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

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Announcement

The JOURNAL OF SPACE LAW is pleased to announce that *Martine Rothblatt* and *Marcia S. Smith* will become contributing editors of the JOURNAL.

Martine Rothblatt is a business technologist and lawyer specializing in the fields of telecommunications and biopharmaceuticals. Over the past 15 years Rothblatt has successfully built and financed a number of new companies in these fields.

Martine Rothblatt is responsible of initiating, founding or launching several of the most innovative projects in the satellite communications industry, including the PanAmSat international television system, the Geostar and Hummingbird GPS vehicle location systems, GE's StarSys low earth orbit communications business and the CD Radio and WorldSpace digital audio broadcasting services. In addition, Rothblatt was responsible for securing the radio frequencies used by the Iridium, GlobalStar and Ellipsat global cellular phone systems.

Rothblatt is currently Executive Vice President of Sky Station International (a broadband wireless internet company Martine co-founded in 1996), Chairman & CEO of LRX Pharmaceuticals (a biotech company developing drugs for rare diseases), and Project Director of the PPH Cure Foundation (a medical research organization focused on pulmonary hypertension).

Martine Rothblatt graduated from UCLA's School of Law and Graduate School of Management in 1981, after receiving an undergraduate degree in Communications Studies, *summa cum laude*, from the University of California at Los Angeles in 1977. Rothblatt has practiced law at the leading Washington, DC firm of Covington & Burling, and represented NASA in satellite matters and the National Academy of Sciences. in radio astronomy matters before the Federal Communications Commission. In 1997, Martine was named a partner of Mahon, Patusky & Rothblatt, Chartered.

Martine Rothblatt has published books in the fields of satellite communications, gender studies and biotechnology, as well as over fifty articles and conference papers. Rothblatt is an elected lifetime member of the International Institute of Space Law and the International Astronautical Federation. In the biotech arena, Rothblatt is Chair of the International Bar Association's Bioethics Subcommittee, with responsibility for leading a global group of scientists and lawyers in developing a global treaty on appropriate human genome activities.

Martine and Bina Rothblatt are also proud parents of four children, two in college and two more on the way.

Marcia Smith is a Specialist in Aerospace and Telecommunications Policy for the Science Policy Research Division of the Congressional Research Service, Library of Congress, Washington, D.C. She has been at CRS since 1975, serving as a policy analyst for the Members and committees of the U.S. Congress on matters concerning U.S. and foreign military and civilian space activities, and on telecommunications issues (and formerly on nuclear energy). She was Section Head for Space and Defense Technologies from 1987-1991, and Section Head for Energy, Aerospace and Transportation Technologies from 1984-1985.

From 1985-1986, Ms. Smith took a leave of absence to serve as Executive Director of the U.S. National Commission on Space. The Commission, created by Congress and its members appointed by the President, developed long term (50 year) goals for the civilian space program under the chairmanship of (the late) former NASA Administrator Thomas Paine. The Commission published its results in the report Pioneering the Space Frontier.

A graduate of Syracuse University, Ms. Smith is the author or co-author of more than 160 reports and articles on space, nuclear energy, and telecommunications. Previously she worked in the Washington office of the American Institute of Aeronautics and Astronautics.

Ms. Smith is a Trustee of the International Academy of Astronautics (was co-chair of the Space Activities and Society Committee from 1991-1997, and is a member of the International Space Policies and Plans Committee and the Scientific-Legal Liaison Committee). She was a member of the Committee on Human Exploration (CHEX) of the U.S. National Academy of Sciences' Space Studies Board (1992-93, 1996-97). She is a Fellow of the American Institute of Aeronautics and Astronautics (AIAA). She serves on AIAA's Ethical Conduct Panel, and the International Activities Committee; was a member of the International Space Year Committee (1989-1992), the Public Policy Committee (1982-1989) and the Space Systems Technical Committee (1986-1989); was an AIAA Distinguished Lecturer (1983-1988); and was a member of the Council of AIAA's National Capital Section (1994-1996). She is a member of the Kettering Group of space observers. She is a Fellow of the British Interplanetary Society. She is a member of the Board of Directors of the International Institute of Space Law (IISL) and of the Association of U.S. Members of the IISL. She was a founder of Women in Aerospace, was its President (1987) and member of its Board of Directors (1984-1990), and is an Emeritus Member. She was President of the American Astronautical Society (1985-1986), on its Board of Directors (1982-1985), and Executive Committee (1982-1987, 1988-1989). She is a Life Member of the New York Academy of Sciences and the Washington Academy of Sciences (Board of Directors, 1988-1989). She is a member of Sigma Xi (the honorary scientific research society). Ms. Smith serves on the editorial boards of the journals Space Policy and Space Forum, and is a contributing editor for the Smithsonian Institution's Air & Space magazine. She is listed in several "Who's Who" directories, including Who's Who in the World, Who's Who of American Women, and American Men and Women of Science.

Ms. Smith is the daughter of Sherman K. and (the late) Shirley Smith. Born on February 22, 1951 in Greenfield, Massachusetts, she now resides in Arlington, Virginia.

The JOURNAL welcomes these two distinguished, internationally known experts in the field of the multidisciplinary aspects of space law and looks forward to what will unboubtedly be their enriching contributions to the pages of this publication.

THE OUTER SPACE TREATY IN PERSPECTIVE

He Qizhi*

1997 is the 30th anniversary 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, commonly referred to as the Outer Space Treaty. The International Institute of Space Law decided to devote a special session to commemorate the birth of this important treaty which represents a remarkable culmination to embark on the elaboration of international space law. With the adoption of this treaty, the space activities of states brought about by the great revolution in science and technology have been subjected to a regime of law.

The Charter of Space Law

The 1967 Outer Space Treaty is regarded as the cornerstone of international space law conventions, or what may be termed the Magna Carta of international space law. It propounds a set of fundamental principles which establish the basic framework for space exploration and utilization. Being the first international convention embodying a number of customary international space laws as enunciated in the 1963 Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space,[1] it prescribed in treaty form the principles adopted in the Declaration, and went further to enrich the law by providing additional important substantive rules. These basic principles and rules could be summarized as follows:

1) The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interest of all countries;

2) Outer space shall be free for exploration and use by all states on a basis of equality;

3) Outer space shall not be subject to appropriation by claim of sovereignty, by means of use or occupation, or by any other means;

4) Activities in the exploration and use of outer space must be carried out in accordance with international law, including the Charter of the United Nations in the interest of maintaining peace and security;

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* Member: International Law Commission; Board of Directors of International Institute of Space Law; Board of Trustees of International Academy of Astronautics; Editorial Board and Advisers, JOURNAL OF SPACE LAW.

[1] G.A. Res. 1962(XVIII) of 13 December, 1963.

5) No nuclear weapons or any other kind of weapons of mass destruction shall be placed in orbits of the earth;

6) The Moon and other celestial bodies shall be used by all state parties to the treaty exclusively for peaceful purposes;

7) Astronauts shall be given every possible assistance;

8) State parties bear international responsibility for national activities in outer space;

9) State parties keep jurisdiction and control over launched objects and personnel recorded in their register;

10) State parties shall avoid harmful contamination of outer space, celestial bodies and the environment of the earth, and shall consult with other state parties regarding potential harmful experiments;

11) The UN Secretary-General must be informed about space activities and shall disseminate such information to the public and the international scientific community;

12) International cooperation and understanding are to be promoted.

The Treaty entered into force in October 1967. Thus, the state parties were contractually obligated to carry out their space activities in accordance with the accepted norms and goals as set out in the treaty which, as per its title, is a treaty of principles, capable of broad interpretations, and is considered to form the basis upon which more precise legal instruments could be constructed. Some specific issues call for further elaboration. They include four additional treaties and four sets of principles adopted by the General Assembly.[2] The legal contents of all these instruments are determined by the ideas and principles of the 1967 Outer Space Treaty, which were developed and amplified into more specific provisions, including procedures for resolving disputes which might arise from relevant space activities.

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[2] The four treaties are: Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects launched into Outer Space of 1968; Convention on International Liability for Damage Caused by Space Objects of 1972; Convention on Registration of objects Launched into Outer Space of 1976; Agreement Governing the Activities of States on the Moon and Other Celestial Bodies of 1979. The four sets of principles are: Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting of 1982; Principles Relating to Remote Sensing of the Earth form Space of 1986; Principles Relevant to the Use of Nuclear Power Sources in Outer Space of 1992; Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the interest of All States, Taking into Particular Account the Needs of Developing Countries of 1996.

Historical Background

Looking back 30 years when the Outer Space Treaty was adopted at the threshold of space age, it may be asked what were the circumstances that led to the drafting and adoption of the Outer Space Treaty composed of a set of comprehensive legal rules closely linked with man's journey into outer space.

Confronted with the wide range of important issues which proliferated with the speedy development of space science and technology, states immediately realized the urgent necessity of bringing them within the framework of the law. This is how the movement towards legal regulation of outer space under the aegis of the United Nations has taken place.

The United Nations as a worldwide organization established to maintain peace and security, and entrusted with the task of "encouraging the progressive development of international law and its codification",[3] made quick response and took the initiative for the elaboration of treaty law dealing with space and space activities. Immediately after the successful launch of the first satellites, the General Assembly set up the Ad Hoc Committee on the Peaceful Uses of Outer Space (COPUOS) in 1958,[4] and made it permanent in 1961.[5] COPUOS and its two subcommittees, the Scientific and Technical Subcommittee and Legal Subcommittee, embarked on their substantive work in 1962, and have become the main center of international cooperation and co-ordination in the field of exploration and peaceful uses of outer space.

One of the tasks entrusted to the committee and the legal subcommittee was "to study legal problems which may arise from the exploration and the use of outer space".[6] The result of the laborious deliberations were finally embodied in the Outer Space Treaty, which is a monumental work laying down the foundation and the first layers of brick in the structure of the international space law.

The unique characteristics of outer space require a special law-making mechanism which should allow technical experts, government representatives and lawyers specializing in this field to interact together to accommodate both political and legal concerns in regulating space activities.[7] The developing events could show that without the timely and appropriate institutional arrangements provided by the United Nations, it would be unlikely that the legal regime provided by the 1967 Outer Space Treaty could be established in such an efficient and expeditious way within such a short span of time.

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3 Art. 13 of the UN Charter.

4 G.A. Res. 1348 (XVIII) of 13 December, 1958.

5 G.A. Res. 1472 (XIV) of 12 December, 1959.

6 *Id.*

7 *Cf.* N. Jasentuliyana, *The Lawmaking Process in the United Nations, in* SPACE LAW: DEVELOPMENT AND SCOPE, 35 (N. Jasentuliyana ed., Praeger 1992).

International political developments also played an important part which should not be overlooked for the conclusion of the Outer Space Treaty. The 1960's witnessed the sharp confrontation amidst the cold war between the two superpowers which alone possessed the satellite launching capabilities, thus placing them in a dominant position in treaty making for outer space. Among the procedures which were not in the framework of COPUOS is the agreement by the USSR and the USA "of their intention not to station in outer space any objects carrying nuclear weapons or any kind of weapons of mass destruction", and called upon all states to refrain from such activities.[8] Such a political compromise and arrangement reached outside the United Nations by the two superpowers was a determining factor that led to the formulation of a key provision of Article IV of the Outer Space Treaty. Although Article IV invoked a lot of comments,[9] the result of the efforts as a whole were noteworthy. Legal principles and rules universal in scope were established in the immediate wake of scientific and technological progress, and began to operate for the new dimension. To this, it should be added that states not engaged in space activities in the beginning phase of the space era also played a very active part in the negotiation process by making substantive statements and proposals which found their way into the final instruments. So the Outer Space Treaty was being drafted through the cooperation of the international community as a whole. This fact was all the more instructive since, in practice, outer space was being explored and utilized then by only a very small number of states.[10]

Customary Rules of International Space Law

Analysis of state practice in outer space shows that long before the conclusion of the 1967 Outer Space Treaty, important principles had been established as customary international space law.[11]

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8 G.A. Res. 1884 (XVIII), of 17 October, 1963.

9 Criticisms were mainly centered on Section I of Article 4 which did not mention any weapon other than nuclear weapons of mass destruction, thus allowing the use of other weapons, such as ballistic missiles and rockets in earth orbits. Section 2 of Article 4 was also being criticized on the ground that although the Moon and other celestial bodies shall be used exclusively for "peaceful purposes", yet that term was subjected to varying interpretations. Thus the Outer Space Treaty was described as "an international agreement tailored to the needs and wishes of the US and USSR". *See* N.M. MATTE, SPACE POLICY AND PROGRAMS TODAY AND TOMORROW; THE VANISHING DUOPOLE 41 (Toronto 1980). D. Goedhuis also noted the views of some commentators who characterized the Treaty as "essentially a bilateral agreement between the US and Soviet Union to which 80 states had dutifully accepted." 54 INTERNATIONAL LAW ASSOCIATION PROC.442 (The Hague1990).

10 *Cf.* MANFRED LACHS, THE LAW OF OUTER SPACE - AN EXPERIENCE IN CONTEMPORARY LAW-MAKING 141 (Leiden 1972).

11 V.S. Vereshchetin and G.M. Danilenko, *Custom as A Source of International Law of Outer Space,* 13 J. SPACE L. 22 (1985).

Among these practices which were codified into the Outer Space Treaty, the most important are the following: Outer space is open and free for exploration and use by all states; The sovereignty of states does not extend to outer space; Outer space is not subject to national appropriation; and States retain jurisdiction and control over space objects launched into outer space.

It should be noted that these principles were grown into being within a very short period of time. Although there were controversies over the problem of the emergence of "instant" customary international law,[12] most publicists held that international law, particularly the customary law of outer space, does not require the existence of practice for a long period of time. This was evinced by the dictum of the International Court of Justice in the North Sea Continental Shelf case:

"The passage of only a short period of time is not necessarily, or, of itself, a bar to the formation of a new rule of customary law."[13]

In the case of the Outer Space Treaty, custom as a source of international law to be codified in the Treaty shall operate alongside the Treaty provisions and may extend the sphere of the validity of the customary rules of outer space to those states which do not formally accept this Treaty.[14] In this respect, the International Law Commission did authoritatively state:

"A principle or rule of customary international law may be embodied in a bipartite or multipartite agreement so as to have, within the stated limits, conventional force for the state parties to the agreement so long as the agreement is in force; yet it would continue to be binding as a principle or rule of customary international law for other states."[15]

An example of great significance may be cited here to illustrate the importance of the application of customary rules of outer space to those states which have not accepted the Outer Space Treaty.

In consideration of the legal status of the geostationary orbit in COPUOS, some of the equatorial countries which are not parties of the 1967 Outer Space Treaty stressed the claim that they are not bound to the principles of the Treaty, in particular principles relating to the freedom of exploration and outer space contained in Articles I and II of the Outer Space Treaty, as they are not party members of the Treaty.[16]

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12 *See* B. Cheng, *United Nations Resolutions on Outer Space: "Instant" International Customary Law?* 5 INDIAN J. INT'L L. 36 (1965). However, other publicists insist customary international law can not come into being "instantly", because custom is based on constant and uniform practice and calls for the passage of at least a certain period of time, *supra* note 11, at p. 25.

13 1969 I.C.J. 43.

14 Up to 1997, there have been 96 states that have ratified the Outer Space Treaty. *See* Annual Report, 1997, published by the Standing Committee on the Status of International Agreements Relating to Activities in Outer Space of IISL.

15 1950 Y.B. INT'L L. COMM'N. 368.

16 *See*, for example, the statement by the representative of Colombia in COPUOS, UN Doc. A/AC.105/PV.173, at 56 *et seq.*

However, a great majority of states rejected the above agreements of the equatorial states on the ground that the fundamental principles and rules of the Outer Space Treaty, as enumerated above represent the existing general customary law which shall bind all members of the international community independent of formally ratifying or accepting the Treaty.[17]

Thus, the 1967 Outer Space Treaty, by codifying customary rules of international space law, regulates the mutual relations of both states which are parties of the Treaty and States which are not, as well as the relations of states which do not participate in the Treaty. In this way, the effectiveness of the fundamental legal rules relating to space activities plays a more important role in the maintenance of the international legal order in outer space.

Future Developments

In retrospect, the 1967 Outer Space Treaty together with other related instruments forming the basic parts of space law, have played a significant role to regulate and promote space ventures which have brought enormous benefits to mankind. Now thirty years after the adoption of the Treaty, the question may be raised whether the existing legal regime based on the Outer Space Treaty can cope with anticipated developments in the coming years of the 21st century.

The immediate answer would be the fundamentals of the Treaty would be viable and effective to meet the challenges, but this does not preclude necessary adjustment and changes which should be made to forestall the forthcoming developments.

Space law will grow to cover two principal aspects of space ventures. In the field of earth-oriented activities, environmental issues, including both earth and space environment, have become a matter of great concern to mankind. An examination of existing law shows that effective protection of the environment requires not only general principles but also more detailed specific legal rules. This indicates the need for further progressive development of space law relating to environment mainly on a treaty basis, since existing treaty law regarding environmental protection is very inadequate, and customary law provides only a few basic legal principles which lay down guidelines to be followed.[18] In such circumstances, and bearing in mind the political and legal realities of the international system, the development of a comprehensive system of space environmental law has to take a realistic approach, dealing with issues step by step based by a comprehensive and in-depth understanding of the environment situation mainly by space technology.

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17 *See,* for example, the statement by the representative of Czechoslovakia and Italy in the Legal Subcommittee, UN Doc. A/AC.105 C.2/SR.297 (1978), at 4 and 8, respectively.

18 *Cf.* Qizhi He, *Space Law and Environment, in* SPACE LAW: DEVELOPMENT AND SCOPE 169 (N. Jasentuliyana ed., Praeger 1992).

With regard to space-oriented ventures which will extend well into the 21st century, the recent magnificent feat of pathfinder's landing on Mars on July 4, 1997 revives man's interest and opens a new chapter of man's forays into the universe. The new and successive moves in space would make space lawyers to watch scientific discoveries warily and to be mindful of changing needs in the field of law which would be attendant on the new achievements.

New pages of space law will thus be added to those already written. In the case of Mars, the Moon Agreement provides its provision would apply to Mars and other celestial bodies "except in so far as specific legal norms enter into force" for them.[19] This question should be answered so as to ascertain whether the terms of the 1979 Moon Agreement be applied to Mars as one of the other celestial bodies and also to asteroids.

The principle of "common heritage of mankind"[20] may also be reaffirmed along the lines of the Law of the Sea Convention[21] which was accepted by all states ratifying the Convention.[22] The essential point seems to establish the regime spelled out in para. 7 of Article 11 of the Moon Agreement that special consideration should be given to the interest and needs of the developing countries, but also to the efforts of those countries which have contributed either directly or indirectly to the exploration of the Moon, *i.e.* to the efforts of space faring countries and other countries participating in the activities.

With regard to other space activities in the earlier years of the 21st century, legal provisions shoul perhaps be required for the crew traveling inside space vehicles to space stations, and from there to the Moon, as well as inside lunar habitats and for flights to Mars. These rules could vary if crew members are national or international in an environment equipped with special life-support systems, which are unknown on the earth. Though the undertaking of occasional, short and long duration, multi-person visits to celestial bodies are still far away in the future, they will be realized in the course of the 21st century, with which the legal profession should keep in touch as a natural extension of the existing legal system based on the principles of the Outer Space Treaty.

In addition to treaties in response to anticipated events, there will be in the future, as in the past, accepted international practice, namely customary international space law, which can produce a valued alternative to treaty law.

Moreover, legal rules based on the Outer Space Treaty will have to be tailored to cope with immediate events. This means the attention of the legal profession should also be directed to the perfection of regimes both for manned and unmanned flights, the management of space stations and

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19 Art.1 of the Moon Agreement.

20 Art.1, para. 1 of the Moon Agreement.

21 Art. 136 *et seq.* of the Law of the Sea Convention, UN Doc. A/48/950 (1993).

22 In accordance with Art. 308, the Convention shall enter into force after 12 months of the deposit of the 60th ratification or accession.

robots, etc. The priorities will be subject to the necessities of space undertakings.

The prospects are getting better and better. The diminishing East-West tension and the easing of North-South confrontation will enhance international cooperation towards the noble goal of man's ventures into space.

AEROSPACE OBJECT - LEGAL AND POLICY ISSUES FOR AIR AND SPACE LAW+

Stephen Gorove*

Introduction and Retrospect

The use of the phrase "aerospace object" has surfaced in U.N. discussions thrusting on international legal technicians and policy makers a set of challenging issues and alternative choices in the fields of air and space law. Prior to its sudden emergence, the phrase has rarely been encountered in the legal literature although the word "aerospace" has been used in joint combination with "law" to make up the phrase "aerospace law."

If an attempt were made to shed light on the background of the term "aerospace law" and trace the possible reasons for its emergence, one would undoubtedly come across the writings of such a well-known authority as John C. Cooper who suggested analogies from the law of the sea and referred to territorial airspace, contiguous zone and the space beyond.[1]

Similarly, Nicolas Mateesco Matte compared the territorial sea to the territorial air and used the expression of "Aerospace Law" as the title of his 1969 book in which he restated his earlier held views, opposing arbitrary legal boundaries between airspace and outer space and

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1 *See* John C. Cooper, *Legal Problems of Upper Space,* 50 PROC. AM. SOC'Y INT'L L. 85-93 (1956); *idem, Flight-Space and the Satellites,* 7 INT'L & COMP. L. Q. 82, at 89 (1958). By his proposal, Professor Cooper, in essence, revived the old zone idea which was advocated half a century earlier and was based on maritime analogy.

championing the establishment of an aerospace law based on a new functional theory.[2]

There can be little doubt that analogies drawn from the law of the sea have contributed to the tendency to place air and space law under the unifying umbrella of "aerospace law." Of course, this was a hard thing to sell because with entry into force of the fundamental charter of space law, the 1967 Outer Space Treaty,[3] the contours of a legal system distinct from air law seemed to have emerged. With the passage of time and in light of four additional international treaties and a number of resolutions dealing with the distinct law of outer space, the contention that there could be a fusion of air and space law under the heading of "aerospace law" became even more remote. A quick glance at the vast literature reveals an overwhelming number of writers who have preferred to use the now generally accepted phrase "space law."

Aerospace Object and the U.N. Questionnaire

The coupling of the terms "aerospace" and "object" in the joint expressions of "aerospace object" surfaced first in the Legal Subcommittee of the U.N. Committee on the Peaceful Uses of Outer Space (COPUOS) in connection with the definition and delimitation of outer space.[4] This issue has been on the agenda of the Subcommittee since 1967 due to the fact that advocates of the spatial and functional theories could not agree whether a boundary should be established internationally, at a height of approximately 100-110 km above sea level, as proposed by the Soviet Union, or whether such delineation was unnecessary, serving no useful purpose, as asserted by several western spacefaring nations, including the United States. Notwithstanding this deadlock, practical developments over the last 30 years seem to have confirmed that the area where artificial satellites and other man-made objects are in orbit around the earth and beyond is outer space. However, the actual boundary line between airspace and outer space remains internationally undetermined to date.

