WORKING GROUP ON AGENDA ITEM 3*

(Consideration of the possibility of supplementing the norms of international law relevant to the use of nuclear power sources in outer space)

1. The Sub-Committee, at the 1st meeting of its present session on 1 February 1982, re-established its Working Group on agenda item 3 (Consideration of the possibility of supplementing the norms of international law relevant to the use of nuclear power sources in outer space).
2. The Working Group had before it the report of the Legal Sub-Committee on its twentieth session in 1981 (A/AC.105/288 and Add.1); the report of the Scientific and Technical Sub-Committee on its eighteenth session in 1981, which contained in annex II the report of its Working Group on the use of nuclear power sources in outer space (A/AC.105/287); and the report of the Scientific and Technical Sub-Committee on its nineteenth session in 1982 (A/AC.105/304).
3. The Working Group noted that the report of the Legal Sub-Committee on its twentieth session contained in annex IV a working paper entitled "Use of Nuclear Power Sources in Outer Space" submitted to the Legal Sub-Committee at its twentieth session by the delegation of Canada (A/AC.105/C.2/L.129) and in addendum 1 a working paper submitted by the delegation of Venezuela (WG/NPS(1981)/WP.1) and a working paper submitted by the delegation of Italy (WG/NPS(1981)/WP.2).
4. The Working Group noted that the Scientific and Technical Sub-Committee's Working Group on the use of nuclear power sources in outer space had in paragraph 38 of its 1981 report (A/AC.105/287, annex II) reaffirmed its previous conclusion that "nuclear power sources can be used safely in outer space provided that all necessary safety requirements are met".
5. The following working papers were submitted in the course of the discussions of the Working Group: a working paper submitted by the delegations of Argentina and Chile (WG/NPS(1982)/WP.1); a working paper submitted by the delegation of Sweden (WG/NPS(1982)/WP.2); a working paper submitted by the delegation of Brazil (WG/NPS(1982)/WP.3) and revised by the delegation of Brazil in the light of the discussions in the Working Group (WG/NPS(1982)/WP.3/Rev.1); a working paper submitted by the delegation of Nigeria (WG/NPS(1982)/WP.4). The delegation of Canada informed the Working Group that a new working paper, supplementing but not replacing the Canadian working paper (A/AC.105/C.2/L.129), would be submitted to the Sub-Committee. (This working paper is contained in document A/AC.105/C.2/L.134.) The working papers are attached to the report.
6. The Working Group, following a proposal by the Chairman, agreed that in considering this agenda item, it should begin with the discussion of assistance to States affected by accidental re-entry of a space object with a nuclear power source on board, as it seemed most likely that the Working Group would make progress under that heading.
7. The Working Group considered this question taking into account Section C of the working paper of Canada (A/AC.105/C.2/L.129), and the relevant provisions in the working paper of Italy (WG/NPS(1981)/WP.2) and the working papers on the question of assistance to States submitted to the Working Group at its present session, namely, the working paper submitted jointly by the delegations of

*Taken from U.N. Comm. on the Peaceful Uses of Outer Space, Report of the Legal Sub-Committee on the Work of its Twenty-First Session (1-19 February 1982). Doc. A/AC.105/305, Annex II, pp. 1-4 (1982)

Argentina and Chile (WG/NPS(1982)/WP.1); the working paper submitted by the delegation of Brazil (WG/NPS(1982)WP.3 and Rev. 1); and the working paper submitted by the delegation of Nigeria (WG/NPS/(1982)/WP.4); as well as various views expressed by other delegations. The delegation of Canada informed the Working Group that a Canadian working paper on assistance to States would be submitted to the Sub-Committee. This working paper is contained in document A/AC.105/C.2/L.135 attached hereto.