In 1991, the Soviet Union made an attempt to overcome the long-standing impasse and during the general discussion of the Legal Subcommittee of the COPUOS agenda item on the definition and delimitation of outer space, with the support of some other delegations, suggested that the Subcommittee should commence an "exchange of views on the international legal aspects of future exploitation of aerospace systems."[5] As a follow-up in 1992, the Russian Federation, continuing the

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2 Matte retained the same title in his subsequent book. *See* NICOLAS MATEESCO MATTE, AEROSPACE LAW - FROM SCIENTIFIC EXPLORATION TO COMMERCIAL UTILIZATION (1977).

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

4 U.N. Doc. A/AC.105/484, at annex II, para. 9 (1991).

5 *Id.*

membership of the Soviet Union in the United Nations, submitted a working paper entitled "Questions concerning the legal regime for aerospace objects."[6] It was after this initiative that, in 1993, the Chairman of the respective Working Group circulated an informal working paper entitled "Draft questionnaire concerning aerospace objects."[7] Two years later, at the thirty-fourth session of the Subcommittee, the Working Group finalized the text of the Questionnaire on possible legal issues with regard to aerospace objects" (hereinafter "Questionnaire") in an effort to clarify issues concerning the definition and delimitation of outer space and recommended that it should be circulated to the States Members of COPUOS.[8]

Definition and Meaning of "Aerospace Object"

It was the circulated Questionnaire that raised the issue whether an "aerospace object" could be defined as "an object which is capable both of traveling through outer space and of using its aerodynamic properties to remain in airspace for a certain period of time."[9]

While the purpose of the Questionnaire was to help the Committee in finding a common ground regarding the definition and delimitation of outer space, it became apparent from several of the responses received that while the definition was acceptable for working purposes, it needed further refinement and clarification. As an example, reference was made to the phrase "for certain period of time." Some delegations expressed the view that the definition should provide only for functional, man-made objects as opposed to space debris or natural objects. It was also pointed out that while the use of the term "aerospace systems" or "space transportation systems" may have appeared more appropriate than the uncommonly used phrase "aerospace object," the term "space transportation systems" as used in the report of COPUOS and its Scientific and Technical Subcommittee had a wider meaning, covering both the transportation systems of the space-shuttle-type vehicles and the usual rocket carriers. Therefore, that term would not be appropriate for describing the hybrid systems that might be used for both air flight and missions in outer space.[10]

One other legitimate query requiring clarification was the question whether the definition was meant to apply exclusively to a type of vehicle like the space shuttle whose main function has been transportation of people and cargo into space but which has also been using its aerodynamic properties when returning to land on earth, in a way reminiscent of the landing of an aircraft. The use of the term "aerospace object" in lieu of

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6 *See* U.N. Docs. A/AC.105/C.2/L.189 (1992)

7 U.N. Doc. A/AC.105/C.2/1993/CRP.1.

8 U.N. Doc. A/AC.105/C.2/1995/CRP.3/Rev. 3 of 31 Mar. 1995, reproduced in U.N. Doc. A/AC.105/607, para. 38 and annex I, app. (1995). The text of the Questionnaire also appears in 23 J. SPACE L. 223 (1995).

9 *Id.*

10 U.N. Doc. A/AC. 105/639, at 14-15 (1996).

"space object" left this interpretation somewhat doubtful. In view of this, it was more likely that, apart from objects launched into outer space, the definition had also intended to cover the proposed aerospace-plane-type vehicle the primary purpose of which was point-to-point transportation on earth (the carriage of a payload and/or passengers from one point on the earth to another) though for a brief period of time such vehicle was expected to travel through the fringes of outer space.

Several of the responses received were in line with the foregoing interpretation. For instance, the Czech Republic in its answer indicated that "aerospace object" may cover different types of aerospace vehicles, some of which are still in the design and planning stage, while others have been suspended or even abandoned.[11] Italy also observed that the definition which considers the twofold capacity of the aerospace object is closely linked with the developing technology.[12] Most importantly, the Russian Federation, which brought up the issue of "aerospace object," stated unequivocally that there are two basic programs (purposes) for using aerospace objects, namely:

1. undertaking a flight from one point on the earth to another (for this purpose the object may undertake part of its flight in outer space, not attaining cosmic speed); and

2. delivering a crew and/or payload in outer space and back to the earth (its aerodynamic properties at the time of take-off and landing enable the object to remain in airspace for a certain period of time).[13]

If, as these responses suggest, the Questionnaire's proposed definition is not limited to the space-shuttle-type vehicle but also covers the aerospace plane which in light of expected commercial developments aims at a very fast, long-distance earth transportation, a whole range of issues must be examined so that appropriate policy evaluations and choices can be made with respect to the applicability or inapplicability of norms of air and space law in factual scenarios which relate to both the aerospace plane and the space-shuttle-type vehicle.

In line with the preceding assumption that the Questionnaire's purported definition covers both the space-shuttle-type vehicle and the briefly circumscribed aerospace plane, our attention will now turn to the determination of the legal regime that should govern the two distinctly different aerospace objects.

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11 U.N. Doc. A/AC. 105/635, at 10 (1996). Similarly, in addition to the U.S. space-shuttle-type vehicle, Germany noted references to future space transportation systems such as, for example, HERMES (ESA), HOTOL (U.K..), HOPE (Japan), S/NGER (Germany) and NASP, the United States Space Plane, which are still in the planning phase and for some of which the financing is disputed or has already been canceled. *Id.* at 10-11.

12 *Id.* at 11.

13 U.N. Doc. A/AC. 105/635/Add.1, at 4-5 (1996).

Aerospace Object as an Aerospace Plane

The development and eventual utilization of the aerospace plane is expected to herald the introduction of an advanced space transportation system consisting of a vehicle which would be capable of taking off horizontally and proceeding directly single-stage into outer space.[14] It would have the potential of spawning a new generation of commercial aircraft with the ability to span intercontinental ranges in a matter of minutes. A flight from New York to Tokyo may take only a couple of hours compared to the currently required time of 16 hours or more.[15]

The program relating to the development of the aerospace plane reflects a combination of aeronautical and space technologies; its utility could be gauged from the vehicle's capability of global unrefueled operation and of reaching any point on the earth in two hours or less. While at this stage of scientific research and experimentation, it is not possible to determine with certainty the configuration and eventual capabilities of future aerospace planes, for purposes of our inquiry, it will be assumed that early versions of the plane under discussion will be used as terrestrial transportation devices with the capability of taking off from a point on earth, flying at will in the airspace and traversing through the fringes of outer space without completing an orbit, for the sole purpose of reaching another point on earth.

While there are many legal and policy issues which arise in the wake of the development of the aerospace plane, the central policy issue will be to determine what laws, domestic and international, should be applied to this versatile vehicle in different factual scenarios. The main issues relate to the definition and delimitation of airspace and outer space, the status of astronauts, and the issues of liability, registration and jurisdiction.[16] Will the policy choice be to apply air law to the aerospace plane while traveling through the fringes of outer space or will the choice be to apply space law necessitating the application of space law rules embodied in the relevant international conventions? Will the personnel of the craft be regarded as astronauts, *i.e.*, "envoys of mankind" to whom the special privileges extended by the Agreement on the Rescue and Return of Astronauts and Space Objects would be applicable?[17] Will the law of the underlying state be applicable to an aerospace plane in the airspace in

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[14] For a comprehensive analysis, see *Stephen Gorove, Legal and Policy Issues of the Aerospace Plane*, 16 J. SPACE L. 147 (1988).

[15] *See* The National Aerospace Plane Program, Joint Hearing Before the Subcommittee on Transportation, Aviation and Materials of the Committee on Science, Space and Technology, and the Subcommittee on Research and Development of the Committee on Armed services, U.S. House of Representatives, 100th Cong., 1st Sess. (March 11, 1987), p. 22.

[16] For details, see STEPHEN GOROVE, DEVELOPMENTS IN SPACE LAW - ISSUES AND POLICIES 355-56 (1991).

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

areas currently not utilized by conventional aircraft in view of the fact that the upward extent of national sovereignty has internationally not been determined as yet? Will space law govern an object orbiting the earth at a height of 30 km if new technology enables it to remain in orbit at that height?[18]

In formulating responses to these questions, as a general guideline, it may be suggested that if the aerospace object is used as an aerospace plane for the primary purpose of operating as an aircraft engaged in earth-bound transportation and only incidentally reaches the fringes of outer space, air law should be applicable to it. However, it stands to reason that such objects may be expected to comply with space debris mitigation, rules of the road, and other requirements while operating briefly around the fringes of outer space.

More problematic would be to determine the law applicable to the aerospace plane in areas which are below outer space but which are above areas currently used by aircraft and recognized as national airspace. While the general guideline might still be useful, international agreement or another form of accommodation may be necessary to resolve any dispute that might arise.

It is also doubtful, although not necessarily impossible, that new technology could lead to the acceptance of lowering the current height of the area which is regarded as outer space from approximately 100 km to 30 km.

Aerospace Object as a Space-Shuttle-Type Vehicle, i.e., a "Space Object"

The issue of whether the policy choice should be to apply rules of air law or space law in connection with a technological innovation is not entirely new. At the time when the space shuttle was born, policy makers and lawyers were already faced with a similarly vexing issue which arose because the shuttle ascends into outer space with the assistance of rockets just as does a conventional spacecraft and descends from outer space by gliding through the atmosphere and touching down on a runway in a manner reminiscent of the landing of an aircraft. If the policy choice was arrived at because the vehicle's primary function and purpose was to operate as a device in outer space, this would in fact mean that the choice was to regard

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[18] That scientific and technological innovations can affect orbiting capabilities appears to be borne out by a recent application of Sky Station International to the Federal Communication Commission (FCC) to create a new Global Stratospheric Telecommunications Service (GSTS) by using a revolutionary technology that holds each of the proposed 250 Sky Station platforms stationary at a 30 km altitude. *See* Request to Establish New GSTS Service, Additional Comments and Petition for Rulemaking, FCC, ET Docket No. 94-124, Mar. 20, 1996. This development suggests the necessity of exercising continued caution to avoid premature determination of demarcation lines.

the vehicle as a "space object" with all the attendant legal consequences that follow therefrom.

The notion of "space object" has been central to the international law of outer space. Since the dawn of the space age, it has been the most frequent concept encountered in international agreements, U.N. resolutions, domestic laws, executive pronouncements, and court cases. Notwithstanding its crucial position, only a partial definition of this phrase may be found in the Liability and Registration conventions, both of which state that the term "space object" includes "component" parts of a space object as well as its "launch vehicle" and "parts" thereof.[19]

After a consideration of such vital issues as the relevance and purpose of launching, the pre-launch and landing phases, the relevance of outer space, the issue whether to regard extraterrestrial materials as space objects and the meaning of an object, this writer has suggested that a space object be defined as

> an object launched or attempted to be launched in orbit around the earth or beyond. Such object (or a part of it) is a space object (or a part of it) from the time of its launch or attempted launch, through its ascent from earth to outer space or while in outer space, as well as during its orbit, deorbit, reentry and landing on earth.[20]

If so defined, the space-shuttle-type vehicle would clearly qualify as a space object.

The foregoing conclusion was reinforced by the overall purpose and functions of the shuttle and was also fully borne out by an earlier review of the Federal Aviation Act of 1958, the National Aeronautics and Space Act of 1958, the underlying Congressional intent, the relevant legislative history, as well as NASA practice. To this was added an authoritative statement of the Chief Counsel of the Federal Aeronautics Administration, to the effect that space law had to be applied to the space shuttle. This determination was in line both with international air law incorporated in the Paris Convention of 1919 and the Chicago Convention of 1944, as well as

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[19] *See* Art. I(d) of the Convention on International Liability for Damage Caused by Space Objects, March 29, 1972, 24 U.S.T. 2389, T.I.A.S. No. 7762, 961 U.N.T.S. 187 (entered into force for the United States Oct. 9, 1973); Art. I(c). of the Convention on the Registration of Objects Launched into Outer Space, opened for signature Jan. 14, 1975, 28 U.S.T. 695, T.I.A.S. No. 8480, 1023 U.N.T.S. 15 (entered into force for the United States Sept. 15, 1976).

[20] Stephen Gorove, *Toward a Clarification of the Term 'Space Object' -- An International Legal and Policy Imperative?*, 21 J. SPACE L. 25-26 (1993). The fact that the partial definition of "space object" refers back to itself when speaking of "component parts" of a "space object" and "its" launch vehicle leaves unanswered the fundamental issue of what is or is not a space object or under what circumstances an object becomes or ceases to be a "space object" and the question of the applicability of the relevant space treaty provisions. *Id.* at 12.

with international space law embodied in the Outer Space Treaty of 1967 and the subsequent major international space law conventions.[21]

Since the policy choice has been to regard the space-shuttle-type craft as a space object, all the rules applicable to such objects under international space law apply to such objects. Most crucial among factual scenarios in which such rules apply is the flight by a space-shuttle-type vehicle through the sovereign airspace of another state.

In its response to Question 7 of the UN Questionnaire which raised the issue of whether there are "precedents with respect to the passage of aerospace objects after re-entry into the Earth's atmosphere" and whether international customary law exists with respect to such passage, the Russian Federation stated that there have been relatively few instances of space objects flying over territories of foreign states. As one of such instances, it referred to the flight of the Space Shuttle Atlantis in March 1990 about which the United States communicated information to the USSR a few hours before the overflight as a matter of courtesy.[22] Germany referred to the flight, on November 15, 1988, of the Soviet "Buran" which, after reentry into the Earth's atmosphere, overflew foreign countries for the purpose of touchdown in Baikonur. Germany did not believe that international customary law existed with respect to the passage of space transportation systems over foreign territory, since no international practice on this respect existed and it did not regard this occasion as relevant for the formation of international customary law, especially since the former Soviet Union which was the launching state did not exist anymore.[23]

In view of the relatively few relevant flights that have been noted in the literature, exclusive of accidental situations, it is perhaps not surprising to find that the initial responses of other states, which did not, as of then, include a response from the United States, failed to reveal sufficient support for the conclusion that the right of passage for an ascending or descending space object has been generally recognized as a customary rule of international law. At the same time, there has been an indication that an explicit admission of the right of innocent passage which was not prejudicial to the peace, good order or security of the subjacent states and a more detailed regulation of the exercise of this right should be considered as a way for the legalization of the actual practice.[24] This point was also intimated by the response of the Russian Federation in its statement that provisions of international customary law with respect to the passage of aerospace objects after re-entry into the Earth's atmosphere are currently being "elaborated."[25]

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21 *See* the SPACE SHUTTLE AND THE LAW 2-3 (Stephen Gorove ed. 1980).

22 U.N. Doc. A/AC.105/635/Add.1, at 4-5 (1996).

23 U.N. Doc. A/AC.105/635/Add.1, at 10-11 (1996).

24 U.N. Doc. A/AC.105/635/Add.1, at 4-5 (1996).

25 According to Terekhov, the phrase "is being elaborated," which appears in U.N. Doc. A/AC.105/635/Add.1, at 5 (1996), is an imprecise translation from Russian; the better translation is "evolving." *See* Andrei D. Terekhov, *Passage of*

If one turns from the preceding initial sample of governmental responses to the views of distinguished authorities, a recent survey appears to reveal to this writer widely divergent views.[26] At one end of the spectrum, are the positions of Cheng, Dembling and Terekhov denying the existence of international customary law with respect to the passage of aerospace objects through foreign airspace. Less explicit in their denial are the views of Kopal, Haanappel and Masson-Zwaan, with some equivocation by Vereshchetin and Danilenko and a limited recognition of the right by Lachs. At the other end of the spectrum of competent opinions are the assertions by Finch and Christol that there are such rights.[27]

One explanation for the lack of uniformity, apart from strongly entrenched beliefs, may also have been the time element. During a ten year period, or sometimes even less, as suggested by learned allusions to the notion of "instant custom," perceptions, approaches, and attitudes can change. This writer's own position has also been influenced by actions or inactions in the world arena over a period of time and will no doubt be affected again in the future. Seen in such a light, he stated in 1988:

> The principle of the freedom of exploration and use of outer space, a cardinal principle of the 1967 Outer Space Treaty, in a sense implies the freedom to go into outer space and also the freedom to return to earth from outer space. Because of the very limited number of space flights that might have traversed through the airspace of foreign states the exact nature and scope of this freedom has so far not been determined by international customary law.[28]

In 1993, this author made the following observation:

> States have not objected to the flight of artificial earth satellites above their territories in outer space nor to the ascent or descent of foreign space objects though undoubtedly some of these may have passed through their territorial air spaces. It is not certain how many times such a passage may have occurred since the upper boundary of national territorial air space so far has not been determined by international agreement or international customary law. If there is an international customary law, it is based on common perceptions and shared expectations of international authoritative decision-makers regarding such passage and supported by the cardinal principle of freedom of exploration and use of outer space

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Space Objects Though Foreign Airspace: An International Custom?, 25 J. SPACE L. 1, at 9 (1997).

26 *Id.* at 4-8.

27 *Id.*

28 *Stephen Gorove, Legal and Policy Issues of the Aerospace Plane*, 16 J. SPACE L. 147, at 148 (1988).

> embedded in the Outer Space Treaty of 1967 and generally recognized to the extent and in line with existing state practice."[29]

On the same occasion, he added:

> to the extent that States have not objected to the flight of artificial satellites above their territories in outer space nor to the ascent or descent of space objects through their national air spaces in the situations where such have occurred, a limited international custom with legal implications seems to have emerged.[30]

As late as 1996 this writer's position which, in his view, other learned colleagues appeared to have shared, may be briefly restated in the following terms. If the space-shuttle-type of aerospace object was used for the primary purpose to operate as a device in outer space, space law should apply to it. Once the primary purpose of the object is determined, the corresponding legal regime applicable to it should continue to be applied for the duration of the object's flight, whether in the airspace or outer space, at a particular time. Attempting to proceed otherwise would lead to conflicting interpretations with respect to the applicable law and would greatly confuse the problem.

If the primary function of the aerospace object was to operate as a spacecraft, then air law would not be applicable to it except in situations in which the craft returns in a non-accidental situation to a non-launching state. Aerospace objects launched into outer space are subject to the rules governing the registration of objects so long as the primary purpose of the object has been to operate as a spacecraft. Such an object should be governed by the national laws of the launching state, or if it was launched from a platform in outer space, it should be governed by outer space rules. As long as the object's primary function was to operate as a spacecraft - its safe passage to and from outer space has now attained the status of international customary law.[31]

Within the confines of this presentation, it is not possible to list even in a schematic manner all the relevant factors which prompted this writer to alter his earlier positions but attention may be drawn to the flight of the Soviet "Buran,"[32] about which no advance notice appears to have been given and no permission was requested or granted. Another notable occasion was the flight of the Space Shuttle Atlantis[33] about which a few

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29 PROC. AMERICAN BRANCH OF THE INTERNATIONAL LAW ASSOCIATION, REPORT OF THE SPACE LAW COMMITTEE 105, at 110-111 (1993-1994).

30 *Id.* at 114.

31 *See* Stephen Gorove, *Legal and Policy Issues Raised by the U.N. Questionnaire on Aerospace Objects*, 24 J. SPACE L. 52-53 (1996).

32 *See* note 23 and text preceding it.

33 *See* note 22 and text preceding it.

hours notice was given by the U.S. to the U.S.S.R. only as a "matter of courtesy." This was accepted as such without any charge of a violation of territorial sovereignty that was frequently made in the past in connection with overflights of another kind. Nor was there any warning about avoidance of such an overflight in the future. Additionally, an agreement was also reached establishing that the fact that this information was furnished should not be deemed to set a precedent.[34]

As to the argument of traditionalists that the emergence of international customary law is normally a relatively slow process, it may be pointed out that many publicists do not reject the notion of "instant" international customary law in relation to space activities. As observed by the International Court of Justice in the North Sea Continental Shelf case: "The passage of only a short period of time is not necessarily, or, of itself, a bar to the formation of a new rule of customary law."[35]

Conclusion and a Glance at the Future

The preceding overview of some of the legal and policy choices associated with the notion of "aerospace object" suggests that the choice whether to recognize, in whatever form or extent, the existence of international customary law or to pursue an adoption of guidelines in the form of a UN resolution or perhaps to go the route of international treaty making, should take into account a whole gamut of variables, including the existing legal framework of air and space law, past state practices and precedents, national security, and other considerations,[36] and even effects of possible violations of cardinal norms of space law, if such can be envisaged.

Could a state lawfully deny another state's spacecraft the right of innocent passage at a height of 40-90 km in the space above its territory? Would this violate the fundamental freedom of the exploration and use of outer space? Should the answer be influenced by an analogy to the law of the sea where, in the absence of mutual agreement or international convention, a land-locked state has no independent right for access to the sea and claim innocent passage through the territory of a coastal state notwithstanding the principle of the freedom of the seas?[37] Should this be

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34 U.N. Doc. A/AC. 105/635/Add.1, at 5 (1996).

35 1969 I.C.J. 43. *Cf.* discussion of "instant custom" by He Qizhi, *The Outer Space Treaty in Perspective,* 25 J. SPACE L. 93, at 97 (1997), *supra.*

36 The factors that underlie, in general, decision making in the world community are well-known. They operate within the context of the overall conditions and trends prevailing therein. For an overview of the processes of interaction, claim and decision, see MYRES S. MCDOUGAL, HAROLD D. LASSWELL AND IVAN A. VLASIC, LAW AND PUBLIC ORDER IN SPACE 3-137 (1963).

37 While the Geneva Convention appears in favor of ensuring free transit for States having no sea-coast through the territory of a coastal state, this right is predicated on mutual agreement. Under Art. 3 of the Convention:

(1) In order to enjoy the freedom of the seas on equal terms with coastal States, States having no sea-coast should have free access to the sea. To this end

our policy choice for interpreting the freedom of exploration and use of outer space enshrined as a fundamental principle in the 1967 Outer Space Treaty? A courageous negative answer to this will be a challenge for air and space lawyers in the 21st century. However, in pondering their answer, decision makers should be reminded of the words of the late Judge Manfred H. Lachs who cautioned that

> [T]he interdependence of the traffic in the air and outer space should not subject the activities of states to unnecessary limitations. To survive in the world today states need to open the frontiers of the air to other states unless they prefer to live in complete isolation, where very few, if any, could survive and develop.[38]

If the right of innocent passage to and from outer space, as a matter of international customary law is contested or challenged, a U.N. resolution, as an indispensable minimum, could help in allaying any doubt.

Before closing this presentation, a final *caveat* ought to be stressed. While the definition of aerospace object is currently based on just two criteria, *i.e.*, the capability of an object to travel through outer space and its capability to remain in the airspace for a certain period of time, as aerospace objects become more sophisticated in design, their definition and the effect of such on legal and policy issues for air and space law may have to be reevaluated in light of additional criteria. Additionally, if future technological developments were to create a hybrid vehicle capable of moving freely in the air like an aircraft and also moving at will in outer space, a consideration of new laws, both domestic and international, may become necessary in order to adjust legal regulations to the latest scientific and technological innovations.

States situated between the sea and a State having no sea-coast shall by common agreement with the latter and in conformity with existing international convention accord:

(a) To the State having no sea-coast, on a basis of reciprocity, free transit through their territory; and

(b) To ships flying the flag of that State treatment equal to that accorded to their own ships, or to the ships of any other States, as regards access to seaports and the use of such ports.

(2) States situated between the sea and a State having no sea-coast shall settle, by mutual agreement with the latter, and taking into account the rights of the coastal State or State of transit and the special conditions of the State having no sea-coast, all matters relating to freedom of transit and equal treatment in ports, in case such States are not already parties to existing international conventions.

Convention on the High Seas, Geneva, Apr. 29, 1958, *Entered into force*, Sept. 30, 1962; 13 U.S.T. 2312, 450 U.N.T.S. 82.

[38] Manfred Lachs, *Freedom of the Air - the Way to Outer Space, in* AIR AND SPACE LAW: *DE LEGE FERENDA*. 244 (T. L. Masson-Zwaan and P.M.J. Mendes de Leon, eds. 1992).

EVENTS OF INTEREST

A. PAST EVENTS

U.N. REPORTS

Scientific and Technical Subcommittee of the COPUOS Holds Thirty-Fourth Session and also Acts as Advisory Committee for Third UNISPACE Conference

The Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) held its thirty-fourth annual session at the United Nations Office at Vienna, Austria, from 17-27 February 1997 under the Chairmanship of Professor D. Rex of Germany.

Pursuant to General Assembly Resolution 51/123 of 13 December 1996, the Subcommittee, during its two-week session, continued its consideration of various issues relating to international cooperation in outer space, including, among others, the implementation of the recommendations of the UNISPACE 82 conference[1] and the United Nations Programme on Space Applications, possible organization of a third UNISPACE conference, space debris with a specific focus on the modeling of the space debris environment and risk assessment, and the use of nuclear power sources in outer space. In addition to these items discussed in detail below, the Subcommittee also continued its consideration of issues related to the remote sensing of the Earth by satellites, the physical and technical attributes of the geostationary orbit, space transportation systems, the Earth environment, life sciences and planetary exploration and astronomy.

As in recent years, this year's session of the Subcommittee took place in a productive atmosphere with no apparent East-West conflicts although North-South differences on economic and development issues remained but were discussed in a constructive manner. As a result, the work of the Subcommittee on many substantive issues took solid steps forward and provided a good basis for future discussions and agreement on many issues.

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[1] For a complete record of the recommendations and conclusions of UNISPACE 82, see generally, *List of Conclusions and Recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82)*, U.N. Doc. A/CONF.101/11/Corr.1 of 2 Nov. 1982.

Themes and Presentations

At this year's session as in previous sessions, COSPAR and IAF organized a symposium on the theme "Space systems for direct broadcasting and Global Information Systems for space research." The symposium included technical presentations on the experiences of various countries and organizations in this area, including presentations by Argentina, Austria, India, China, Republic of Korea, Spain, Russian Federation, United States, the European Commission and ESA. For the thirty-fifth session of the Subcommittee in 1998, the Subcommittee recommended that within the context of the Third UNISPACE Conference, the theme, "Scientific and technical aspects of space-based meteorology" should be fixed for special attention.

Other presentations on various themes were also given during the course of this year's session with a view to enhancing discussions on relevant issues before the Subcommittee. These included presentations from Austria on the Austrian contribution to the cometary probe Rosetta; Chile on research on developing medicaments for Chagas's disease through protein crystallization in micro-gravity conditions; France on integrated global observation strategy, and scientific and technical aspects of the STS 78 mission; Japan on matters relating to planetary exploration; Morocco on space activities of developing countries: technical possibilities and perspectives, and management of water resources in developing countries; Romania on the network of space science and technology capacity-building centres in central eastern and south-eastern Europe; Russian Federation on the Mars 96 mission, collision of nuclear power sources (NPS) with space debris, and NPS on board the Mars 96 spacecraft; ESA on software packages including the use of World Wide Web for research purposes in space science; and IAU on adverse environmental impacts on astronomy.

As was the case in previous sessions, other presentations on the complex issue of space debris were also given by the United Kingdom of Great Britain and Northern Ireland, the Russian Federation, the United States of America, France, Japan, Germany, ESA and the Inter-Agency Space Debris Coordination Committee (IADC).[2]

Implementation of the Recommendations of UNISPACE 82 and United Nations Programme on Space Applications

As has been its accepted practice, the Subcommittee continued its joint consideration of the Implementation of the Recommendations of UNISPACE 82 and the United Nations Programme on Space Applications. The mandate of the Programme on Space Applications covers six major areas: provision of long-term fellowships; organization of training courses, workshops, symposia and conferences; provision of technical advisory

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[2] For further details on these presentations, see generally, *Report of the Scientific and Technical Subcommittee on the Work of its Thirty-Fourth Session*, A/AC.105/672 of 10 March 1997, at para. 15.

services; development of indigenous capability at the local level; provision of space information and promotion of greater cooperation in space science and technology.[3] Of the above, one of the major objectives of the Programme on Space Applications is assisting developing countries by providing access to information on the use of space technology that will further their economic and social development thereby furthering the objectives set out by Secretary-General Boutros-Boutros Ghali in An Agenda for Development. To this end, the Programme organizes short-term training courses, workshops and symposia on the applications of space technology for economic and social development as well as administering fellowships for long-term education in space-related disciplines. The Programme also provides developing countries, on request, with advice on the organization and planning of national and regional space applications programmes.

a. Programme on Space Applications Activities

The Subcommittee noted that in 1996 and 1997, the Programme had successfully conducted five workshops (in Chile, China, Germany, India, and the Philippines), three international and regional conferences (South Africa, Spain and the United States), one international training course (in Sweden), one symposium (in Austria) and one seminar (in Austria). These activities concentrated on a wide variety of themes including spin-off benefits of space technology, microwave remote sensing applications, remote sensing education, space technology for the prevention and mitigation of the effects of disasters, development and dissemination of space technology, basic space science, small satellite missions, space technology and applications in the developing world, space satellite communications, space futures and human security and space technology for sustainable development in Africa.

The Subcommittee also approved the proposed activities of the Programme for 1997 including meetings on spin-off benefits of space technology, remote sensing education for educators, basic space science, the cooperative information network linking scientists, educators, professionals and decision-makers in Africa (COPINE),[4] space industry

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[3] The mandate of the Programme was expanded by General Assembly Resolution 37/90 of 10 December 1982, which took into account the recommendations of UNISPACE 82.

[4] The COPINE project is designed to address one of the recommendations of the Dakar Regional Conference on Space Technology for Sustainable Development in Africa, held in October 1993 regarding the urgent need to establish an efficient communications network among African and European professionals and scientists at national, continental and intercontinental levels. *See generally,* Sanidas, *COPUOS S. & T. Makes Progress on Space Debris and a Possible Third UNISPACE Conference,* 24 J. SPACE LAW 117, at 120 (1996), and *Report of the Scientific and Technical Subcommittee, supra* note 2, at para. 31 (c). Also at this year's session, the Subcommittee noted that the satellite-based COPINE project would offer an excellent opportunity for the exchange of information needed to promote progress in health care, agriculture, education, science and technology,

cooperation with the developing world, data analysis techniques, applications of European Remote Sensing Satellite data, space communications technology for capacity-building, and space technology as a cost-effective tool to improve infrastructure in developing countries.[5]

The Subcommittee further recommended the approval of activities for 1998, many of which would be used as preparatory meetings for the UNISPACE III Conference. The themes to be covered include remote sensing education for educators, microwave remote sensing applications, space technology development, information technology, economic benefits of applying space systems in support of resources planning, education and communication infrastructure, spin-off benefits of space technology, expanding the user community of space technology in developing countries, and space futures and human security. While appreciating the results achieved by the Programme on Space Applications and looking forward to future results, the Subcommittee reiterated its concern that in order to continue this heavy load of activities, the resources available to the Programme would have to be augmented through voluntary contributions.

b. Support for Regional Space Efforts by Programme on Space Applications

The Subcommittee also noted that the Programme continued to provide consulting services in support of regional space efforts, including, (a) assistance to the Government of Uruguay in its follow-up, as *pro tempore* secretariat, of the recommendations of the Third Space Conference of the Americas; (b) assistance to the Government of the Republic of Korea in the growth and operation of the Asia-Pacific Satellite Communications Council; (c) collaboration with several African countries on the implementation of the COPINE project;[6] (d) collaboration with ESA and the Department for Development Support and Management Services of the Secretariat in follow-up activities related to the recommendations of the training courses on applications of the European Remote Sensing Satellite data to natural resources, renewable energy and the environment held at Frascati, Italy, in 1993, 1994 and 1995; (e) collaboration with ESA on follow-up activities relating to the series of workshops on basic space science; and (f) elaboration of an inter-agency project proposal on a satellite-based disaster warning broadcasting system for small island developing States.

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and the management and survey of natural resources and the environment in Africa. The Subcommittee noted that such cooperation would provide long-term benefits to the participating African countries and would contribute to economic growth in the region. *Id.* at para. 50.

[5] *Report of the Scientific and Technical Subcommittee, supra* note 2, at para. 27.

[6] *See supra* note 4.

The Programme on Space Applications continues to contribute to the promotion of cooperation in space science and technology and related fields at the regional level through the establishment of regional Centres for Space Science and Technology Education in developing countries. One of the many objectives of these Centres is to reinforce cooperation among developing countries as well as between the industrialized and developing countries at the regional level with an emphasis on the education of university professors in developing countries who can then pass this knowledge and acquired skills on to large numbers of students.[7] In this regard, the General Assembly, in its resolution 51/123 of 13 December 1996, noted with satisfaction that significant progress had been achieved in establishing regional centres for space science and technology education in the regions covered by the regional commissions.

The General Assembly in the same resolution, also noted with satisfaction that the regional Centre for Space Science and Technology Education in Asia and the Pacific had begun its first education programme in April 1996. That regional Centre had been inaugurated in India in November 1995. Participation in the Governing Board of the Centre and in its activities is open to Member States in the region. The Subcommittee recognized that the Governing Board of the Centre had considered that the Centre could, in time, grow into a network of nodes enabling it to fully utilize the resources and potential of the region. The first nine-month education programme of the Centre had focused on remote sensing and the Geographic Information System (GIS) and had been completed. The second programme on satellite communications had started in January 1997.

During the course of the Subcommittee, it was also announced jointly by Brazil and Mexico that they intended to sign as early as possible the agreement establishing the regional Centre for Space Science and Technology Education in Latin America and the Caribbean. Bolivia, on behalf of the Latin American and Caribbean States, stated that it is supporting the future establishment and operation of that Centre for the benefit of the States in the region and expressing the profound interest of those States in participating in the activities of the Centre.

Regarding the centres in Africa, the Subcommittee noted that Morocco (for the French-speaking African States) and Nigeria (for the English-speaking African States) had developed and circulated for comment agreements that would be entered into by the States concerned later in 1997. It was also noted that discussions were in progress with Jordan, Saudi Arabia and the Syrian Arab Republic on the establishment of a regional centre in western Asia.

With regard to the Centre for Europe, discussions between Bulgaria, Greece, Poland, Romania, Slovakia and Turkey were in progress on the establishment of a network of space science and technology education and research institutions for central eastern and south-eastern European countries. The activities of the network would be in harmony with the relevant work of existing institutions in Europe and would be open to

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[7] *See generally*, Sanidas, *supra* note 4, at 120-21.

international cooperation. To this end, a meeting of experts had been held at Vienna from 17 to 18 October 1996 on the establishment of the network and the experts had resumed their deliberations from 13 to 14 February 1997. During that series of meetings, the representatives of Bulgaria, Greece, Poland, Romania, Slovakia and Turkey had agreed to establish the network and to work with the Office for Outer Space Affairs to undertake a study on the technical requirements, design, operation mechanism and funding of the network.

UNISPACE III Conference

In accordance with the General Assembly resolution 51/123, both the Subcommittee and the Working Group of the Whole to the Subcommittee continued to discuss the possible holding of a third UNISPACE conference.

The General Assembly, in paragraph 29, of its resolution 51/123, requested the Committee and the Scientific and Technical Subcommittee to act as the Preparatory Committee and the Advisory Committee, respectively, for UNISPACE III. In that same paragraph, the General Assembly also requested the Preparatory Committee and the Advisory Committee to carry out the tasks entrusted to them in paragraphs 176 to 185 of the report of the Committee (A/51/20)[8] and to report to the General Assembly at its fifty-second session on the progress made in the preparatory work for UNISPACE III.

During the course of discussions in the Subcommittee, the Advisory Committee was in agreement that the Working Group of the Whole of the Scientific and Technical Subcommittee would carry out the tasks that were entrusted to the Advisory Committee by the General Assembly. As a result, the report of the Working Group of the Whole to the Scientific and Technical Subcommittee contains the bulk of the recommendations made by the Advisory Committee.[9]

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[8] In those paragraphs, the Advisory Committee was requested to a) finalize the agenda and agree on a specific date for the UNISPACE III Conference; b) work out the organizational aspects of the UNISPACE III Conference and a schedule of events, such as workshops, poster sessions, trade exhibitions and other related activities; c) outline the desired form of participation of relevant international, regional and other governmental and non-governmental organizations in preparation for the UNISPACE III Conference; d) use all efforts to limit the cost of the UNISPACE III Conference to keep it within the existing resources for the Committee and its secretariat by reducing or curtailing the duration of the sessions of the Committee and its subsidiary bodies during the year of the Conference. The report of COPUOS also noted that the agenda of the UNISPACE III Conference should be sufficiently detailed to allow the Scientific and Technical Subcommittee to invite international organizations to become involved in the planning and execution of the event and its preparatory activities, as well as in supporting the event in kind or financially.

[9] The paragraphs of the report of the Working Group of the Whole that pertain to matters related to the convening of the UNISPACE III Conference can be

During its discussions, the Advisory Committee agreed that the primary objectives of the UNISPACE III Conference would be to (a) promote effective means of using space technology to assist in the solution of problems or regional or global significance and (b) strengthen the capabilities of Member States, in particular the developing countries, to use the applications of space research for economic, social and cultural development. It also agreed that other objectives of the UNISPACE III Conference would be to (a) provide developing countries with opportunities to define their needs for space applications for development purposes in advance of the UNISPACE III Conference; (b) consider ways of expediting the use of space applications by Member States to promote sustainable development; (c) address the various issues related to education, training and technical assistance in space science and technology and their applications aimed at the development of indigenous capabilities in all States; (d) provide a valuable forum for a critical evaluation of space activities and to increase awareness among the general public regarding the benefits of space technology; and (e) strengthen international cooperation in space technology and applications.

In terms of organization of the UNISPACE III Conference in order to limit the cost, the Advisory Committee stated that the UNISPACE III Conference would be held as a special session of the Committee, open to all Member States of the United Nations and would be held at the United Nations Office at Vienna for a period of up to 10 days in July 1999.

Member States of the United Nations would be invited to attend the UNISPACE III Conference as participants and relevant inter-governmental organizations, non-governmental organizations having observer status with the Committee, non-governmental organizations involved in space activities, and space related industry would be invited to attend as observers.

A provisional agenda of the UNISPACE III Conference was agreed upon including numerous substantive agenda items that could be covered by the Conference. Within the context of the agenda, legal issues relating to these substantive items would also be discussed. The Advisory Committee also agreed that the objectives of the UNISPACE III Conference should be kept in mind while deliberating upon these items.

Financially speaking, the Advisory Committee agreed that in planning and executing the UNISPACE III Conference, all efforts should be made to limit costs and to keep within the existing resources of the Committee and its Secretariat by reducing or curtailing the duration of sessions of the Committee and its subsidiary bodies during the year of the UNISPACE III Conference, on the understanding that the conference-servicing resources allocated to those bodies in 1999 would remain at the same level as in the current biennium.

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found in *Report of the Scientific and Technical Subcommittee, supra* note 2, at Annex II, paras. 13-23.

Space Debris

The Subcommittee, at its 1997 session, continued, on a priority basis, its consideration of the agenda item on space debris. Along with the presentations made by experts in the field, the Subcommittee had before it the report prepared by the Secretariat on various steps taken by space agencies for reducing the growth or damage potential of space debris and with information on national research on space debris, provided in advance by several Member States. This information contributed to the success of the session with regard to its consideration of this agenda item.

The Subcommittee agreed that consideration of space debris was important, and that international cooperation was needed to expand appropriate and affordable strategies to minimize the potential of space debris on future space missions. Of significant interest at this year's session was the presentation to the Subcommittee by representatives of the Inter-Agency Space Debris Coordination Committee (IADC), on the subject of space debris modelling and risk assessment. As a result, the Subcommittee agreed that IADC should be invited to make a technical presentation on space debris mitigation practices at the thirty-fifth session of the Subcommittee.

This year, the Subcommittee also noted the reports of the first confirmed collision of two catalogued objects in orbit, namely the collision of the Cerise (1995-033B) and Ariane-1 (1986-019RF) upper stage debris which had occurred on 24 July 1996. Although it had not been observed directly, sufficient evidence had been obtained from the orbit and attitude behaviour of the two objects involved. This was also seen as significant because it tended to validate the statistical models predicting the probability of similar collisions in the future.

The most important aspect of the Subcommittee's consideration of space debris at this year's session was that it continued its discussions and preparation of its technical report pursuant to its multi-year work plan adopted at the 1995 session of the Subcommittee.[10] In this regard, the report for 1997 concentrated on modelling of the space debris environment and risk assessment.[11] In terms of substance, the report discussed different types of modelling methodologies and accepted modelling parameters. Space debris models provide a mathematical description of the distribution of objects in space, the movement and flux of objects and the physical characteristics of objects. During the course of discussions, numerous short-term and long-term models were mentioned and included within the text of this year's portion of the technical report.

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10 *See generally*, Sanidas, *Scientific and Technical Subcommittee of COPUOS Meets in a Productive Atmosphere*, 23 J. SPACE LAW 141, at 144-45 (1995).

11 The technical report for this year's session of the Subcommittee can be found in *Report of the Scientific and Technical Subcommittee, supra* note 2, at paras. 102-104.

In terms of risk assessment, it was understood that risk assessments include the probability of an event, as well as its subsequent consequences. With the assistance of models of the orbital debris environment, the risk of collision among operational spacecraft and orbital debris can be evaluated. In this sense, the Subcommittee commented on, and included an overview of collision risk assessments in low-Earth orbit and the geostationary orbit. It also touched upon risk assessments for re-entering orbital debris.

As last year, although highly technical, this year's consideration of space debris was quite interesting and thanks to the efforts of the Chairman, an expert in the study of space debris, in coordinating the work of the numerous experts in the field in attendance, significant progress was made on this highly complex issue. The Subcommittee agreed that it should continue its consideration of space debris at next year's session and complete work on the last section of the technical report, namely, space debris mitigation measures.[12] The Subcommittee, in taking note of the technical changes and amendments to its technical report for 1996 given at this year's session, stated that any changes or updates to each part of its technical report would be made at the following year's session, leading to the report on space debris being finalized by the Subcommittee in 1999.[13]

Nuclear Power Sources in Outer Space

In accordance with General Assembly resolution 51/123, the Subcommittee continued its consideration of the priority item relating to the use of nuclear power sources (NPS) in outer space. Also because of recent developments in the use of Nuclear Power Sources in Outer Space and on the urging of some Member States, the Working Group on the Use of NPS in Outer Space was also reconvened under the chairmanship of Professor D. Rex (Germany).

The Working Group on NPS was reconvened at the request of the United Kingdom, supported by the United States, following a suggestion

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[12] The 1998 section of the technical report on space debris mitigation measures is as follows:

3. Space debris mitigation measures,
3.1 Reduction of the debris increase in time,
3.1.1 Avoidance of mission-related objects,
3.1.2 Improving structural integrity of space objects (explosion, prevention, etc.),
3.1.2 De-orbiting and reorbiting of space objects,
3.2 Protection strategies,
3.2.1 Shielding,
3.2.2 Collision avoidance,
3.3 Effectiveness of mitigation measures.

Id. at para. 105.

[13] *Id.* at para. 99.

contained in the working paper submitted by the United Kingdom,[14] that additional principles could be added. It was agreed that technical experts, including those from the IAEA should be invited to next year's session of the Working Group on NPS in order to identify and study current technical standards pertinent to the use of NPS in outer space.

The report of the Working Group on NPS was adopted by the Subcommittee which also agreed that, at the present time, revision of the Principles Relevant to the Use of NPS in Outer Space (adopted in 1992) was not warranted. However, the Subcommittee also noted the statement made by the representative of the IAEA that the safety principles should be revised in light of the requirements of the two IAEA conventions (Convention on Early Notification of a Nuclear Accident[15] and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency[16]) and also with the most recent International Commission on Radiological Protection (ICRP) recommendations on radiation safety.[17] At future sessions of the Subcommittee, the possibility of amending the Principles will continue, in particular because of technical advances in the area continue as well as the possibility of negative environmental impacts in the event of NPS-powered satellite re-entry in the atmosphere or its collision with space debris.

During the general exchange of views and during the NPS item deliberations, many delegations (in particular Bolivia, Chile, and Ecuador) made a reference to the recent re-entry in December 1996 of the Russian space probe Mars 96, which carried NPS generators. In this regard, the Russian Federation made two detailed technical presentations and noted that it had complied with the safety precautions and all international standards and recommendations. It also noted that the radioactive material from the probe would be safely contained under all possible circumstances and that the tracking data suggested that the fall of debris into the Pacific Ocean took place not closer than 100 km to the nearest coast. The Subcommittee agreed to continue its consideration of the matter at next year's session.

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14 The working paper of the United Kingdom is contained in document A/AC.105/C.1/L.210.

15 25 I.L.M. 1370 (1986).

16 25 I.L.M. 1377 (1986).

17 *See generally,* IAEA INTERNATIONAL BASIC SAFETY STANDARDS FOR PROTECTION AGAINST IONIZING RADIATION AND FOR THE SAFETY OF RADIATION SOURCES, IAEA Safety Series No. 115.

UN Legal Subcommittee on Space Agrees on New Agenda Item

I. Introduction

On 1 April 1997, the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) convened its thirty-sixth session at the United Nations Office at Vienna. The session, which ended ahead of schedule, on 8 April, was chaired once again by *Mr. Václav Mikulka* of the Czech Republic.