8. The views expressed in and the results of the discussions of the Working Group are summarized below.

9. Some delegations were of the view that Section C of the Canadian working paper provided a useful basis for discussion of the necessary supplement to the norms of international law. Other delegations stressed the need to build on the existing international law and considered that Section C of the Canadian paper raised, without providing adequate answers, questions not susceptible to simple treatment; some such questions were already covered by existing treaties, and others required fuller definition and elaboration. The view was expressed that prior to the decision on the necessity of supplementing the existing international law relating to assistance, several questions should be further discussed with a view to the possible working out of mutually acceptable concepts. These questions concerned, inter alia, the definition of "necessary assistance", methods of determining extent and duration of search and clean-up operations, the right of the launching State to participate in those operations, the steps immediately to be taken by the affected State, the payment of costs of search and clean-up operations not conducted by the launching State, the access to the affected State's territory by search groups of assisting States, the extent of local experts' participation, the affected State's right to request assistance from a third State, determining the methods of removing debris from the territory of the affected State. The delegations which were generally in favour of the approach taken in the Canadian paper, however, considered that the sovereignty of States with respect to their own territory and the obligation of the launching State for consequences of its use of nuclear power sources, together with the relevant provisions of The Outer Space Treaty and the Liability Convention, provided adequate bases for resolving virtually all of those questions.

10. Some delegations considered that it was necessary that there be a régime for State responsibility and liability as in the Brazilian working paper and also in the jointly submitted Argentinian-Chilean working paper. Others doubted that liability was a subject to be considered incidentally to the question of assistance, and that if the existing Liability Convention needed to be supplemented in order adequately to cover NPS, then this was a major legal task to be undertaken separately. While some tended to the view that the Liability Convention's provisions were clear and adequate, others considered that the special characteristics of NPS warranted the development of additional specific liability rules. Some expressed reservation about the Working Group's going beyond examining what additions to the Liability Convention might be warranted by the special characteristics of NPS. Some delegations expressed the view that the affected State had the right to determine whether the launching State or other States should render assistance to it. These delegations were of the view that it should be made clear that the launching State had, nevertheless, the fundamental obligation to offer assistance as provided in the Nigerian working paper. Some of these delegations stressed that assistance from the launching State or a third State could only be rendered upon request from the affected State. In support of the launching State's interest in participating in assistance operations, references were made to the Outer Space Treaty and to the Rescue and Return Agreement as well as to analogies drawn from the law applicable to aircraft accidents. However, some delegations drew attention to the distinction between, on the one hand, the right of the launching State to investigate the causes of the malfunction of its NPS space object or to retrieve it and, on the other hand, the obligation of the launching State to give assistance to the affected State; in the view of these delegations it would complicate the consideration of the assistance question to

consider these questions concurrently. A view was also expressed that the launching State has a priority right to conduct search and clean-up operations if the affected State resorts to foreign assistance.

11. In this connexion, the view was expressed that need existed for a definition of "necessary assistance". This was, it was felt, particularly so in case the launching State had to bear the expenses for assistance operations even when the affected State, in the exercise of its sovereignty, had either sought the assistance of another State or conducted the search and clean-up operations itself. It was pointed out that the ability to render effective assistance might depend on specific knowledge about the space object which only experts of the launching State have that unnecessary costs might be incurred and that, moreover, additional damage might result from operations conducted without the launching State's participation. Some delegations stressed, however, that since it was for the affected State to determine what assistance was to be given as well as by whom it should be given, the expenses of assistance should be borne by the launching State in any event. A number of delegations in this connexion indicated that the obligation of the launching State to reimburse the affected State for the expenses for search and clean-up operations could be derived from article XII of the Convention on Liability. It was also considered that the launching State's obligation to meet all expenses for assistance, in particular assistance requested of a third State, would be subject to standards of reasonableness. On this last point it was said that only justified expenses proportional to the goal of protecting persons and goods should be borne by the launching State. Some delegations noted that the term "necessary assistance" was already well understood in international law and used in legal instruments including the Rescue and Return Agreement. These delegations further pointed out that though assistance and compensation were two different problems they were interrelated.