The session was attended by 42 of the 61 States members of the Subcommittee, namely: Argentina, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Czech Republic, Ecuador, France, Germany, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Italy, Japan, Lebanon, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Peru, Philippines, Poland, Romania, Russian Federation, South Africa, Spain, Sudan, Sweden, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay and Venezuela. It was also attended by five specialized agencies and other international organizations (International Atomic Energy Agency (IAEA), International Telecommunication Union (ITU), the European Space Agency (ESA), the International Astronautical Federation (IAF) and the International Law Association (ILA), as well as seven observers (Azerbaijan, Bolivia, Cuba, Republic of Korea, Slovakia, United Arab Emirates and the League of Arab States).

Pursuant to the recommendations of the thirty-fifth session of the Legal Subcommittee,[18] the thirty-ninth session of COPUOS (held in June 1996),[19] which were endorsed by the General Assembly at its 51st session (December 1996),[20] the Legal Subcommittee considered the following two substantive items on its agenda:

(I) Question of review and possible revision of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space (agenda item 3); and

(II) Matters relating to the definition and delimitation of outer space and to the character and utilization of the geostationary orbit, including consideration of ways and means to ensure the rational and equitable use of the geostationary orbit without prejudice to the role of the International Telecommunication Union (agenda item 4).

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18 *See Report of the Legal Subcommittee on the Work of its Thirty-Fifth Session (18-28 March 1996)*, U.N. Doc. A/AC.105/639 (11 Apr. 1996) [hereinafter LSC 35th].

19 *See Report of the Committee on the Peaceful Uses of Outer Space*, General Assembly Official Records, 51st Sess., Supp. No. 20, U.N. Doc. A/51/20.

20 *See* A/Res/51/123 (10 Feb. 1997).

II. Discussions on Substantive Agenda Items

(a) Item 3, "Question of Review and Possible Revision of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space"[21]

This year, too, the Working Group on this item was not re-established.[22] The Subcommittee once again agreed that, at the present time, revision of the Principles was not warranted and that therefore it should not open discussion of the item. If the debate in the 1998 session of the Scientific and Technical Subcommittee showed progress, only then would the Legal Subcommittee reconvene the Working Group on this item next year. The item would, however, be maintained on the agenda of the Legal Subcommittee so that States could continue the debate in the Plenary.

(b) Item 4, "Matters Relating to the Definition and Delimitation of Outer Space and to the Character and Utilization of the Geostationary Orbit, Including Consideration of Ways and Means to Ensure the Rational and Equitable Use of the Geostationary Orbit without Prejudice to the Role of the International Telecommunications Union"

The Working Group on this item was re-established, under the Chairmanship of *Mr. Gabriel Maffei*, the representative of Argentina. As in previous years, the Subcommittee discussed two issues under this agenda item: "Question of the definition and delimitation of outer space" and "Question of the geostationary orbit."

With regard to the first issue, the Working Group had before it a note, "Comprehensive analysis of the replies to the questionnaire on possible legal issues with regard to aerospace objects" (A/AC.105/C.2/L. 204), that had been prepared by the Secretariat in accordance with a request the Working Group made at its session in 1996,[23] as well as the replies received to the questionnaire on aerospace objects (A/AC.105/635/Adds.1-4).[24] Little discussion took place either on the

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21 The Principles Relevant to the Use of Nuclear Power Sources in Outer Space were adopted by G.A. Res. 47/68 (14 Dec. 1992). They can be found in *United Nations Treaties and Principles on Outer Space*, U.N. Doc. A/AC.105/572/Rev. 1 (Apr. 1996).

22 *See* J.S. Thaker, *"Outer Space Benefits Resolution" Nearing Finalization: Report of Progress in COPUOS Legal Subcommittee*, 22 J. SPACE L. 126, at 127 (1996) [hereinafter Thaker] for a description of the debate on this item during the 1996 session of the Legal Subcommittee.

23 *See* Thaker, *id.* at 128.

24 For the history of the "Questionnaire on Possible Legal Issues With Regard to Aerospace Objects," see this author's articles, *1994 Session of U.N. Legal Subcommittee on Space Reasonably Successful*, 22 J. SPACE L. 120, at 123-124, *UN*

Secretariat document (L. 204) or on the replies to the questionnaire. It is likely that, in order to make further progress on the matter, the Russian Federation, who first came up with the idea of a questionnaire several years ago, might prepare a working paper on the subject of aerospace objects for the next session of the Working Group in 1998, depending on the number of additional replies from Member States.

With respect to the second matter, that of the geostationary orbit, the Working Group had before it a paper prepared by the Secretariat, in cooperation with the ITU Secretariat, analysing the compatibility of the approach of the working paper submitted by Colombia in 1996, "Some considerations concerning the utilizations of the geostationary satellite orbit", with the existing regulatory procedures of the ITU relating to the GSO (A/AC.105/C.2/L.205). The paper was prepared in response to a request made by the Subcommittee last year.[25]

Unfortunately, the delegation of Colombia did not participate in the meetings of the Working Group,[26] and very little discussion was held on either the Secretariat's or Colombia's working paper. Document L.205 makes positive recommendations on how Colombia's paper could be made compatible with ITU regulations.

Nevertheless, very productive work was still achieved on this topic. The delegation of Germany submitted a proposed draft resolution, requesting the ITU and its Member States to ensure equitable access to and efficient use of the GSO (A/AC.105/C.2/L.207). The German delegation vigorously pursued the adoption of the draft document by the Legal Subcommittee, so that it could be sent to the forthcoming ITU World Radiocommunication Conference to be held from 27 October- 21 November 1997 (WRC-97). The aim of the German delegation was that once the draft resolution was adopted, debate on the GSO in the Legal Subcommittee could be considered dealt with in a "substantive and constructive way", and the topic could be thus removed from the agenda. This proposal met with opposition, especially from the developing countries who wanted to retain the topic of the GSO on the agenda. The debate that ensued in the Working Group led to the working paper being revised twice. In the second revision, the basic "goal" of the paper is to suspend the consideration of the issue of GSO in the Working Group on item 4 until the year 2000, if the draft resolution is adopted by the 40th session of the Committee, in June 1997. However, some delegations oppose even suspending discussions of the GSO.

Legal Subcommittee on Space Makes Progress on Definition/Delimitation Issue, 23 J. SPACE L. 149, at 151-152, and *id.* at 128.

[25] For a detailed description of the debate on this topic during the 1996 session of the Working Group, see Thaker, *supra* note 5, at 128-130.

[26] It is reported that this was due to the recent retirement of the chief delegate Ambassador Alfredo Rey Cordoba, who had led the discussions for Colombia on the subject for many years, and the inability to replace him, for the negotiations, with someone else, on short notice.

If they continue to maintain this position, Germany may withdraw its working paper because it is of the opinion that there would be no point in pursuing the matter, especially after WRC-97.

III. New Items for the Agenda

In accordance with the Committee's recommendation, made at its session in 1996, the Chairman of the Subcommittee continued to conduct informal open-ended consultations with all members of the Subcommittee, with a view to coming up with a list of annotated items agreed upon by consensus, for possible inclusion in the agenda of the Subcommittee.

As a follow-up to its proposal made during the Subcommittee's 1996 open-ended consultations,[27] the delegation of Mexico submitted a detailed working paper on the "Review of the status of the five international legal instruments governing outer space". After extensive consultations, Mexico submitted a revised version of the paper (A/AC.105/C.2/L.206/Rev. 1). The Subcommittee agreed to recommend that a new agenda item, as contained in L. 206/Rev. 1, be included in its agenda, starting with its session in 1998. Open-ended informal consultations on new agenda items are to continue at the 1998 session of the Subcommittee, to consider specific proposals already made for possible new agenda items.

IV. Space Law Symposium

The International Institute of Space Law (IISL), in collaboration with the European Centre for Space Law (ECSL) organized a space law Symposium on "*Celebrating the 30th Anniversary of the Outer Space Treaty*," at the end of the first day's session of the Legal Subcommittee's meeting.[28] In addition, Dr. Gabriel Lafferranderie, ESA Legal Advisor and Chairman of the ECSL, presented the United Nations and the Members States of COPUOS with a book, *Outlook on Space Law over the Next Thirty Years*, that had been published by the ECSL, also in celebration of the 30th

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27 *See* LSC 35th, *supra* note 1, at annex III, Section G.

28 Professor Y. Kolosov, Moscow State Institute of International Relations, presented a paper on the *Background and History of the Outer Space Treaties*; Dr. R. Jakhu, International Space University, spoke on the *Application and Implementation of the Outer Space Treaties*; and Dr. F. von der Dunk, Institute of Air and Space Law of Leiden University, presented a paper on *Future Developments Relating to the Outer Space Treaties*. Professor V. Kopal, Charles University, Prague, commented on the three presentations.

Anniversary of the Outer Space Treaty.[29]

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Establishment of a New Bureau and Elaboration of the Agenda of UNISPACE III Highlight 40th COPUOS Session

1. Introduction

The fortieth session of the United Nations Committee on the Peaceful Uses of Outer Space was held again in Vienna, Austria from 2 to 10 June 1997. This year's session was marked by significant changes in the way in which the Committee and its subsidiary bodies conduct their business.

At the end of the 1996 session of the Committee, it was decided that inter-sessional consultations among all interested Member States of the Committee should be organized by Chairman Hohenfellner to consider its working methods and agenda structure as well as composition of the bureau of the Committee. Six meetings of inter-sessional consultations were held from July 1996 to April 1997 during which time, Members of the Committee were able to express their views and ultimately negotiate by consensus a package of elements designed to improve the way in which the Committee works. As a result, a package proposal of the Chairman on the working methods of the Committee and its subsidiary bodies was elaborated and put before the last meeting of the inter-sessional consultations. The package put forward proposals that would fundamentally change the way in which the Committee pursued its work in the future.[30] During the inter-sessional, it was also agreed that the current bureau of the Committee would step down at the beginning of the fortieth session of COPUOS and be replaced.

Thus the Committee adopted by consensus, at the beginning of its fortieth session the entire package proposal of the Chairman. For the first time in its history, the Committee also elected a new bureau consisting

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[29] The book, OUTLOOK ON SPACE LAW OVER THE NEXT 30 YEARS: ESSAYS PUBLISHED FOR THE 30TH ANNIVERSARY OF THE OUTER SPACE TREATY (G. Lafferranderie & D. Crowther eds., 1997), was accepted on behalf of the United Nations by Mr. Nandasiri Jasentuliyana, Deputy to the Director-General, United Nations Office at Vienna, and Director, United Nations Office for Outer Space Affairs.

[30] Other elements included in the package proposal of the Chairman that was ultimately agreed upon included session limitations for the Committee and its subsidiary bodies and the inclusion of a new agenda item for the Legal Subcommittee. *See infra* text accompanying note 5.

entirely of experts from developing countries: Professor U.R. Rao of India, Ambassador Raimundo Gonzalez of Chile and Professor Mouslim Kabbaj of Morocco were elected as Chairman, First Vice-Chairman and Second Vice-Chairman/Rapporteur respectively.

Under its new leadership, the Committee continued its string of successful sessions. In particular, it made significant progress in its efforts to organize the UNISPACE III Conference. As usual, the Committee's session was marked by a strong sense of multilateral cooperation that helped the Committee to complete its usual mandated tasks in an efficient manner as well as making substantial decisions in many areas.

2. UNISPACE III

At its session in 1996, the Committee agreed that a Special Session of the Committee open to all Members of the United Nations (UNISPACE III), should be convened at the United Nations Office at Vienna, preferably in 1999,[31] and that it would be for a period of up to 10 days. At that time, the Committee further agreed that it would act as the Preparatory Committee for UNISPACE III and that the Scientific and Technical Subcommittee would act as the Advisory Committee.

On the basis of the work of the Scientific and Technical Subcommittee in its role as Advisory Committee, the Committee, at this year's session began its work as the Preparatory Committee for UNISPACE III. In this role, the Preparatory Committee agreed with the recommendations made by the Advisory Committee.[32] It was also agreed that the Space Applications Programme should organize regional preparatory meetings for the UNISPACE III Conference. It further agreed that the Office for Outer Space Affairs, as Executive Secretariat should prepare background papers for the benefit of Governments that are in the process of preparing national papers and that the Office should seek expert contributions from relevant international and national institutions as well

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[31] Based on the progress made in the Scientific and Technical Subcommittee during its 34th session, the date for the UNISPACE III Conference was set for July 1999. *See generally,* Sanidas, *Scientific and Technical Subcommittee of the COPUOS Holds Thirty-Fourth Session: Advisory Committee for Third UNISPACE Conference Meets (17-27 February 1997, Vienna, Austria)*, printed elsewhere in this volume.

[32] *See generally, id.*

as from renowned experts.[33] Of particular interest is the background paper on the promotion of international cooperation in outer space, which would review existing and new mechanisms for international cooperation in space activities and consider ways and means for enhancing coordination and cooperation among Member States, the United Nations and its organizations. An important element of this paper would be to review the status of the law of outer space, including ways and means of promoting wider adherence to the existing international space treaties and principles.[34]

As for the work of next year, the Preparatory Committee recommended that the Advisory Committee should agree on an indicative schedule of events to be held prior to and during the Conference and requested the Secretariat to prepare, in time for the 1998 session of the Advisory Committee, an indicative schedule of those events, including the distribution of agenda items between the two Committees of the Conference, the participation of international organizations and industry, technical presentations, poster sessions, evening lectures, exhibition and other related aspects of the Conference. It also recommended that the Secretariat prepare an initial draft report of the conference in time for the 1998 sessions of the Advisory Committee and Preparatory Committee for their comment and review with a view to preparing a revised version for the Advisory Committee to finalize in February 1999. The Preparatory Committee also recommended that the Secretariat should take steps to encourage participation by high-level officials, eminent scientists and experts, especially from the developing countries which could benefit from the use of space technology in their economic and social development

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[33] The following are the subjects of the background papers agreed upon by the Preparatory Committee as contained in document A/AC.105/1997/CRP.4/Rev.2:

1. The Earth and its environment in space;
2. Disaster prediction, warning and mitigation;
3. Management of Earth resources;
4. Satellite navigation and location systems;
5. Space communications and applications;
6. Basic space science and microgravity research and their benefits;
7. Commercial aspects of space exploration including spin-off benefits;
8. Information systems for research and applications;
9. Small satellite missions;
10. Education and training in space science and technology;
11. Economic and societal benefits; and
12. Promotion of international cooperation.

[34] *Id.*

programmes. It should also be noted that the International Institute of Space Law plans to hold a Workshop during the UNISPACE III Conference in order to heighten awareness of the importance of international space law in fulfilling the goals and objectives of the Conference.

3. New Agenda Item for the Legal Subcommittee: Review of the Status of the Five International Legal Instruments Governing Outer Space

On the basis of the continuing informal consultations held by the Legal Subcommittee at its thirty-sixth session, the Committee considered the recommendation of the Legal Subcommittee to include a new agenda item on the agenda of that body. During this year's session of the Legal Subcommittee, it considered specific proposals put forward by Member States for possible new agenda items.[35] Among these was the proposal of the Government of Mexico to review the status of the international legal instruments governing outer space. In furtherance of this proposal, Mexico put forward a working paper giving details on the objective of consideration of the matter as well as a detailed work plan for its consideration by the Legal Subcommittee (A/AC.105/C.2/L.206). After discussions in the Legal Subcommittee on this document, it was revised in document A/AC.105/C.2/L.206/Rev.1. As a result, the Legal Subcommittee recommended, by consensus, that a new item "Review of the status of the five international legal instruments governing outer space" be included in its agenda at its thirty-seventh session. The Committee endorsed the recommendation of the Legal Subcommittee for the inclusion of the new agenda item and also recommended that the Legal Subcommittee continue at its thirty-seventh session, the consideration of the specific proposals already made for possible new agenda items for the Legal Subcommittee.

4. Character and Utilization of the Geostationary Orbit

On the basis of the work accomplished during the thirty-sixth session of the Legal Subcommittee, the Committee continued the work started by the Legal Subcommittee in its consideration of the working paper submitted by Germany on the geostationary satellite orbit.

During the course of exhaustive formal and informal discussions in the Committee, many countries with interests in the legal regulation of the geostationary orbit expressed their views on the matter with a view to

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35 *See generally*, Thaker, *Agreement on a New Agenda Item: Report of the Thirty-Sixth Session of UN Legal Subcommittee on Space (1-8 April 1997)* printed earlier in this issue of the JOURNAL.

reaching some type of agreement on the issue. In certain cases, long held views were adapted to fit the scope of the working paper but unfortunately steadfast viewpoints remained as the order of the day. Most notably, because the working paper looked to suspend consideration of the matter in the Legal Subcommittee until the year 2000 under the guise of awaiting the results of discussions in the International Telecommunication Union, many countries, in particular the countries of the Group of 77 and the Group of Latin American and Caribbean States, stated that such a stipulation was not acceptable as discussions on the issue were still needed in the Legal Subcommittee. In their view it was premature to either suspend or conclude the debate on the item in the Subcommittee.

During consultations, the delegation of Germany, as sponsor of the working paper pursued the matter vigorously and conceded many points that enhanced the value of the paper to those States that held reservations to its content. However, many States and in particular the equatorial countries, continued to maintain that since there was no definition or delimitation of outer space, it could not be stated that the geostationary orbit was part of outer space and therefore, the geostationary orbit required a special, *sui generis* legal regime to regulate access and utilization by all States. Since these long-standing positions remained, upon conclusion of the debate, Germany withdrew its working paper as it did not see any further merit in continuing the stalled debate unless some delegations changed their position.[36].

5. *United Nations Programme on Space Applications*

In considering the work of the Space Applications Programme, the Committee expressed its satisfaction with the Programme as implemented by the United Nations Office for Outer Space Affairs and, particularly, by the United Nations Expert on Space Applications. The Committee, however,

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[36] The delegation of Germany noted that divergences of view remained over three issues: (i) that still some delegations insisted on deleting the preambular paragraph of the working paper stating that the geostationary satellite orbit is an integral part of outer space and thus governed by the 1967 Outer Space Treaty, which would consequently pose the question of why the UN Outer Space Committee should discuss that subject; (ii) that controversies remained over the character of ITU and its relationship with COPUOS, while some delegations regarded ITU as the UN Specialized Agency for international telecommunications governed by its Convention and Constitution also covering political, legal and technical aspects of the GSO; (iii) that the agenda item should be deleted or suspended from the agenda in view of the previous fruitless discussions in order to provide delegations with a pause for reflection.

once again expressed its concern over the still limited financial resources available for carrying out the Programme, and it appealed to Member States to support the Programme through voluntary contributions. The Committee also approved the proposed programme for the rest of 1997 and also for 1998 which would be used primarily to promote awareness of the UNISPACE III Conference. The Committee also noted that the Programme was continuing its technical advisory services to various governments for various international and regional activities.

Finally, the Committee noted that the Centre for Space Science and Technology Education in Asia and the Pacific had been inaugurated in India in November 1995. It also noted that participation in the governing board of the Centre and its activities would be open to Member States in the region and that, in due course and upon approval by its governing board, the Centre would grow into a network of nodes enabling it to fully utilize the resources and potential of the region. The Committee noted with satisfaction that the first education programme of the Centre had begun in April 1996 and that the second programme on satellite communications had started in January 1997.

For the Centre in Africa, the Committee noted that Morocco and Nigeria had developed and circulated for comment agreements that would be entered into by the States concerned later in 1997. For Latin America and the Caribbean, the Committee noted that Brazil and Mexico had signed an agreement establishing the regional Centre for Space Science and Technology Education in Latin America and the Caribbean on 11 March 1997.

6. Space Debris

The Committee noted with satisfaction that, at its session this year, the Scientific and Technical Subcommittee had conducted its work based on the multi-year work plan, which the Subcommittee had adopted at its thirty-second session to address specific topics relating to space debris to be covered during the period 1996-1998. The Subcommittee worked, at its session this year, on the topic of modelling of the space debris environment and risk assessment. Pursuant to its decision last year, the Committee took note of the technical changes and amendments to the Subcommittee's technical report. Ultimately, it was believed that inclusion of the changes would lead to the report being finalized by the Subcommittee in 1999 and would assist in establishing a common understanding that could serve as the basis for further deliberations of the Committee on the matter.

7. Ways and Means of Maintaining Outer Space for Peaceful Purposes

With regard to this item, it was emphasized that present efforts should be continued to strengthen the role of the Committee in maintaining outer space for peaceful purposes. As in previous sessions, this year's session was once again marked by the different views of Member States with regard to the prevention of an arms race in outer space. Some delegations expressed the view that the Committee should complement and contribute to the work being done in the Conference of Disarmament and in the First Committee of the General Assembly, while other delegations indicating that such contact with other disarmament bodies was inappropriate.

8. Spin-off Benefits of Space Technology

The Committee agreed that spin-offs of space technology were yielding substantial benefits in many fields. The importance of these benefits was growing rapidly. Many member States were making efforts to develop spin-off benefits and disseminate information on such activities to interested countries. The Committee agreed that there was a need to examine ways of strengthening and enhancing international cooperation in the field of spin-off benefits of space technology. This could be done by, *inter alia*, improving the access of all countries, especially developing countries, to spin-offs. Some States also noted that it was important for countries with emerging space potential to develop their own independent research programmes in order to find optimal ways to advance in research and technology and augment indigenous capacity.

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OTHER REPORT

Space Law Colloquium in Turin, Italy

Introduction

The 40th Colloquium on the Law of Outer Space was opened by the President, *Dr. N. Jasentuliyana,* on 7 October 1997. The colloquium was attended by over 75 participants, and many excellent papers were presented. Discussion took place after each session and provided an occasion for lively debate on the most topical current space law issues.

A *Dinner Celebrating the 30th Anniversary of the 1967 Outer Space Treaty,* graciously offered by *SAGAT Turin Airport*, was held on 7 October at the beautiful Villa Sassi restaurant outside Turin. Over 90 persons attended, including officials of the IAF and IAA and many prominent space lawyers some of whom had actually taken part in the drafting of the Treaty thirty years earlier. *Prof. Bin Cheng*, who was awarded an IISL Award for his writings on air and space law, gave an entertaining dinner speech, elaborating on his challenging interpretations of such concepts as "peaceful uses of outer space", "outer void space" and more. Another IISL award was granted to *Amb. E. Finch Jr.*, who could not be present to accept his Certificate.

The finals of *the 6th Manfred Lachs Space Law Moot Court Competition* were held on 9 October. The competition was realized with the help of the University of Turin, the Local Organizing Committee of the IAF, KLM Royal Dutch Airlines, the European Centre for Space Law (ECSL), and the Association of US Members of the IISL (AUSMIISL). Preliminary competitions were held in Europe and the USA, and the winners of those preliminaries met in the final round in Turin. The University of Paris XI (France) and the University of North Carolina (USA) competed in the case "Openskey vs. Antipapadia", dealing with Very High Resolution (VHR) remote sensing systems. The honourable court was composed of *Judge Koroma* (President) *Judge Rezek* and *Judge Vereshchetin* of the International Court of Justice. The team of the University of Paris won the competition. Its members were *Jean-François Renaud* and *Ranjani Srinivasan*. The members of the University of North Carolina team were *Christina Benson* and *Scott Syfert*. The case was written by *Harry Tuinder, Marco Ferrazzani* and *Frans von der Dunk*. The case and the written briefs will be published in the IISL Proceedings. The finals of the 7th Competition will be held in Melbourne, October 1998, after regional preliminaries to be held in the Spring of 1998 in Europe, the USA and possibly Asia. The case, "Freedom v. Bravatia", dealing with the Commercial Exploitation of the Moon (The Rover Games Project), was written by *Declan O'Donnell* and *John Gantt*, and has been distributed to the universities.

Session 1

Background and history of the outer space treaty

"Rapporteur: *Mr. J.F. Renaud* (France)"

The first session which hosted only invited papers was chaired by *Amb. A.A. Cocca* (Argentina). In his opening remarks, he spoke in praise of great legal experts such as Manfred Lachs or Eugène Pépin, whose contribution to the elaboration of the existing international space regime had been invaluable.

(1) The fact that there was no activity in space prior to the launching of Sputnik 1 does not mean that there was no need for space law or that no attention was given to space issues before 1957; to the contrary, as pointed out by *Dr. S. Doyle* (USA) in his paper "Concepts of Space Law Before Sputnik". A careful reading of the works published before October 1957 "not only gives clear evidence of considerable thought devoted to

space law problems, but also shows that many concepts embodied in the early international instruments purporting to create space law reflected the thoughts of numerous precursor commentators". The paper surveys the whole range of space law concepts developed by precursor commentators like Emil Laud, Vladimir Mandl, John C. Cooper or Musto, including the definition, delimitation, military uses and the legal status of outer space and celestial bodies.

(2) Focusing on a more specific topic, *Dr. Eilene Galloway* (USA), in her paper "The United States and the 1967 Treaty on Outer Space" highlighted the United States' contribution to the elaboration of the 1967 Outer Space Treaty, and more generally, the leading role this particular state played in the development of space law/activities. In 1958, the United States passed the National Aeronautics and Space Act. Following the adoption of the NASA Act, President Eisenhower requested the UN General Assembly to consider a US draft resolution proposing the creation of a UN ad hoc Committee on the peaceful uses of outer space. Lyndon B. Johnson addressed the UN and urged for the adoption of the resolution initiated by the US. This resolution, many basic concepts of which became principles in the 1967 Outer Space Treaty, was adopted on December 13, 1958. A year later, COPUOS was established. President Johnson proposed on May 7, 1966 that international negotiations begin on the preparation of a treaty providing rules and procedures for the peaceful exploration of outer space and celestial bodies. A consensus on a text was reached in early December 1966 and the Treaty was opened for signature on January 27, 1967. The US Senate gave his consent on October 10, 1967.

(3) *Prof. P. Dembling* (USA) , in a paper entitled "Negotiating issues in forming the 1967 Treaty on Outer Space" paid particular attention to the expressions of views, international treaties and other relevant events which were pertinent to the establishment of principles governing the exploration and use of outer space and celestial bodies which led, subsequently, to the 1967 Outer Space Treaty. Achieving agreement within COPUOS wasn't an easy task given the east-west tensions. Nevertheless, consensus building and compromise prevailed among the 28 members of the Committee.

(4) The former longtime Chairman of COPUOS (from 1972 to 1991) *Amb. P. Jankowitsch* (Austria) spoke on "The Role of the United Nations in Outer Space Law Development; from Cold War to Détente in Outer Space". He discussed the major influence played by geopolitical develoments such as the East-West and North-South debates on space law making, and commented on the roles played by the Superpowers, their commitment towards peaceful use of outer space despite the arms-race environment, and their intentions behind that commitment (political or economic), which are even today difficult to assess. The author further described the role of the UN in trying to accommodate the national security concerns of the Superpowers on the one hand, and the "sharing in benefits" concerns of the Third World, and mentioned the Unispace conferences in this context, the third of which is to be held, like the first two, in Vienna in 1999. Amb. Jankowitsch tried to answer the question why space law making has not gained new momentum now that the North-South and East-West debates

have been settled or transformed, and concluded that this is due to the new worldwide trend of liberalization and deregulation, which led to the emergence of new actors (private entities), who are reluctant to strict regulation of their activities. Nevertheless, the author believes that the need for universal rules will renew the role of the UN and COPUOS in the formulation of space law in the interest of all nations.

(5) The paper by *Dr. He Qizhi* (China), entitled "The Outer Space Treaty in Perspective" complemented Mr. Dembling's by summing up the principles and rules enshrined in the 1967 Treaty while offering a historical background and future prospects (in particular concerning environmental issues and further moves deeper into outer space, to Mars for instance). To the question whether the existing legal space regime based on the 1967 Outer Space Treaty can accommodate the anticipated developments in this field, Dr. He's answer is yes, provided that the necessary adjustments/changes are implemented should the occasion arise. New pages of mankind's space history must now be written by means of growing international co-operation and lessons learned from the past.

(6) The role played by the two superpowers, and to a lesser extent the other industrialised states, in the development of space law and activities is often emphasized. Nevertheless, as *Mr. N. Jasentuliyana's* (UN/Sri Lanka) paper "The development of the outer space treaties and legal principles from a Third World perspective" proves, the third world's contribution to this process has been, from the very outset, far from insignificant. From the threshold of the "space age", developing countries have feared that space natural resources (including those of the Moon and other celestial bodies) could be exploited at their expense and that they could be denied access to space technology. In this new field, third world countries managed to promote international co-operation and stood up for their views of what the international regime for space activities should be. They did more than backing up the ban on weapons of mass destruction, including nuclear weapons, by requesting a full demilitarisation of outer space. Third world countries also participated in the elaboration of and supported the three additional treaties to the 1967 Outer Space Treaty, and lobbied -unsuccessfully- for the drawing up of a Dispute Settlement Agreement. Above all, the 1979 Moon Agreement appears to be the main contribution of third world countries to the development of space law on account of the introduction of the « common heritage of mankind » concept.

(7) Many of the principles enshrined in the 1967 Treaty were "inspired" by concepts developed in the UN Charter, as demonstrated by *Dr. A.A. Cocca* in his paper entitled "Solidarity and Humanism in the Outer Space Treaty". He argued that the UN Charter gives specific and unprecedented value to expressions like: peoples, generation, mankind, fundamental human rights, dignity and worth of the human person, social progress and better standards of life in larger freedom. All these concepts influenced, directly or not, the elaboration of the 1967 Outer Space Treaty.

In the course of the *discussions* which followed the presentation of the papers, the following issues were addressed, most of which were related to the future of the Moon Agreement.

- To the question why developing countries have not taken more interest in the implementation of the Moon Agreement *Mr. Jasentuliyana* replied that not much more could be done as long as the Agreement wasn't ratified and implemented by the most interested states, which is unlikely unless some of the treaty's most « sensitive » and ambiguous provisions were modified. Mr. Jasentuliyana also drew a parallel between the Moon Agreement and the Convention on the Law of the Sea which was belatedly ratified by industrialised states - after the text of the Convention was amended.
- As to what amendments would be necessary for the Moon Agreement to be revived, *Mr. von der Dunk* argued that if the provision regarding the common heritage of mankind were purely and simply deleted, perhaps the industrialised states would accept to ratify the Moon Agreement.
- *Mr. J. Monserrat Filho* (Brazil) wondered whether it is judicious or even possible to modify the Agreement, or whether one should just let space activities take their course without the benefit of a Moon treaty, and *Amb. Jankowitsch* (OECD/Austria) argued that rules are necessary to ensure the orderly development of space activities. Of course, we should proceed by steering a middle course between elaborating and implementing legal rules and letting the intervening parties compete with each other in conformity with the rules, as competition is necessary to encourage the further development of space activities.

Session 2

Concepts of space law and the outer space treaty

"Rapporteur: *Ms. M. Longo* (Italy)"

Chairmen Dr. E. Galloway (USA) and *Prof. Catalano Sgrosso* (Italy) introduced the theme of the session and welcomed the participants.

(1) *Prof. C. Christol* (USA) presented the first paper "Important concepts for the international law of Outer Space". He observed that the space age, at its outset, was not a peaceful one because of military confrontation between the Soviet Union and the United States and the birth of many new States. Nevertheless, all understood the importance of preserving outer space as the "province of all mankind". This principle is, however, abstract and does not oblige nations to share the product of their experiments. Besides there is no international intergovernmental entity with the power to enforce such distribution. Thus, States maintain the right to determine how to share the benefits and results of their space activities. The Moon Agreement, on the other hand, is more precise with its "Common Heritage of Mankind" principle because it makes provisions (Art.11, p.7 d) for equitable sharing. Despite all the difficulties in realizing the "province of all mankind" principle, the author believes that it has effectively avoided the erection of artificial barriers to the world-wide dissemination of benefits of the space age.

(2) *Amb. A.A. Cocca* briefly summarised the paper by *Mrs. Esquivel de Cocca* (Argentina), entitled "Is it necessary to redefine principles and concepts of the Outer Space Treaty?". Today the *corpus iuris spatialis* that came into force 30 years ago, is no longer satisfactory. Even though the principles of international cooperation and common heritage of mankind

strongly limit the fast development of commercial activities, the efforts in realizing these principles have been worthwhile. In the light of new projects, there are several matters that need to be analysed, such as absolute liability, the legal status of astronauts and crew, or the definition of space object. The author does not propose to amend the treaty but she believes it is necessary to understand thoroughly the principles already in force and to enshrine the rules that appear necessary for new activities in a protocol.

(3) *Ms.T. Masson-Zwaan* presented the paper by *Dr. A.D. Terekhov* (UN/Russia) on "UN General Assembly Resolutions and Outer Space Law". The purpose of the paper was to examine the role of the General Assembly in the development and codification of international space law. Resolutions have often been adopted in the form of declarations and, with their principles, they constitute a focal point in the birth of space law. Even though they are not legally binding, they do have considerable moral and political weight, as Resolution 1962 of 1963 clearly demonstrates. The declaration of principles of 1963 is very important because if a State which is not Party to the Outer Space Treaty would appropriate a part of a celestial body it could still be considered as a violator of international law. The binding force of some provisions in the resolutions, except for the 1963 one, derives from the fact that they codify pre-existing rules. Only treaties establish unequivocally binding obligations for parties, but one of the advantages of declarations is that they are addressed to all States. The author extensively discussed all UNGA resolutions dealing with outer space over the past thirty years and up until the 1996 "Benefits declaration", including such factors as voting or adoption by consensus, language ("shall" or "should"), subsequent State practice etc, thus providing a very useful overview and a clear demonstration of the important role the General Assembly plays in the development of space law.

(4) The next speaker was *Prof. V. Kopal* (Czech Republic), who presented his paper "Outer Space as a Global Common", discussing the status of international law in various new areas of human activities such as Antarctica, Outer Space, or the Ocean Floor. Every area needs a specific regime, and the outer space regime is an example of compromise between common and individual interest in a system of cooperation and reciprocity. No perfect definition of the legal status of the new area exists, but merely a general guideline for space activities to be legal and peaceful through a system of registration, liability and mutual assistance. The Outer Space Treaty is general and left the door open for further development in additional international agreements. Space law does not provide for an international organisation or a special court for dispute settlement, contrary to the law of the sea. The author hopes that in the future the obstacles for the ratification of the 1979 Moon Agreement will be removed as has been the case with the 1982 Law of the Sea Convention. The author stressed that the Outer Space Treaty establishes guidelines and that the space regime is not yet a complete system.

(5) *Mr. F. von der Dunk* (Netherlands), in his paper "The Dark Side of the Moon", analysed the legal status of the moon. According to art. 2 of

the OST, outer space including the Moon and other celestial bodies is not subject to national appropriation by claim of sovereignty. The Moon Agreement adds further precision to the OST provision, but does not provide instruments or mechanism to realise them. However, while the Outer Space Treaty was ratified by over 90 States, the Moon Agreement has only been ratified by nine States. The definition of the Moon, with regard to exploitation and use of resources, as the "Common Heritage of Mankind" remains ambiguous. The author discussed three types of jurisdiction with regard to the Moon: territorial, national and quasi-territorial jurisdiction, none of which he considered satisfactory in the light of future commercial developments. Future private activities may present specific problems that are not regulated under the current space regime, and it is advisable to address these issues without further delay and thus advance general international agreement on the legal status of the Moon. This will also positively influence further legislation at the national level.

(6) *Dr. G. Gál* (Hungary), in his paper entitled "30 Years of Functionalism", observed that the applicability of space law depends on the orbital character of the space activity; he is a so-called "functionalist". The OST provides no delimitation between outer space and air space, but many provisions refer to the term "orbit". Dr. Gàl believes that, at this point, the functionalist approach is the only realistic solution. He could accept the 1987 Soviet Union proposal for a boundary established by agreement at an altitude not exceeding 110 km above sea level, but argues that even such a solution would be based on a functional approach.

(7) The next paper was by *Prof. A. Kerrest* (France): "Remarks on the responsibility and liability of states for damages other than those directly caused by the fall of a space object". It discussed potential damage caused by general space activities other than traffic accidents. He started from the distinction between the terms "responsibility" and "liability that give uncertainty to this particular field. Both terms are not defined even if, in the history of space debate, it has often been attempted to find a distinction, connecting responsibility to fault or to a wrongful act of a state, and liability to an act without fault. Prof. Kerrest observed how the privatisation of space activities will to modify space law, and discussed the US Commercial Space Launch Act. It is becoming more and more important to clarify the sense of expressions such as "national activities" and "the appropriate state". Prof. Kerrest would prefer to maintain the current system while improving its provisions relating to commercial private activities.

(8) *Dr. P. Sterns* (USA) presented the paper written with *Dr. L. Tennen* on "Exobiology and the Outer Space Treaty: from planetary protection to the search for extraterrestrial life". States are obliged to avoid back and forward contamination of the earth, the moon and other celestial bodies, and it is therefore important to provide for planetary protection policies. In the middle of 1950s, the Committee on Space Research (Cospar) began to develop policies to avoid back contamination, for example the planetary quarantine system, but the use of decontamination and cleanliness controls, adding to the cost and complexity of mission, are now becoming more and more infrequent. In the

light of the discovery of possible evidence of Martian life in meteorite ALH84001 and owing to the new activities on Mars and the Moon, the problem of contamination could become pressing. Problems connected with the duty of return of personnel or space objects could increase in case of their contamination. The authors believe that these problems need to be solved urgently to protect the integrity of scientific investigation, including the search for extraterrestrial intelligence.

(9) The last speaker was *Prof. N. Poulantzas* (Greece) with the paper "The judicial settlement of disputes: returning to an old proposal". He underlined that current space law does not provide for dispute settlement, in spite of art. 7 of the Outer Space Treaty and art. 14 of the Liability Convention, and held that this gap will prevent satisfactory solution of controversies. In spite of the tendency, in international law, to create specialised international courts, the author does not favor the creation of a Court for Outer Space Matters, similar to the International Tribunal for the Law of the Sea. The author proposed to return to a proposal advanced in 1965 by Dr. D. Poulantzas, to adopt the Chambers of the International Court of Justice to settle disputes arising out of space activities.

During the *discussions*, *Prof.Christol* (USA) commented on the paper by *Dr. Terekhov* and recalled the numerous discussions about the consensus decision making process in the UN, and one of the first papers on that topic, written by Dr. E. Galloway. He held that the discussions about the choice to use "shall" or "should" are interesting, but agreed with the author's conclusion that they are not useful to define the legal status of a document.

Mr.White (USA) inquired about the necessity for more precise international regulation for the exploitation of space resources. *Mr. von der Dunk* (Netherlands) argued that, in the light of growing private activity in this field, and considering the delays in international law-making, it might be better if States would formulate rules at national level to control these activities.

With regard to *Prof. Kerrest*'s paper and the terminological problems of defining "responsibility" and "liability", *Mr. Wirin* (USA) claimed a sense of "majesty" for the concept of responsibility in the Outer Space Treaty. He underlined a possible distinction between responsibility connected to the future and liability connected, instead, to the past, but, in his opinion, the most important concept is the "sense of responsibility" of each State for activities, official or private, in outer space.

Ms K. Gorove (USA) commented on *Mr. Poulantzas'* proposal to entrust a Chamber of the ICJ with the settlement of space law disputes, and recalled that in 1993 a Environmental Law Chamber had been created, and that this had possibly precluded the establishment of a special Environmental Court.

Finally, *Judge A. Koroma* of the International Court of Justice underlined the interest of the themes dealt with by the various papers. Regarding the creation of an "Outer Space Chamber", he argued that the ICJ would certainly examine the matter if the need for such a chamber arose. He reminded that the Court would consider the entire spectrum of international law, and not limit its considerations to space law.

Session 3

Applications & implementation of the outer space treaty

"Rapporteur: *Mr. F. von der Dunk* (Netherlands)"

Dr. S.E. Doyle (USA), Co-Chairman of the Session together with *Dr. G. Lafferranderie* (ESA, France), introduced the session by pointing to the necessity to look, 40 years after Sputnik I and 30 years after the entry into force of the Outer Space Treaty, at its application and implementation (and that of the other space treaties which have sprung from it) in practical terms.

(1) The first speaker was *Dr. K.U. Schrogl* (Germany), who discussed the forthcoming UNISPACE III conference and the activities which should follow that conference in his paper "Space Law at UNISPACE III (1999) and Beyond", co-authored by *Dr. M. Benkö.* In UNISPACE III the focus should be on space applications like earth observation and telecommunications, from the point of view of international cooperation and international law. Speaker considered the political setting very favourable for reaching some substantial results, and characterized UNISPACE III as a "clearing house" which should "filter out" topics interesting for discussion and at the same time with the potential for success within UNCOPUOS. He considered in particular as potential topics: 1) those following from cases like Sea Launch, 2) nuclear power sources; and 3) space debris.

(2) *Dr. A. A. Cocca* shortly presented the paper of the absent *Dr. M. Williams (Argentina)* on "The Development of Article IX of the Outer Space Treaty". Environmental issues continued to demand attention, and therefore also more precision than Article IX of the Outer Space Treaty afforded with respect to relevant obligations of states. The paper discussed some of the main notions requiring further definition from this perspective, as well as some other relevant documents on the issue of environmental harm and outer space activities.

(3) The third speaker was *Dr. G. Lafferranderie*, who presented his paper on "The Outer Space Treaty and the International Organisations conducting Space Activities". Dr. Lafferranderie pointed out that implementation of any legal text constitutes the real "proof of the pudding", and discussed especially Articles VI and XIII of the Outer Space Treaty from this perspective. How to implement these central Articles was not foreseen by the texts themselves. Thus, for example Article XXII of the Liability Convention and Article VII of the Registration Convention do not provide any specifics as to what substance the respective declarations thereunder, applying the particular legal regime to an international organization, would require. Speaker discussed the two ESA declarations as the first examples of implementation in this respect. Also, related issues with regard to Spacelab and the international space station passed scrutiny.

(4) Then, *Mr. B. L. Smith* (France) presented his paper entitled "Problems and Realities in Applying the Provisions of the Outer Space Treaty to Intellectual Property Issues", a paper co-authored by *Ms. E. Mazzoli.* Mr. Smith extensively discussed and criticized the

implementation which the US Space Bill on intellectual property rights issues presented with regard to pertinent provisions of the Outer Space Treaty. It led, most specifically, to "flags of convenience" in outer space, and "forum shopping" for private space entrepreneurs. In this respect he pointed at the analogy presented by the case of Sea Launch. Also, the patent claim of TRW, effectively extending to a whole range of orbits, as protected by the US legal system, was analyzed. Speaker concluded that, in order to prevent the United States from de facto unilaterally defining the status of complete areas of outer space, Europe should also extend intellectual property rights legislation into space, so as ultimately to force a measure of harmonization on the global level.

A short *discussion* ensued. *Prof. C.Q. Christol* (USA) found some useful suggestions in Mr. Smith's presentation, and wondered whether they might be worthy of consideration by UNISPACE III. He then asked whether Mr. Smith considered that Article VI of the Outer Space Treaty, providing for authorization and control, and violation of the substantive provisions of the Outer Space Treaty by TRW's patent had ever impeded science, to which the answer was "no". *Prof. K.H. Böckstiegel* (Germany) wondered whether the Outer Space Treaty, by presuming and even establishing the free use of outer space, had not already been violated as such by the United States' legislative actions, to which Mr. Smith answered with an emphatic "yes". *Dr. Doyle* finally pointed at the analogy - to some extent - of the patent to ITU's allocation of certain slots and orbits to states, which was however an allocation occurring at the international level by an intergovernmental body with almost global membership.

(5) The next speaker, *Mr. D. O'Donnell* (USA), claimed with regard to the Outer Space Treaty, that "This Treaty Needs a Lawsuit", as the title of his paper went. He considered that the recent United Nations Resolutions on international benefit sharing contained only some philosophical principles, and must therefore have seemed a rather meager implementation, if not indeed some sort of a betrayal, read violation, of the lofty ideas behind Article I of the Outer Space Treaty. In regard of the different theories he saw arising on benefit sharing, between 'the North' and 'the South', he suggested a 'Rule 23-class action' under United States law as a possible legal tool for 'the South' to enforce a more just interpretation of that clause of Article I.

(6) *Dr. Doyle* presented the paper of the absent *Mr. H.H. Almond* (USA), on "Interaction of the Law of Outer Space with Terrestrial Law". The paper discussed, from the aforementioned perspective, the application problems as evident in the fields of space debris and space militarization. The author of the paper for instance wondered whether space law would still be adequate in the light of the fact that states themselves would have to take any steps to disarmament. He proposed to seriously regard a mix of private and public law regimes as a possible means to ameliorate the disadvantages of the sovereignty which still remained in this respect.

(7) The seventh speaker was *Prof. I.H.P. Diederiks-Verschoor* (The Netherlands), whose paper discussed "The Development of Financing of Spacecraft". In second instance, Prof. Diederiks-Verschoor considered that "The Development of Spacecraft Financing and Cooperation" would have

been a better title, as the major aspect of the developments discerned was the growing measure of international cooperation. Whereas the first financial arrangements regarding space activities had been matters of purely national concern (NASA and the Soviet government), from 1973 onwards (NASA-ESRO cooperation, with "no exchange of funds") the financing of space operations became a matter for international agreements also. Speaker specifically discussed from this point of view the ESA Convention with its system of mandatory and optional programmes, the international space station project, and international satellite organizations such as INTELSAT, INMARSAT, ARABSAT and EUTELSAT. Finally, she dealt with the financing scheme of ITU as a topic presently under discussion.