12. The reference to "indirect" and "direct" damage contained in both the Brazilian working paper and the Argentinian-Chilean paper was discussed. Some delegates thought it inadvisable to enter so complex and diversely treated an area of law while others, although admitting the difficulty, wished nonetheless to take account of the possibility of wide-ranging, long-term environmental and delayed effects of NPS accidents. The view was expressed that liability for damage arising as a result of search and clean-up operations not conducted by the launching State cannot be imposed upon the launching State. Several references were made to the Convention on Liability in particular to articles I, II and XII thereof which defined very carefully the liability to pay compensation for damage which could be applicable for determining liability in respect of NPS as well as more generally any other damage caused by the accident. Reference was also made - in connexion with consequential and environmental damages and expenses - to article 5, paragraph 4 of the Rescue and Return Agreement which requires the launching State to take effective steps to eliminate possible danger of harm. Some delegations recalled that the concepts of "direct damage" and "indirect damage" were not accepted in the drafting of the Convention on Liability and that it would, therefore, be prudent not to use them in the present context. The view was expressed that it was necessary to clearly distinguish between liability for damage resulting from an NPS accident and the obligation to reimburse expenses resulting from an accident.

13. Among other aspects of the question of assistance that were considered by the Working Group, it was generally agreed that apart from the special responsibilities of the launching State and in the context of international humanitarianism, all States should be prepared to offer assistance to the affected State to the extent of their capabilities. Furthermore, it was agreed by some delegations that assistance to developing countries should take into account the special needs of these countries. Some delegations felt that such special needs should be defined. Some delegations expressed the view that a useful role in providing assistance might be played by entities other than States, e.g. international organizations such as the IAEA. In this connexion, the Working Group invited a statement from the observer of the IAEA. The view was expressed that it would be useful to ascertain what

functions were to be performed, in connexion with the question of assistance to States, by the Secretary-General of the United Nations with particular reference to the first paragraphs of the Canadian and the Argentinian-Chilean papers respectively.

14. The observation was made that it was left open at the present stage whether the provisions now being considered in the Working Group were intended to be eventually in the nature of guidelines, principles or treaty provisions and that this should be borne in mind during the discussions of this subject.

15. The Working Group held its final meeting on 18 February 1982 when it considered and approved the present report.

III.

RESOLUTION APPROVED BY THE XXII CONFERENCE OF THE INTER-AMERICAN BAR ASSOCIATION, MARCH 14-20, 1981 QUITO, ECUADOR

Res. 32 Solar Energy

WHEREAS:

The ever increasing problems related with the worldwide energy crisis make it necessary to search for new sources of energy such as solar energy;

The utilization of solar energy lacks specific juridical rules which are necessary at an international level to permit its correct and equitable use by all nations of the World;

The proper organs of the United Nations should formulate the principles of an Agreement on this matter which would be added to the existing international legal treaties on the peaceful use of outer space, the Moon and other celestial bodies;

At a Symposium on Space Law held in Miami in April 1980, convened by the University of Miami jointly with the Latin American Air and Space Law Association, a Document entitled "The XII Tables on Solar Energy" was approved, which represents the thought of American jurists concerning the legal problems relating to the capture of solar energy in outer space and its utilization on Earth;

The principles stipulated in said Document refer, among others, to the following subjects: application of the principle of "common heritage of mankind" to solar energy; solar energy should not be subject to national exclusive appropriation in outer space; the utilization of solar energy should be done in accordance with international law, including the Charter of the United Nations and other treaties or conventions relating to space; the geostationary orbit should constitute a common heritage of mankind; definition of "damage" which would include the damages that might be caused by solar energy to the environment, to air navigation or any other type of damage on earth; a preventive system to avoid damages caused by solar energy; international cooperation as a conditioning element of lawful activity in this field; participation by all countries and technical assistance to take part in the exploitation of solar energy; equal benefits to all countries; prohibition of utilization of solar energy other than for peaceful purpose, exclusively; administration of solar energy through an international agency with sufficient jurisdiction to guarantee its rational and equitable utilization,

RESOLVES

1. To recommend to the United Nations the adoption of the principles contained in the Document entitled "XII Tables of Solar Energy", except principle IV relating to the geostationary orbit, since there is no consensus with respect to this subject.
2. To recommend the establishment within the United Nations of a technical juridical body to handle all problems pertaining to the utilization of solar energy captured in space.
3. To suggest the scheduling of periodical meetings, at governmental level, to study these problems and to prepare a common policy on this matter.
4. To suggest the creation of national technical-juridical Commissions to study national problems relating to the utilization of solar energy and to serve as liaison with the international organizations dealing with the subject.
5. To recommend enactment of legislation providing tax and credit incentives to foster the private utilization of solar energy.