(8) After the break, a special paper was presented by *Mr. A. Debus* (France), co-authored by five other authors, on the "Mars 96 Planetary Protection Program and Implementations for Mars Environment Preservation". In this technical paper, coupled with a number of very illustrative slides, firstly an overview was given of the history of Mars' planetary protection as an issue. A new recommendation by COSPAR on the matter was discussed. The Mars 96 Mission Planetary Protection Program was then discussed extensively, for example regarding the allowable standards of decontamination and decontamination methods for the various instruments involved. Finally, the cooperation aspects as between Russia and France, the two states participating in this programme, were highlighted as a practical example of cooperation in outer space matters.

Dr. L. I. Tennen (USA) asked the author whether the mission involved life protection experiments on board, to which Mr. Debus answered "no", inter alia because the decontamination required resulted (hopefully!) in an environment impossible for sustaining any life.

(9) *Mr. Y. Hashimoto* (Japan) then presented his paper on "The Legality of Military Observation from Outer Space". He discussed the question of reconnaissance satellites, and their legality, from the 1950's onwards, and pointed out that Article IV of the Outer Space Treaty really represented the only military provision regarding the use of outer space. He made the comparison in this regard between the freedom of the high seas and the freedom of outer space, and came to the unequivocal conclusion that reconnaissance operations undertaken in outer space were perfectly legal. Speaker then dealt with the ISMA project, as constituting an effort to combine the principles of peaceful use, to the extent relevant for outer space, and international cooperation. He concluded by pointing at the need to activate the UN system for ensuring peace within the framework of the UN Resolution on remote sensing, in order to draw maximum benefits from space reconnaissance.

With regard to this paper, *Prof. G. Gál* (Hungary) generally agreed with the observation that military reconnaissance has been allowed, and pointed inter alia to the ABM Treaty in this respect. He then, however, asked to what extent such a bilateral treaty could legalize as such the military activities under consideration. Also, he wondered to what extent the provision by a third state of important data to one if the parties in an armed conflict could be considered legal or illegal. *Mr. Hashimoto* replied

firstly that bilateral agreements, while as such of course not binding upon third states, could considerably contribute to the establishment of relevant customary law, particularly if it involved the two most important states from the perspective of global military power and any global treaty on the subject was absent. Secondly, he pointed out that the non-discrimination-requirement made one-sided provision of reconnaissance data in an armed conflict illegal.

(10) As the tenth speaker, *Mr. E. Brooks* (USA) dealt with the "Dangers from Asteroids and Comets: Relevance of International Law and the Space Treaties". Mr. Brooks extensively dealt with the various categories of asteroids and comets, and essentially concluded that they had two important legal aspects: that of detection of these heavenly bodies, and that of deflection. He then dealt with the various treaties and other documents regarding space, analyzing each of them as to their relevance on these two legal aspects. Thus, for example the Outer Space Treaty and the Moon Agreement, but also the Nuclear Test Ban Treaty and the Environmental Modification Treaty passed scrutiny.

(11) Next, *Prof. A. Kerrest* (France) dealt with "Launching Spacecraft from the Sea and the Outer Space Treaty: the Sea Launch Project". He explained the double advantage of Sea Launch: physically launching from (close to) the equator, and the use of cheap launch technology and hardware coming from the former Soviet Union. Then he focused on the legal aspects, especially those regarding liability. A very illustrative slide enumerated all the states one way or another involved in the project. Discussing the liability regime as provided by outer space law, he came to the conclusion that the notion of 'territory', as used for the launch, presented "the lock on the system"; once this lock is open, problems abound. Speaker also shortly discussed the various proposals to amend or change the present liability system, as inter alia following from such projects of Sea Launch and the possible inadequacy of the present space law liability regime to deal with them.

The paper raised an interesting and heated discussion. *Mr. W. Wirin* (USA) proposed to have the slide showing the list of states involved in Sea Launched again on the overhead projector, and then to ask the audience to 'vote' off-hand, at each particular state, whether the involvement of that state in Sea Launch would suffice for qualifying it as a launching state for cases of damage arising as a consequence of Sea Launch operations. This was done, and if the ensuing 'vote' did one thing, it was confirming that amongst space lawyers little agreement exists so far on the precise scope of the term 'launching state' for liability purposes. *Prof. Christol* asked what the legal relevance of Long Beach being the 'home-port' of the Sea Launch venture would be, to which *Prof. Kerrest* answered that it would be the flag of ship and launch platform which would count under international law. Yet, the 'vote' just taken confirmed that nevertheless even this form of involvement was interpreted by some to make (in this case) the United States a 'launching state'.

(12) The last speaker was *Prof. P. B. Larsen* (USA), who discussed "Legal Issues in Augmentation of Global Navigation Satellite Systems (GNSS)". While his remarks were largely relevant also to other GNSS

systems (most prominently of course GLONASS), he dealt in first instance with GPS. He considered that neither the Standard Precisioning Service (SPS) nor the Precise Positioning Service (PPS) suffice in terms of accuracy for the intended purposes of e.g. precision aircraft landing. Thus, local or regional augmentation systems were required. From this perspective, he then discussed the American WAAS and marine systems, the EGNOS system in Europe, and the Japanese augmentation system. He finally put these systems in the perspective of the Outer Space Treaty, and in particular the liability regime as it had arisen in space law.

Commenting on this paper, *Dr. E. Galloway* (USA) wondered whether the ITU (or another global institution similar to it) would not present the best option for arriving at a coherent international legal regime for these operations. *Prof. Larsen* agreed that ITU had some role to play, but considered the analogy with remote sensing as dealt with at the international level more adequate. Dr. Galloway reiterated, that one overarching international authority with the necessary expertise would be required to realize an internationally workable environment for future GNSS. In addition, *Mr. Kinnell* of INMARSAT pointed out that legal issues regarding either the use of EGNOS, or WAAS, or both, were already being discussed within INMARSAT amongst other fora. Finally, *Mr. F.G. von der Dunk* answered the question of Dr. Galloway in some more detail, by pointing out that within the multiple discussions being presently undertaken on the operational GNSS systems and the augmentation systems, as well as on future systems and a coherent global regime therefore, a prominent topic was that of establishing a separate global GNSS Agency which should guarantee a just and workable balance between the various interests involved.

Session 4
The future applications of the outer space treaty
"Rapporteur*: Dr O. Ribbelink* (Netherlands)"

The last session was chaired by *Prof. K.-H. Böckstiegel* (Germany).

Almost fifteen papers on a wide variety of topics were presented. As far as feasible, the papers were scheduled according to subject matter, so as to create some consistency throughout the session.

(1) *Dr. L. Perek* (Czech Republic), "Outer Space Treaty in Perspective". Dr. Perek gave an outline of a needed Agreement on Space Debris. At the time of the conclusion of the OST it was tacitly assumed that (then still few) space debris would disappear in outer space, and concern dealt more with possible contamination of the environment by extraterrestrial matter (cf. art.IX OST). The new agreement should take into account: 1st: the existence of space debris (95% of all objects in space); 2nd: criteria to determine whether an object is debris or not - there exists no problem with fragments or detached parts, but with inactive but still orbiting satellites; 3rd: the status of space debris and the liability of the original owner; 4th: the difference between space object and space debris; 5th: the legal status of those who dispose of orbiting non-manoeuvrable

debris, and the legalisation of such activities. The new Agreement, however, should not re-open the OST.

(2) *Mr. M. Williamson* (UK), "Protection of the Space Environment under the Outer Space Treaty". Dr. Williamson addressed the need for good arrangements for the protection of the planetary bodies (e.g. Moon and Mars) from debris which will inevitably result from future development and exploitation. This topic could very well become just as important as orbital debris is today. Since the OST in its present form does not provide for adequate protection, and the development of the Moon and Mars is expected to begin in the 21st Century, we would be well advised not to wait too long with the discussion of an adequate instrument.

(3) *Prof. G. Catalano Sgrosso* (Italy), "Must the special typology of aerospace planes lead to the supplementation of the rules of the Outer Space Treaty?". After discussing different types of Aerospace planes and theories, Prof. Catalano Sgrosso concludes that the functionalist approach is the most suitable. Nevertheless, some measures are necessary in order to solve the conflicting situations in which the aerospace plane could find itself, *e.g.* with regard to the passage through the air space of third States, the identification of the launching State, the crew statute, and the regime of liability. However, the amount of time needed for the adaptation of existing legal instruments or the creation of a new instrument would be excessive. Also, since States do not wish to give up their exclusive competence and in order not to slow down their space activities, it is to be expected that States will prefer to regulate through means of specific *ad hoc* agreements.

(4) *Mr. C. H. Rebellon Betancourt* (Colombia), "The Treaty of '67 in Front of 21st Century". The author held that the OST should be amended and supplemented, and that the concepts "Envoys of mankind" and "Common heritage of mankind" need to be developed further.

(5) *Dr. N. Goldman & Dr. D.J. O'Donnell* (USA), "Revisiting the Outer Space Treaty: A re-examination of the Sovereignty-Jurisdiction Compromise" (short summary presented by Jeri Mercer-Fike, United Societies in Space, USA). The OST, although dealing with many topics, neglects the concept of jurisdiction, while the day when we live and work in outer space is nearby. A choice should be made between the two related components in the sovereignty-jurisdiction compromise in the OST: either limited sovereignty (non-appropriation) or ultimate sovereignty of humankind (province of mankind / common heritage of mankind). For the first option the Native American analogy might offer some guidance, while for the second the concept of the Trust Territory might find applications.

(6) *Dr. D.J. O'Donnell & Dr. N. Goldman* (USA), "Astro Law as Lex Communis Specialis". The authors proposed to extend the existing *Corpus Iuris Spatialis* with a common law in space: *Lex Communis Spatialis*, or as he called it: Astro Law. This will be necessary to regulate the everyday behaviour of people in space, which today is not addressed by the existing treaties.

(7) *Prof. T. Kosuge* (Japan), "Commercialization of Space Activities and Applications of the Space Treaty ... Geostationary Orbit and Frequency Spectrum". Prof. Kosuge spoke about the need to optimize the use of the orbital space and frequency spectrum for the further development of

commercial satellite communications and broadcasting services. Domestic management could implement more efficient, effective and economical use of the limited natural resources. The Australian experience (the auctioning of spectrum licenses) could serve as one example of a market-oriented approach in dealing with the challenges posed in the search for ways to optimize the use of these resources.

(8) *Prof. M. Andem* (Finland), "Implementation of Article IV of the Outer Space Treaty of 1967 During the 21st Century". Prof. Andem stressed the need for peaceful uses of Outer Space, especially with regard to future generations. Now that the Cold War had ended, time had come for a new understanding, and possibly a new meaning, of the concept of peace.

(9) *Ms. K. Cramer* (USA), "The Lunar User's Union - An Organization to Grant Land Use Rights on the Moon in Accordance with the Outer Space Treaty". Ms Cramer spoke about the need to devise some form of regulation for the use of the surface of the Moon, since not all of the expected activities will be compatible. A "Lunar Users Union", modeled after the ITU, could deal with lunar territory and grant rights for specified activities in specified areas, to insure non-interference. Scarce resources would be allocated without granting ownership, thus staying within the bounds of the OST.

(10) *Dr. J. Monserrat Filho* (Brazil), "Total Militarization of Space and Space Law" (new title). Speaker warned about recent attempts to step up the militarization of Outer Space. Especially in the USA, based on the theory that "non-aggressive" equals "peaceful", there is much discussion about the need to control space. It is remarkable that now, in the new post-Cold War reality, global disarmament advances as never before, but there has been no legal advance with regard to closing Outer Space to the arms race. One of the first tasks, both urgent and logical, will be to update Art.IV OST, which now still permits placement of arms in outer space, (with exception of nuclear and mass destruction weapons). The historic mission is to close the sky for the arms race forever.

(11) *Mr. W. N. White Jr.* (USA), "Real Property Rights in Outer Space". Mr. White proposed a regime of real property rights which would provide an element of legal certainty and incentive for private ventures into outer space. Existing international space law permits limited, functional property rights, which will permit free access to all areas of outer space and the celestial bodies, because these rights do not necessitate territorial appropriation cq. national claims of sovereignty. The regime, which will be easy to implement, would be legal under both common law and civil law theories of property, and under Articles II and VIII OST.

(12) *Prof. F. Lyall* (UK), "Telecommunications and the Outer Space Treaty". Prof. Lyall stressed that although telecommunications have been recognized, from the very beginning, as a very important use of outer space, the subject has been remarkably absent in space law, except for some of the very early UN Resolutions and the ITU. There is e.g. no specific mention in the 1963 Principles nor in the 1967 OST. However, there are some worries with regard to the present first-come-first-served system, the abuse of (Tonga) and non-compliance with (Indonesia, China) Procedures, phantom

satellites (notifications of systems in embryonic state), lack of supervision, the pressures towards privatization and competition (e.g. the deregulation-mania in the EC). The goal of global non-discriminatory telecommunications services may be lost, and "public utility" services may be in danger. This does not necessarily mean that an amendment of the OST is the answer, since all these problems concern implementation by states of international agreements.

(13) *Dr. L. F. Martinez* (USA), "Space Telecommunications and the Internet: implications for the Outer Space Treaty". Internet developments (esp. GMPCS systems) will, according to dr. Martinez, challenge Art.VI OST and its focus on state authorization and supervision. The shift from analog to digital technology will mean a shift of control from the network operator to the user; together with the shift to commercialized information markets this will mean an end to government (PTT) monopolies; Also, traditional governmental jurisdictional boundaries will blur as a consequence of the evolution from circuit-based regulation to service-based regulation; this will have consequences for traditional views on intervention, since it will become increasingly difficult to separate military and civilian networks. The technological, economic and security boundaries of state jurisdiction on which he OST is premised may no longer exist.

(14) *Dr. M. Hoskova* (Czech Republic), "Outer Space Treaty as a framework for the regulation of space debris". Dr. Hoskova stated that the OST and the Liability Convention do not provide sufficient basis to effectively cope with space debris, since space debris appear to be interpreted as a sub-category of space-objects or as their component parts, which has consequences for the ownership of space debris. This may not pose a problem for relatively large objects the state of registry of which can be easily identified, but it does for smaller particles. The latter should *de lege ferenda* be excluded from the protection of ownership so that they can be removed without consent of the owner. In order not to deprive a state from compensation for damage from the latter, the creation of a special fund seems appropriate, the precise legal formulation of which would represent a constructive approach and contribute to the regulation of the legal consequences of damages occurring in outer space.

In the *discussions*, *Prof. S. Gorove* (USA) asked whether the definition of "aerospace object" (in particular with regard to the Aerospace plane) will remain an issue for discussion within the Legal Sub-Committee of UNCOPUOS. *Dr. Schrogl* answered that this topic, which had been put forward by the SU, mainly in view of specific questions regarding the Buran-project and the necessity to approach the landing site through the airspace of third states, has been discussed within the framework of the delimitation item. Several delegations were of the opinion that no special passage right should be created for such aerospace objects. Although the Buran project has been terminated, the topic is likely to remain under discussion, if only because in UNCOPUOS-practice the removal of topics is much more difficult than the addition of new topics. *Judge V. Vereshchetin* (ICJ/Russia) later stipulated that the original proposal did not only relate to the Buran-project, but to various other planned systems as well. Also, he

added, the Buran project is not dead, it just does not exist anymore, and other projects are under way.

Prof. C. Christol asked Dr. Perek's opinion on the issue of space objects which had become debris and the procedure which had to be followed to determine as such, and, what to do with these objects that were no longer space objects. *Dr. L. Perek* answered that fragments should be separated from objects. This however, poses no major problem. Much can be done through the use of tracking systems, as there are technical ways to determine whether one deals with a fragment or an entire object. The bigger problem is to determine which satellites have ceased to be active. In fact, this is a question to which only the owner knows the answer. This will have to be solved through means of the Registration Convention. Dr. Perek had noted the difference between his approach and the approach suggested by dr. Hoskova, which he attributed to different points of departure. He suggested they work together in order to try to reach a common position.

Mr White Jr. asked Ms. Cramer whether materials to be found on the surface of the Moon were evenly distributed or concentrated in certain specific areas only, since this could be of relevance to the issue of property rights. *Ms. Cramer* answered that the most relevant material, Helium 3, is evenly distributed over the surface of the Moon.

The last question was from *Mr F. Smith* (UK) who had noticed that the discussion on property rights mostly concerned the Moon, and he wondered what the situation was with respect to asteroids. *Ms. Cramer* replied that there has been mention of plans to claim passing asteroids with the prospect of their exploitation.

Hereafter, the 40th Colloquium was closed and the President thanked all those who contributed to it and invited all to the 41st Colloquium in Melbourne.*

Tanja Masson Zwaan (Editor)**
IISL Secretary/ Colloquium Coordinator

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* 28 September - 2 October 1998. Information about the Colloquium, session topics and procedure for the submission of abstracts, as well as the Manfred Lachs Space Law Moot Court Competition may be obtained from the IISL Secretary via fax (++65-4661163) or e-mail (jtmasson@cyberway.com.sg), or from the IAF Website (http://www.IAFASTRO.COM). For proposed session topics, see also FORTHCOMING EVENTS, *infra.*.

** With many thanks to the Session Rapporteurs: *Jean-François Renaud* (University of Paris XI), *Marialetizia Longo* (University of Rome), *Frans von der Dunk* (International Institute of Air and Space Law, Leiden University), and *Olivier Ribbelink* (T.M.C. Asser Institute, The Hague/University of Amsterdam).

COMMENTS

Mobile Satellite Communications: Challenging the Regulatory Barriers

Introduction

Since its establishment in 1979, one of the key issues faced by Inmarsat in developing a global mobile-satellite communications network has been the existence of national regulatory barriers to the importation and use of mobile earth stations (MESs). Legal regulation of radio transmissions has traditionally been associated with domestic systems operating mainly within the territorial limits of a State, but the establishment of regional and global satellite systems, accessible by small mobile terminals operating in areas under national jurisdiction, necessitated a new approach to regulation.

A new dimension has been added to this issue by the availability of global mobile personal communications by satellite (GMPCS). These systems have much to offer to the developed and developing world alike, but their potential will only be fully realized if the myriad of differing national licensing regimes can be replaced by a truly international regulatory framework. The outcome of the world's first World Telecommunication Policy Forum (WTPF) in Geneva in October 1996, described below, goes a long way toward achieving these goals.

INMARSAT's attempts to find solutions to the problem, initially with its maritime and aeronautical services, and latterly, in association with other operators, with its land mobile communications services, are described below.

Maritime Satellite Communications

When Inmarsat started providing international maritime satellite communications, many States forbade the use of ship earth stations (SESs) in territorial waters where ships spend a great deal of time. Since restrictions on the use of SESs was seen as a threat to safety and good ship management, as well as a commercial disadvantage, the Inmarsat Assembly of Parties, in 1985, with support from the International Telecommunication Union (ITU) and the International Maritime Organization (IMO), adopted a multilateral treaty, entitled "The International Agreement on the Use of Inmarsat Ship Earth Stations in the Territorial Sea and Ports," which was open to all States.

The Agreement provides that States Parties shall permit, in their territorial seas and ports, the operation of approved ship earth stations utilizing the Inmarsat maritime space communications system and properly installed aboard ships flying the flag of any other Party. The operation of SESs is made subject to various conditions. SESs are required to use the maritime mobile-satellite frequencies and to comply with the applicable Radio Regulations. The operation of SESs shall not be prejudicial to the peace,

good order and security of the Coastal State; shall not cause harmful interference with other radio services; SESs shall be subject to inspection by the authorities of the Coastal State without prejudice to the navigational rights established under international law.

Security considerations are reflected in two further provisions; one enables Parties to restrict, suspend, or prohibit the operation of SESs in ports and areas of territorial sea specified by them; the other excludes application of the Agreement to warships and other government vessels operated for non-commercial purposes. The International Agreement entered into force on 12 September 1993, and had 39 States Parties as of July 1997.

Aeronautical Communications

When Inmarsat introduced public correspondence and air safety communications after 1985, it was faced with the question of sovereignty over national airspace and the requirement of Article 30 of the Convention on International Civil Aviation (the Chicago Convention) that the use of radio in an aircraft flying over national airspace is subject to the regulations of the State concerned.

In seeking a solution to the problem, Inmarsat cooperated closely with the International Civil Aviation Organization (ICAO). An ICAO study revealed that no legal problems arose in connection with safety communications, *i.e.*, air traffic services (ATS) and aeronautical operational control (AOC). However, the study confirmed that there were restrictions on the non-safety communications, *i.e.*, aeronautical passenger (public correspondence) communications (APC) and also aeronautical administrative communications (AAC).

The 29th Session of the ICAO Assembly (September-October 1992) adopted a Resolution to the effect that all ICAO Member States should ensure that the use of radio transmitting apparatus upon an aircraft for non-safety related air-ground radio transmissions, shall not be prohibited subject to certain specified conditions, including compliance with licensing, frequency and other technical and operating requirements.

Land Mobile Communications

Regulatory Barriers

The start of land mobile satellite services (LMSS) in 1989 posed problems of a different magnitude for Inmarsat. Even today, many years after the start of INMARSAT's services, and with a membership of 81 States, some member States, as well as other countries, have not opened up their markets for Inmarsat LMSS. The Inmarsat Convention does not give the Organization special rights of access to the markets of its members. Indeed Article 7 (4) of the Convention provides that use of Inmarsat mobile earth stations (MESs) is subject to national regulations.

A worldwide survey of national licensing regimes, compiled by Inmarsat, revealed extensive regulatory barriers. Many countries permit the use of MESs, but others, including some Inmarsat Member States, prohibit such use except, in some cases, for disaster communications; a range of license fees are payable in many countries, sometimes exceeding the cost of the terminal; customs fees also vary but are in some cases a deterrent to use, either from the high rates of duty or the fact that they are charged irrespective of the time spent in the country by the MES user; national type-approval of an MES is sometimes required even though it complies with other national or internationally recognized standards; requirement of participation in local investment as a condition of use or maintaining outdated regulations may also be a barrier to use of MESs.

Reasons for Barriers

The reasons why States maintain these barriers are well understood. They include concern about revenue losses from MESs physically bypassing national terrestrial networks; security concerns that MESs could be used for political subversion or to conduct criminal activities undetected; possible radio frequency interference with other national systems; protectionism in some countries for the domestic satellite provider against international competition; and in some cases, inadequate regulatory frameworks.

Thus while technically it is possible to use mobile satellite communications all over the world, such use is forbidden or restricted in many countries for what their governments consider to be sound economic or other reasons, but which effectively inhibit rapid deployment of the services and deny opportunities for service providers and countries alike to benefit economically and socially from the available systems.

Initial Steps to Modify Barriers

In the early 1990's, Inmarsat sought to improve the regulatory situation and facilitate the transborder use of land mobile earth stations through direct contacts with its Members and national regulators, and also in cooperation with regional telecommunications organizations in the Asia-Pacific Region, Africa, Latin America and the Gulf States.

Action in Europe

Substantial progress has been made in Europe which has the most liberal telecommunications environment in the world. For example, the Conference of European Postal and Telecommunications Administrations (CEPT) and the European Radiocommunications Committee (ERC) have adopted or drafted decisions and recommendations relative to the free circulation, use and type-approval of radio and satellite equipment,

including specified Inmarsat terminal standards among the CEPT countries (*e.g.* ERC/DEC/(95)01).*

GMPCS

It is with the advent of GMPCS that large strides are now being made towards a more liberal regulatory environment worldwide. GMPCS will be provided by a number of existing or planned geostationary and non-geostationary systems. The recent launches of Inmarsat third generation satellites with spot beam capacity has already enabled Inmarsat to make available a GMPCS terminal, known as the Inmarsat-phone, a lap-top sized satellite phone providing voice, data and fax services.

Inmarsat and the other planned system operators were faced with an enormous task of tackling, on a global scale, the multiplicity of national licensing regimes. The many socio-economic benefits which GMPCS could bring to countries lacking basic telephony systems, as well as the recovery of the huge investments involved in establishing the systems, could only be achieved if worldwide favorable regulatory regime was established.

The ITU and WTPF

Cooperation in the ITU among the GMPCS operators, including Inmarsat, and national governments and industry representatives has made recent progress possible.

A decisive breakthrough came at the ITU's first World Telecommunications Policy Forum (WTPF) in October 1996. The WTPF examined policy and regulatory issues raised by the introduction of GMPCS, including the role of such systems in the provision of basic telecommunications services in developing countries and remote and rural areas, and measures necessary to achieve transborder use of mobile terminals.

One action of the WTPF was to draw up a set of *voluntary* principles for national policy makers, regulators, GMPCS system operators and service providers. to take into account when licensing and operating the systems, namely: (i) early introduction of GMPCS services; (ii) international cooperation to harmonize GMPCS domestic policies; (iii) global service availability, maximizing competition and non-discriminatory practices; (iv) creation of a simplified, non-discriminatory and transparent regulatory environment; (v) wide multinational participation in the equity ownership of GMPCS systems and services; (vi) preventing the use of GMPCS in any country which has not authorized the system; (vii) free circulation of user terminals and global roaming; (viii) universal access to basic telecommunication services at a reasonable cost; (ix) interconnectivity among GMPCS systems and public networks; (x) further cooperation between all authorities and entities involved.

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* Other recent developments in satellite services licensing in the European Union were described by S. Le Gouëff in 25 J. SPACE L. 40 (1997).

The GMPCS MoU and the Arrangements to Introduce GMPCS

Another important action of the WTPF was to draft a Memorandum of Understanding (MoU) (which was finalized in February 1997) on the development of Arrangements to facilitate free circulation of GMPCS terminals. The MoU covers type approval, licensing and marking of terminals, customs arrangements and access to traffic data. The MoU is open for signature by administrations, satellite operators, manufacturers and service providers.

A meeting of Signatories and potential Signatories of the MoU in Geneva on 18-19 July 1997 agreed on the detailed Arrangements envisaged by the MoU. The objective of the global Arrangements is to provide a framework for introduction of GMPCS, including:

(a) permission to carry a terminal into a visited country, and use it, within the framework of a licensing scheme, (*i.e.*, without the need for individual license in that country);

(b) permission to carry a terminal into a visited country but not use it, and

(c) technical conditions for placing terminals on the market.

The scope of the Arrangements acknowledges that the sovereign right of governments to regulate telecommunications is not affected by the Arrangements; that implementation of the Arrangements is voluntary, and that they extend to all Administrations and Competent Authorities, ITU Sector Members, GMPCS System Operators, Service Providers and Terminal Manufacturers.

GMPCS System is defined as "Any satellite system (*i.e.*, fixed or mobile, broadband or narrowband, global or regional, existing or planned) providing telecommunications services directly to end users from a constellation of satellites."

The Arrangements cover mutual recognition of type approval of GMPCS terminals; a simplified regime for the licensing of GMPCS terminals; a method of identification (marking) of GMPCS terminals and access to traffic data by authorized national authorities. They also include a recommendation on the principles for customs procedures to facilitate unrestricted transborder movement of GMPCS terminals.

The final text of the arrangements was agreed at the third meeting of Signatories and potential Signatories held on 6 and 7 October 1997. The ITU Secretary-General will now invite all its Members, other competent authorities, Signatories to the GMPCS MoU and all non-Signatories to implement them.

As the depository of these Arrangements, the ITU will maintain a list of standards and specifications that are used for type approval and will keep track of how the Arrangements have been implemented. The ITU will periodically publish a list of all entities that have implemented the Arrangements in full or in part; the GMPCS system authorized in each country; a list of GMPCS terminals that have been granted approval and the countries that have granted type approval. Although implementation of the

Arrangements will be on a voluntary basis, their adoption represents substantial progress toward eventual worldwide acceptance of GMPCS.

Other Developments

Developments in other organizations also contribute to the lifting of regulatory barriers.

In February 1997, the World Trade Organization (WTO) established a Group on Basic Telecommunications (GBT) which completed negotiations aimed at liberalizing basic telecommunications including satellite services, worldwide; 69 countries participated, and have made varying commitments to a range of regulatory principles covering competition safeguards, interconnection guarantees, transparent licensing processes and independence of regulators; the results of the GBT negotiations will be extended to all WTO Members through the most favored nation treatment.

In December 1996, 28 WTO Member States signed an Information Technology Agreement (ITA) committing signatories to reducing customs duties on a range of items, including, it is understood, mobile satellite terminals.

In the World Customs Organization (WCO), the 1991 Istanbul Convention on Temporary Admission, which exempts personal effects and professional equipment from customs duties, could also help to reduce customs duties on mobile satellite terminals.

Conclusion

Much work remains to be done to achieve an international regulatory framework in which all countries can obtain the social, political and economic benefits which can flow from access to satellite communications, especially GMPCS, while at the same time ensuring that vital national and economic interests are not jeopardized by opening up their markets. However, the steps toward liberalization of satellite communications in the European Community and the wide participation and collaboration of policy makers, regulators, system operators, service providers, manufacturers and others in the WTPF and the GMPCS MoU and Arrangements are encouraging signs that rapid progress in reaching these goals may be imminent.

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Current Space Insurance Market Conditions

Market Capacity Space Insurance

The total worldwide space insurance capacity for space launches has continued to increase from about US$ 300 Million at the beginning of

the decade to approximately US$ 914 Million in 1997. Insurance capacity is the total amount of insurance available from the insurance markets on a single risk basis to cover the physical loss or damage to satellites during space launch. The level of capacity reflects the industry's business interest in the space line of insurance, and what the prospects are for dependable and economical sources of space insurance in the future.

The total market capacity is estimated by aggregating the capacities which individual markets have indicated they are capable of providing for space risks. There are approximately two dozen major space markets plus several smaller markets primarily in Europe and the United States. There is no guarantee that any given market would participate in any given risk or, if it did participate, would put up a full line. The following chart shows the percentage breakdown of capacity by country in which space underwriting facilities exist.

Space Launch Insurance Capacity - 1997

COUNTRY	PERCENT %
FRANCE	22.2
UK/LLOYDS	20.6
USA	15.9
ITALY	13.7
GERMANY	11.1
BERMUDA	5.5
OTHERS	11.0
TOTAL	**100.0**

(It is noted that the insurance capacity for physical loss or damage to satellites does not provide the coverage for legal liability resulting from third party damage. Liability insurance for third party claims derives from generally different markets, requires different underwriting criteria, and is affected by different market experience).

The current space insurance capacity is generally considered sufficient to support the insurance coverage required for the highest valued launches expected in the near future. Such risks would likely be the combined single risk of two high valued satellites launched on an Ariane-5 launch vehicle. The values would include satellite asset values, launch service costs and possible extra expenses and revenue exposures. It is possible, however, that the addition of large revenue exposures for some of the future space projects could exceed the current capacity, and limit full insurance coverage.

In-orbit insurance capacity is estimated to be about US$ 700 Million, somewhat lower than the amount for launch. In-orbit insurance covers exposures following the termination of the launch insurance policy. Essentially the same markets underwrite in-orbit insurance, although the available capacity usually has been less since there was not a large demand at the premium rates underwriters believed were necessary. With the

advent of large, low earth orbit (LEO) satellite constellations, additional capacity may be needed for certain in-orbit risks.

Of particular concern is the increased hazard of space debris in LEO from man-made and natural sources. A number of satellites in a constellation could be affected by a single occurrence which substantially degrades communications services on a worldwide basis, requiring an extensive period while replacement satellites are being launched and losses incurred to the business. In addition to the satellite asset value losses, network revenues could be severely curtailed and extra expenses incurred while gaps are being filled in the network.

Sources of Insured Losses

The causes of space failures are quite diverse and have emanated from various sources involving the launch vehicles, satellites and other space systems. As a quantification of the relative contribution to the insurance losses from different causes, a measure is derived based on the insured loss payments. This proves a convenient illustration of the relative risk rating for different phases of launch and in-orbit operations. It is also more straight forward than counting units of failure, since many failures result in partial losses with partial insurance payments.

The following chart presents the insured losses by phase as a percentage of the total space insurance losses paid over the 20 year period. The cumulative payout in losses during this period was about US$ 4.1 Billion.

Sources of Losses - 1977 to 1997

PHASE	PERCENT %
Launch Vehicle	56.0
Upper Stages	8.0
Satellite Early Orbit	19.0
Satellite in Orbit	12.0
Undetermined/Disputed	5.0
TOTAL	**100.0**

Launch Vehicle - Launch from the ground up until separation from the launch vehicle until termination of the launch insurance policy, usually 180 days after launch.

Upper Stages - The stages that provide propulsive orbit changes after separation from the launch vehicle.

Satellite Early Orbit - After satellite separation from the launch vehicle until termination of the launch insurance policy, usually 180 days after the launch.

Satellite In-Orbit - Satellite orbit operations after termination of the launch insurance policy.

Undeter/Disputed - Losses which have not been agreed to or fully understood.

Space Premium Rates

The premium rates most often used for reference are those that apply to launches to geostationary orbit which include the satellite checkout in orbit, and typically cover satellite performance during the first 180 days after launch. The premium paid is calculated by multiplying the premium rate times the sum insured. The sum insured is the value of the satellite plus the cost of launch services, and can include extra expenses and lost revenues sustained in the event of a failure.

The current premium rates for GEO launches are in the range of 15 to 20 percent. Some GEO risks have been below this range and some a good bit above. The premium rate depends upon a number of factors including market experience with the specific launch vehicle and satellite systems, underwriter concerns with the specific technologies employed, and the overall loss results in the market.

After the satellite completes its checkout and initial period of orbital operations, in-orbit insurance rates are estimated to be in the range of 1.5 to 2.5% per year. This coverage, also called satellite life insurance, would attach after termination of the launch insurance policy and demonstration of the satellite performance or health status.

Launch vehicle phase only insurance is also available with rates in the range of 6 to 12% of the sum insured. The lower rates reflect the exclusion of coverage for the upper stages and satellite performance following separation from the launch vehicle. These rates are used in cases where the launch services provider guarantees the launch plus successful separation. The risk of loss following separation transfers to the satellite owner or other party with the risk of loss.

The LEO and other non-GEO launch rates also would depend upon whether the insurance coverage is for launch vehicle phase only, or also includes satellite performance following separation from the launch vehicle. There is somewhat lower launch risk due to typically fewer propulsion maneuvers required to achieve the lower orbits. On the other hand, insurance underwriters have had less experience rating the various launch vehicles and satellite systems which will be utilized for lower orbit operations. With the importance of mobile and other low earth orbit applications, this is expected to be an increasingly important segment of the business.

Additional Considerations

A number of issues are being discussed in the space insurance industry which can effect the underwriting process, provisions of insurance policies, and scope of space insurance coverages. These issues were addressed at the April 1997 insurance conference in Venice sponsored by one of the leading space insurance companies, Assicurazioni Generali S.p.A., and held every two years.*

* For a short account of the Conference, see 25 J. SPACE L. 50 (1997).

In some cases space insurance policy wording can be different than the language in the supplier contract resulting in different interpretations, and misunderstandings as to the scope of insurance coverage. Supplier contract performance specifications for successful operations, for example, could exceed what insurers might determine are sufficient specifications for determining success for purposes of insurance.

Under-insurance reduces the premium paid to insurers, but insurers still pay the full partial amount in event of partial losses. Those insured are in effect paying less to get full partial loss coverage. This situation is somewhat less of a consideration where there is a total loss. In the cases where the insured pays a premium on a lesser sum insured -- less than the actual value of the assets exposed to risk -- in the event of total loss, the insured would receive only the sum insured, which is less than actual value.

The constructive total loss point is usually set at 50% for geostationary orbit satellites, while the communications capability of contemporary satellites is substantial even at and below that point. Typical constructive total loss points would be the loss of more than 50% of fuel or of the transponders. Some insurers feel that higher percentages should be used depending upon the particular program.

Also, some banks want a payee cut-through clause if the insured breaches an insurance policy warranty, while insurers want protection from paying claims if the insured makes a material breach. In addition, insurers are expressing concern about possible reductions in pre-launch testing and in-flight component qualification.

These issues are part of the on-going dialog between the parties and represent the expression of the various interests involved in insuring space systems.

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The Legal Status of Stratospheric Platforms: An Update

In an earlier article in the Journal of Space Law[1] the author observed that stratospheric platforms could be considered to be either in airspace or in outer space. The author concluded that the most progressive result, from the standpoint of tangible benefits and legal protections to the greatest number of people, would be to classify the stratospheric platforms within outer space.[2] More recently, international legal experts within the International Telecommunication Union (ITU) and the U.S. Federal Communications Commission (FCC) have exhaustively studied the definitional status of stratospheric platforms. Their conclusion, enshrined

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1 M. Rothblatt, *Are Stratospheric Platforms in Airspace or Outer Space,* 24 J. SPACE L. 107 (1996).

2 *Id.* at 112.

in new law in the United States[3] and preparatory documents for a new multilateral treaty at the ITU,[4] is that stratospheric platforms are in airspace and are therefore presumptively subject to the underlying state's national jurisdiction and control.

Stratospheric platforms are structures kept stationary at altitudes around 20-30 kilometers above the earth. By incorporating a communications payload onto such structures, it is possible to provide satellite-like communications services over a wide surface area of the earth up to 1000 kilometers in diameter. Dozens of such stratospheric platforms could provide a global communications service, much like fleets of low earth orbit satellites. The key difference is that each stratospheric platform would remain stationary over a major population area, whereas each low earth orbit satellite orbits about the earth. It is the combination of dozens of such stratospheric platforms or low earth orbit satellites which create global telecommunications networks. Such networks can also be created via a just a few geostationary satellites because their much greater distance from the earth affords a much vaster coverage area on the surface of the earth. However, there are numerous practical benefits, such as smaller antennas, which arise from shrinking the distance between the satellite and the user on the earth. In this regard, from a telecommunications proximity standpoint, stratospheric platforms are more beneficial than low earth satellites, and low earth satellites are more beneficial than geostationary satellites.

On July 21, 1997, the U.S. FCC declared that "a stratospheric radio relay repeater system from platforms is a terrestrial service..."[5] By virtue of making this decision, the FCC decided, at least for the purposes of international telecommunications law, that stratospheric platforms are not in outer space because a terrestrial service is a service that does not depend on radio equipment in outer space,[6] For example, radio communications equipment onboard aircraft that communicate with ground stations are considered part of a terrestrial service. The FCC explained their decision in the context of regulatory documents filed by the Telecommunications Industry Association (TIA) and Motorola with regard to whether the stratospheric platforms of a company called Sky Station seeking regulatory approval were in outer space or airspace:

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[3] Second Report and Order, Federal Communications Commission, Docket No. 94-124, July 21, 1997.

[4] Doc.4-9S/TEMP/30 (Rev.1), International Telecommunication Union, Jan. 1997.

[5] *Supra* note 3, at para 18, referencing earlier proposal in Allocation and Designation of Spectrum for Fixed Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.5-50.2 GHz Frequency Bands; Allocation of Spectrum To Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band, Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 and 40.0-40.5 GHz for Government Operations, IB Docket no. 97-95, Notice of Proposed Rulemaking, FCC No. 97-85, released March 24, 1997, at para 17.

[6] 47 C.F.R. Section 2.106.

> We disagree with TIA and Motorola that the platform qualifies as a space station and that the proposed service should be considered to be a satellite service. The platforms proposed for use by Sky Station clearly are not satellites and, unlike satellites, will not be in earth orbit. Although the platforms will be located 30 kilometers above the earth's surface, they still will be within the earth's atmosphere and will rely on atmospheric lift to keep them at that fixed altitude, which is far below the location of the lowest satellite orbit.[7]

A similar conclusion has been reached by the dozens of countries which participate in the ITU, and has been reflected in Proposed Draft New Recommendations relating to stratospheric platforms[8] that are likely to become part of a new international treaty at the World Radio Conference to be convened in Geneva during November 1997.

The FCC's Report and Order also definitively settled the issue that stratospheric platforms are permissible activities of private companies under government supervision and authorization. Prior to the FCC decision, there was some uncertainty as to whether such a wholly innovative activity was legal. Now, there is no doubt that it is legal, at least in the United States and in such other countries which choose to authorize stratospheric platforms.

Although the author's earlier article opined in favor of space station status for stratospheric platforms, the inexorable reach of national sovereignty has brought these high flying network nodes within its grasp. This means that it is unlikely that stratospheric platforms will be deemed to come within the purview of the Outer Space Treaty of 1967.[9] Given the numerous functional and structural similarities between stratospheric platforms and orbiting satellites, the outcome of this definitional question should give rise to concern as to whether the altitude of an object is the wisest basis for its legal regime.

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CASE DEVELOPMENTS

In *NERAC, INC. v. Meehan*, 690 A. 2d 440 (Conn. Super. 328, 1995), plaintiff claimed that it has been an instrumentality of the National Aeronautics and Space Administration ("NASA") and, consequently, the State of Connecticut is prohibited from taxing certain purchases that it has made. The Court held this contention to be correct, concluding that in

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7 *Supra* note 3, at para. 36.

8 *Supra* note 4.

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

making these purchases, the plaintiff was an "instrumentality so closely connected to the Government that the two cannot realistically be viewed as separate entities...." and, in view of this, the sales and use taxes in question cannot constitutionally be imposed.

In new *New Valley Corporation v. U.S.*, 34 Fed. Cl. 703 (1996) plaintiff sought damages, for breach of contract or just compensation for a taking, arising from the government's failure to launch New Valley's ("NVC") satellite due to revisions to the nation's space policy following the shuttle "Challenger" disaster. Defendant argued, and the court agreed, that plaintiff's claim for termination damages must be dismissed because plaintiff did not exhaust the contractual administrative disputes process, as set out in the Launch Services Agreement ("LSA"). Also, termination by the government, based on the President's 1986 launch policy, is a "Reason Beyond NASA's Control," limiting plaintiff's damages to the refund of progress payments and earnest money, less NASA's incurred costs. NVC already has received a refund of its progress payments and earnest money. The court also concluded that plaintiff's claim for breach of contract based on NASA's delay in performing, or non-performance of the LSA, was contractually waived and plaintiff's claim for indirect or consequential damages was contractually barred.

NVC appealed the order of the U.S. Court of Federal Claims, 34 Fed. Cl. 703 (1996), dismissing its complaint and the Court of Appeals held (119 F.3d 1576) that the grant of a motion to dismiss for failure to state a claim upon which relief may be granted is appropriate where the plaintiff cannot assert a set of facts that supports its claim. Whether the lower court properly granted the government's motion was a question of law, over which the higher court exercised plenary review.

The Appeals Court held that the three primary errors that New Valley argues that the lower court made, namely: (1) holding that New Valley failed to exhaust its administrative remedies; (2) concluding that NASA was permitted to terminate the LSA; and (3) holding that New Valley waived all judicial claims; were all issues of contract interpretation, which begins with the plain language. The LSA must be interpreted as a whole and in a manner that gives meaning to all of its provisions and makes sense. An interpretation that gives a reasonable meaning to all of its parts is preferred to one which leaves a portion of the LSA inoperative, void, meaningless, or superfluous. Applying these well-settled canons of contract construction, the higher court held that the lower court erred in interpreting the LSA and in dismissing New Valley's complaint. Accordingly, the order of the Court of Claims dismissing New Valley's complaint was reversed by the higher court and the case was remanded for further proceedings consistent with this opinion.

In his dissenting opinion, Circuit Judge Lourie interpreted the LSA, as immunizing the government from liability for nonperformance of launch services. and while, in his view, the majority attempts to slide away from the clear import of relevant LSA provision, he would affirm the lower court's decision.

In *American Satellite Co. v. United States*, 26 Cl.Ct. 146 (1992) the Claims Court granted defendant's motion for summary judgment as to the

three counts then remaining in this proceeding. That decision was reversed in part, vacated in part, and remanded by a decision of the United States Court of Appeals for the Federal Circuit. *American Satellite Co. v. United States,* 998 F.2d 950 (Fed.Cir.1993). The Federal Circuit reversed the Claims Court's holding that the American Satellite Company ("ASC") could not recover damages under its August 3, 1984, Launch Service Agreement ("LSA") with the National Aeronautics and Space Administration ("NASA") where NASA's failure to launch ASC's spacecraft was the result of a change in United States space policy announced by the President. In addition, the Federal Circuit vacated the court's holding that the Government did not breach a follow-on agreement, executed December 6, 1988, because ASC failed to obtain appropriate government clearances authorizing ASC's spacecraft as a priority payload. The appeals court held that, absent the successful assertion of another defense, the LSA required NASA to bear the cost of changes in launch priority. On remand, both parties (ASC under its business name Contel ASC.) have filed motions for summary judgment. After carefully considering the parties' written and oral arguments, the Court of Claims concluded that the Federal Circuit's mandate was clear and, absent the assertion of another defense, NASA must "bear the cost of changes in launch priority and scheduling resulting from the revised policy." Accordingly, plaintiff's motion for summary judgment as to liability was granted and the Government's motion was denied.*

The Hawaii County Green party in Honolulu sought a preliminary injunction against the launch of the Cassini plutonium powered spacecraft set to embark on a nearly seven-year voyage to Saturn. To generate electricity and heat, because solar panels a billion miles from the sun were impractical, the craft was to carry three nuclear batteries with a total of 72 pounds of plutonium dioxide, a non-weapons-grade material.

Being its 24th launching with nuclear material, NASA maintained that extensive testing of the devices, including several layers of protective shield, has proved the chances of a radioactive release were minimal, *i.e.* 1 in 1,4oo during the first 3 1/2 minutes after blastoff, 1 in 476 during the rocket's climb to orbit and 1 in a million during an August 1999 fly-by above the earth when the craft uses the earth's gravitational pull to pick up speed on its way deep into space. However, critics argued that 5 billion people could suffer ill effects if Cassini blows up on the launch pad or crashes into Earth during its planned fly-by in 1999. On Oct. 11, 1997 a federal judge refused to stop the launch ruling that NASA had complied with federal environmental assessment guidelines.**

Based on patents issued since July 1997, TRW filed a U.S. patent infringement suit against ICO Global Communications Ltd. in a California court to enforce its claim for reserving a global mobile satellite communications system using a constellation of satellites in medium-altitude Earth orbits and enforcing the exclusion of foreign competitor

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* *See American Satellite Co. v. United States,* 34 Fed.Cl.468 (1995).

** On the Cassini mission, see also *"Executive and Legislative Notes,"* and *"International Developments, " infra.*

from the forbidden altitude zone. Reportedly the case was dismissed on the ground that the satellites in question were still under construction and no infringement had taken place as yet.

Two Yemeni men claiming ownership of Mars filed a lawsuit against NASA for landing a U.S. spacecraft, without their prior notification and permission, on the red planet which they said they inherited from ancient ancestors. However, they had withdrawn the case after Yemen's prosecutor general dubbed them abnormal and threatened them with arrest. Commenting on the lawsuit, Pathfinder's mission manager reportedly remarked that Mars is "everybody's. Mars is for the whole world to explore and to understand." There have also been reports of successful offers for sale of lunar areas, which apparently some people took advantage of, leaving legal issues of a possible violation of law and questions of enforceability for future considerations.

SHORT ACCOUNTS

Legal Aspects of Cooperation between ESA and Central and Eastern European Countries

The European Space Agency (ESA) together with the European Centre for Space Law coorganised with the Czech Society of International Law associated with the University of Law, Charles University and Prague, an International Colloquium on the "Legal Aspects of Cooperation between the European Space Agency and Central and Eastern European Countries (CEEC)". This initiative, held in Prague on 11-12 September 1997, is the first concrete step of collaboration between a country of Eastern Europe and ESA since the conclusion of international agreements on space cooperation for peaceful purposes between the Agency and four of these States (Republic of Hungary in 1991, Romania in 1992, Republic of Poland in 1994 and Czech Republic in 1996) as it was recalled by Mr. Lafferranderie (ESA, Legal Adviser), Chairman of the first session.

The first session dealt with "the Role of ESA in organizing international cooperation on space activities and forms taken by this cooperation". Ms. Baudin (ESA, Legal Affairs) presented the international cooperation as foreseen in article XIV of the ESA Convention. This legal explanation was followed by the ESA analysis of cooperation agreements by Mr. Tremayne-Smith (BNSC, UK, Chairman of ESA International Relations Committee). The following points were explained in more detail: the aims of collaboration agreements, the areas of interest for collaboration, and the different routes of collaboration. Dr. Kopal (Vice Chairman of the Czech Society of International Law) analyzed then the different agreements concluded between ESA and Hungary. Romania, Poland, and the Czech Republic. He stressed that the European Centre for Space Law might serve as a forum for further consideration of legal questions related to the elaboration of adequate tools for such cooperation. Mr. Paillon (Head of Unit XII, D-IV Space, European Commission, Brussels, Belgium) reported on the 5th framework

programme of the European Community for research, technological development and demonstration activities.

The second session of the day chaired by Mr. Böckstiegel, dealt with "the recent and expected developments in Space law, contribution of, and possible impact on, ESA and other international organisations or institutions." Ms. Cheli (ESA, International Relations Department) reviewed the evolution of the relations between ESA and CEEC. The presentation included *inter alia* the more political aspects of coordination activities. Mr. Roisse (Legal Adviser, Eutelsat) spoke about the recent development of Eutelsat and the role played by the organization in providing the use of satellites for telecommunications and audiovisual services in Europe. Dr. Hartig (Ambassador of Austria, Director General of Central European initiative Documentation Centre, Trieste, Italy) explained the Central European Initiative. It was followed by a presentation by Ms. Crowther (European Centre for Space Law, ESA, Paris) of the European Centre for Space Law and its active role in the promotion and development of space law teaching. Some ideas of cooperation with CEEC were also provided. The day was concluded by a fascinating presentation of concrete cooperation in space by two astronauts, Dr. Merbold (ESA/EAC) and Dr. Prunariu (Romanian Space Agency).

The second day of the colloquium dealt with future issues. The opening session reflected the "new perspectives on space cooperation between ESA and the Central and Eastern European Countries" and was chaired by Dr. Kopal. The first speaker, Mr. Olthof, head of the PRODEX Programme, ESTEC, The Netherlands, explained ESA's Space science and PRODEX programmes. These programmes could provide a good opportunity for further cooperation at scientific levels with CEEC. Dr. Pico (Executive Director of the Romanian Space Agency, Romania) pointed out the importance for CEEC to expand and their need of cooperation at a regional level to establish a network of space science in technology, research and education in these countries. Mr. Szegö (Scientific Director of the KFKI Research Institute for Physics, Hungary) reviewed the Hungarian experience of cooperation with ESA in the field of space science and its further development within PRODEX. Thereafter, the subject of space applications was discussed. Mr. Ferrazzani (ESA, Legal Affairs) reported on the Global Navigation Satellite System, Prof. Linsenbarth (Director of Institute of Geodesy and Cartography, Poland) on Earth Observation and Dr. Maslag (Ministry of PTT, Poland) on telecommunication policy.

The afternoon session was dedicated to a round table discussion, chaired by Dr. Jankowitsh (Ambassador, Permanent Mission of Austria to OECD. France), on the topic of "the prospects for international cooperation between ESA and Central and Eastern European Countries". Dr. Jankowitsch evoked the existing structures allowing experts of the CEEC to play a role in a European forum, but he also mentioned that ESA should play a more active role in this process of integration and cooperation. Mr. Dordain (Associate Director for Strategy, Planning and International Policy, ESA, Paris) explained the recent evolution of ESA. In his view, a new strategy needs to be developed for the future. It is clear that cooperation with CEEC is important but Mr. Dordain emphasized

the fact that the initiative for developing industrial links has to come from these countries. ESA is then willing to help. Mr. Ortner (Head of the Austrian Space Agency) is ready and willing to share the Austrian experience of the cooperation with ESA existing for 13 years. He recalled the interest of the PRODEX programme for scientific cooperation. Mr. Sehnal (Astronomical Institute, Academy of Sciences of the Czech Republic) expressed the view that ESA should be more open to non-European countries. Mr. Gál (Honorary Director, IISL) clearly stated the CEEC do have a lot of differences in terms of financial, industrial and technological capabilities. That fact has to be taken into account. Dr. Klos expressed his satisfaction about the actual cooperation between Poland and ESA at a scientific level with their participation in the PRODEX programme. For the time being, it would seem rather difficult to engage further, for example by enjoying an "associate member status". Mr. Rebillard (chargé de mission, CNES, Paris, France) expressed the view that ESA structure is too costly for CEEC to participate as full members. The best cooperation solution would be to adopt a more pragmatic view. Dr. Schrogl (DARA, International and National Cooperation, Germany) recalled that as far as the UNCOPUOS is concerned, a long tradition of cooperation and coordination between ESA and CEEC already exists. He expressed the idea that CEEC should adopt a concerted strategy. This last point raised reactions. Mr. Gál stated that the differences of levels of economies and of space connected industries do not allow for such a uniformed structure. Further ideas of exchange of information, of the ESA rule on geographic return, and of integration in the European Union, were also discussed.*

Daphné Crowther
ECSL Secretary

First United States - Argentina Joint Conference on Space Science and Technology for Society

The First United States - Argentina Joint Conference on Space Science and Technology for Society, held in Buenos Aires in Sept. 22-24, 1997 was organized and supported by the National Commission on Space Activities (CONAE), the Ministry of Foreign Affairs, the International Trade and Worship of the Republic of Argentina, the U.S. Department of State, the National Aeronautics and Space Administration (NASA), National Oceanic and Atmospheric Administration (NOAA), the American Institute of Aeronautics and Astronautics (AIAA) and also supported by the Consejo Profesional de Ciencias Económicas de la Capital Federal.

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* The proceedings of the colloquium, including all the speeches and the whole discussion will be available beginning of 1998 through ECSL Secretariat, 8-10, rue Mario Nikis, 75738 Paris, Cedex 15, fax: +33 1 53 69 75 60, e-mail: ecsl@hq.esa.fr).

The objectives of the conference were to: 1) Promote a closer relationship between Argentina and United States space scientists, engineers and commercial firms; 2) Assess the role of space technology in society; 3) Discuss a) progress in space science, b) the CONAE/NASA SAC satellite program, c) US/Argentina scientific cooperation, d) earth observation from space, search and rescue using satellites, e) global positioning system and its applications for Argentina; 4) Facilitate encounters between representatives of the academic community, government and industry.

The opening plenary session included a welcome by Conrado E. Varotto of CONAE and Michael Mott of NASA, and addresses by Andres Cisneros, Deputy Minister of Foreign Affairs of Argentina, F.C. Aldridge, Jr. President of AIAA and Mario Mariscotti, President of the National Academy of Sciences of Argentina.

The Conference General coordinators were: Michael Mott, Associate Deputy Administrator, NASA and Conrado F. Varotto, Executive and Technical Director, CONAE who also acted as scientific coordinator.

The session on "Search and Rescue Using Satellites: Cospas - Sarsat" coordinated by Alberto Giraldez, CONAE - James Bailey, NOAA, presented an overview of the international cooperative and humanitarian search and rescue satellite system known as Cospas-Sarsat. Speakers addressed new satellite search and rescue technologies such as geostationary satellites, including GPS navigational receivers and existing 406 Mhz emergency beacons.

Under the "Earth Observation from Space: Applications" subject, coordinated by Juan Yeloz, CONAE- Eugenia Kalnay, NOAA, U.S. and Argentine scientists presented their experiences in the use of earth observation data and information for oceanic, terrestrial and atmospheric applications.

In the "SAC Program", coordinated by Daniel Caruso, CONAE and Guenter Riegler, NASA, NASA and CONAE reviewed SAC-B and SAC-A missions and discussed plans for this active cooperative program.

In the session on "The SAC Program SAC-C Satellite", coordinated by Daniel Caruso, CONAE and John Labrecque, JPL, NASA and CONAE discussed cooperation in the SAC-C program, mission concept and common spacecraft engineering issues.

In the "Search and Rescue, Using satellites/Cospas-Sarsat" session, coordinated by Alberto Guiraldes, CONAE and James Bailey, NASA, a description of Cospas-Sarsat alert data distribution in the Americas and the proposed South America Region were addressed. Presentations included the status and future plans for the welcomed participation of Argentina in the Cospas-Sarsat System.

In the session on "Earth Observations from Space Mission," coordinated by Juan Yeloz of CONAE and Ghassem Asrar of NASA, new and future Earth observation missions as well as ideas for future collaboration were considered.

In the "Applications and Use of Global Positioning System (GPS)" session, coordinated by Ricardo Sanchez Pena, CONAE and Clark Wilson, NASA, the present and future status of the GPS system were discussed.

Speakers from industry, academia and government addressed applications of GPS technology to civilian, government and scientific uses.

In the session dealing with "Applications and Use of the Global Positioning System (GPS)" the discussion was followed by an open forum to allow audience participation.

In the "US/Argentina Scientific Cooperation" session, coordinated by Marcos Machado, CONAE and Ghassem Asrar, NASA, new areas of scientific cooperation between the two countries, particularly in the areas of space medicine with the study of the Chagas were reviewed.

There was also a presentation entitled "Working in Space" by NASA astronaut, Fernando Caldeiro.

The Space and Education session, coordinated by Maria del Carmen Galloni of the Programa Globe in Argentina and Frank C. Owens of NASA, focused on the broad reach of NASA education programs, the Globe Program in Argentina (an international program for students 15-18) and an Argentina/U.S. dialogue on higher education.

The conclusions were presented by Dr. Conrado F. Varotto, Executive and Technical Director of CONAE and Michael Mott, Associate Deputy Administrator of NASA. Mr. Mott was represented in this event by Dr. Frank Owens, who is in charge of the educational branch of NASA.

Dr.Varotto expressed the view that the balance of the conference was positive and the proposed objectives were achieved inasmuch as a great number of ideas and experiences were interchanged. The participation by a large number of academic and scientific institutions, including 95 national and 15 U.S. organizations testified to the success of the Conference. The attendees held 29 different academic degrees and with respect to the U.S.-CONAE cooperation, it appeared clear that the envisaged results coincided with the ones stated in the PEsN (National Space Plan of Argentina) since the joint projects proposed were developing according to scales.

On his part, Dr. Frank Owens stated that the Conference was an extraordinary event. Never before had a bilateral Conference about Space been held in Latin America. This success was due to the increasing level of cooperation between the U.S. and Argentina regarding the peaceful use of space. The PEsN represented an exceptional inversion on the future of the country which will imply important economic rewards, the development of new technologies and will also contribute to a better education. From the U.S. perspective, this cooperation constitutes a real society. For instance, the Projects SAC-A, SAC-B, SAC-C are not only Argentine programs in which NASA is involved but are considered as joint programs in which NASA is looking forward for success as CONAE does.

Dr. Fernando Raul Colomb,
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NASA's Reusable Launch Vehicle Program

A recent report prepared by the General Accounting Office in consultation with NASA's Office of the Inspector General includes a discussion of launch vehicles in its list of critical issues.*

NASA believes that a single-stage-to-orbit, reusable space transportation system would substantially reduce the cost of access to space. It is NASA's desire to improve ground operations in order to reduce turnaround time and personnel requirements. For these reasons NASA has established a reusable launch vehicle program with the objective of demonstrating technologies and operations concepts for reducing space transportation costs to a tenth of their current level. The program consists of four primary elements: 1) ground technology, 2) DC-XA experimental single-stage-to-orbit vehicle, 3) the X-34 small launch vehicle demonstration, and 4) the X-33 advanced technology demonstrator program.

NASA is helping develop the X-33 under an industry-led cooperative agreement which represents a new way of doing business on a major NASA program. As a result, participants do not play their traditional roles where the government oversees and directs the work of a contractor. Instead, government participants act as partners with, and subcontractors to, industry. This approach reduces the government's overhead costs, allows a leaner management structure, and, according to NASA, increases management efficiency.

According to NASA estimates, the X-33 program will cost about $1.4 billion through the end of flight demonstration activity in fiscal year 2000. NASA expects to contribute about $1.1 billion while industry will contribute about $271 million. Although industry partners are not paid a profit under the cooperative agreement, the majority of industry's costs are considered independent research and development and, thus, are reimbursed by the government. For example, industry's total contribution for the flight demonstration phase of the X-33 program is about $212 million. Of this, the government will reimburse approximately $122 million.

As described in the Report, the X-33 will be an experimental single-stage-to-orbit rocket proof-of-concept demonstrator to 1) mature the technologies required for the next-generation launch system; 2) demonstrate the capability to achieve low development and operations costs, and rapid launch turnaround times; and 3) reduce business and technical risks to encourage significant private investment in the commercial development and operation of the next-generation launch system. The X-33 flight demonstration phase began in July 1996, with first flight scheduled for March 1999 -- a 32-month program. During this short time frame, the X-33 program must develop new technology that can enable reusable fuel tanks, lighter weight composite materials for the airframe, advanced thermal protection systems, and a new propulsion system. Ground and flight techniques that will substantially reduce operations costs must also be developed and proven.

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* Doc. IG-97-019, March 27, 1997.

So far, NASA has been successful in demonstrating some of the required technology at the component and subscale levels, but much more development remains. The Inspector General's report adds that the extent to which the X-33 effort may eventually lead to a new launch system is uncertain, as is the ultimate ability of any such system to replace the current space shuttle.

Executive and Legislative Notes

In accordance with Principle 4 of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space which provides that a State launching a nuclear power source into outer space shall inform the Secretary-General of the United Nations on how States may obtain the results of the safety assessment prior to that launch,* the United States in a Note verbale dated 2 June 1997 addressed to the Secretary-General, advised that the *Cassini spacecraft* is scheduled for launch, on its interplanetary mission to Saturn, in October 1997. The spacecraft will carry three radioisotope thermoelectric generators (RTGs) to provide on-board electrical power and regulate the temperature for spacecraft operation and scientific instruments. The Note verbale also stated that pursuant to the National Environmental Policy Act (NEPA), the United States of America has conducted a thorough environmental assessment and an extensive safety analysis for the Cassini mission.**

On October 14, 1997, President Clinton vetoed part of the 1998 defense spending bill involving *inter alia* the military space plane, the Clementine 2 asteroid intercept mission, and the Kinetic Energy Antisatellite (KEAsat) weapon, carrying a tag of $77.5 million. Congress could oppose Clinton's action within 30 days with a separate bill or bills that would also be subject to a presidential veto.

The Space-Based Laser, an anti-missile technology effort which was approved by both the White House and the Pentagon, escaped the President's budget cut.

NASA policies define *lunar samples* as a limited national resource and future heritage and require that samples be released only for approved applications in research, education, and public display. To meet that responsibility, NASA carefully screens all sample requests with most of the review processes being focused at the Johnson Space Center.+

Under an old law, absentee ballot had to be sent by U.S. mail but to enable U.S. astronauts to vote while on Mir, a new law was passed in Texas under which astronauts registered to vote there can cast ballots from space. As a result, a ballot was sent to U.S. flight controllers in Moscow who transmitted it to David Wolf 240 miles above Earth.

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* UNGA Res. 47/68 of 14 Dec. 1992.

** On the Cassini mission, see also *"Case Developments," supra* and *"International Developments"* and *"Brief News," infra.*

\+ For a brief discussion on *"How to Request Lunar Samples,"* see LUNAR NEWS 12-14 (No. 61, 1997.

International Developments

The Administrative Committee on Coordination (ACC) endorsed a Declaration on Universal Access to Basic Communication and Information Services at its annual session in Geneva in April 1997. The Declaration which reaffirms the *right to communicate* is expected to be tabled in the United Nations General Assembly for endorsement.

Over 80 countries signed a memorandum of understanding concerning the allocation and management of *generic top level domains* (gTLD). In addition to the existing three gTLD generally accessible to all Internet users -- .com and .net -- there will be .firm (for businesses), .store (for shops), .web (for organizations concentrating on World Wide Web activities), .arts (for cultural and entertainment-based activities), .rec (for organizations involved in recreation activities), .nom (for individual Web sites) and .info (for information services).

The International Activities Committee of the *AIAA* held a 3rd Workshop on "International Cooperation in Space -- From Recommendations to Action" in *Frascati,* Italy, May 26-30, 1997. Cosponsored and hosted by ESA, the Workshop dealt with "Criteria for International Space Cooperation," "Using Space Assets for Disaster Management," "International Cooperation in Space Transportation," and "International Space Station Utilization Strategy."

On June 12, 1997 South Africa and the ITU signed a host country agreement for *Africa Telecom 98.*

In the wake of a first meeting of signatories and potential signatories to the Memorandum of Understanding on Global Mobile Personal Communications by Satellite *(GMPCS-MoU)* held in October 1996 (24 J. SPACE L. 53-4, 1997), a second meeting (Geneva, July 17-18, 1997) ended with the endorsement of the Arrangements that will pave the way for early introduction of the new satellite networks of tomorrow.*

ITU's *Telecom Interactive,* a new global Forum, held in Geneva on Sept. 8-14, 1997 focused on the Internet, Multimedia and Interactivity.

In judging whether prices have been fairly set, an Amendment signed on October 27, 1997, to the 1995 U.S.-China Space Launch Trade Accord permits, in connection with the launch of low-Earth-orbit satellites, consideration of related costs, including launch insurance, security and logistics, beyond the launch contract fees.

The Sixth Practitioners' Forum organized by the European Centre for Space Law met in ESA Headquarters in Paris on November 14, 1997 to provide, in the morning session, an update of new regulatory developments related to space activities and to focus, during the afternoon session, on the "Privatization and Commercialization of Space Activities." Invited participants in the round table discussion chaired by Prof. Böckstiegel (Institute of Air and Space Law, Köln University) included Mr. Roisse (EUTELSAT), Mr. Dahbie (Marsh and McLennan) Mr. Veshchunov (Intersputnik), Mr. Cardin (Matra Marconi Space), Mr. Jany (Alcatel), and Mr. De Mourzitch (Starcem).

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* For a comprehensive discussion, see David Sagar's analysis in the **"Comments"** section, *supra.*

As part of the *Cassini-Huygens* mission to Saturn, a joint project of NASA, ESA and the Italian Space Agency, ESA's Huygens probe is to be released in November 2004 from its NASA mothercraft to descend on Titan, Saturn's largest moon, to study the atmospheric chemistry and topography of a world scientists surmise is similar to primitive Earth and thus could teach us about the evolution of life on our planet.

Manfred Lachs Space Law Moot Court Competition

The final of the 6th *Manfred Lachs* Space Law Moot Court Competition was held in Turin Oct. 9, 1997 between the teams of the University of Paris XI (France) and the University of North Carolina (USA). It was adjudged by *Judges Koroma, Rezek and Vereshchetin* of the International Court of Justice and won by the University of Paris XI. At the initiative of the Law Offices of Sterns and Tennen, an Award for the Best Oralist consisting of a certificate and a prize was awarded and at the initiative of *Professor Stephen Gorove,* Chairman of the Editorial Board of the Journal of Space Law, 1997 issues of the JOURNAL OF SPACE LAW with special inscription were presented on behalf of the JOURNAL for the Best Memorial, written by *Ranjani Srinivasan, Amine Laachani,andJean-François Renaud* of the University of Paris XI. **

Next year's final will be held in Melbourne, Australia, during the IISL Colloquium, Sept. 28-Oct. 2, 1998.

Other Events

The goal of the 4th *Space Governance Conference* held August 1-3, 1997 in Denver, Colorado was to develop an international United Vision for the privatization and commercialization of space.

An estimated 99 *asteroids or comets* are known to pose possible danger to Earth. While not an immediate threat, seven previously unknown asteroids are big enough and close enough to cause at least a potential threat.+

Commercial space ventures that have come to fruition include satellites that relay telephone and television signals, photograph the weather on Earth, discover mineral deposits, and advise farmers what to plant and where. Through *global positioning,* satellites can let the driver of a car pinpoint his or her location. The installation of GPS terminals in its taxis by Taxis G7, one of Europe's largest taxi companies, has helped to cut taxi response times and taxi fares for customers. Using the system, the National Institute for Agricultural Research is running an experiment in a

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** The case involving Commercial Very High Resolution Remote Sensing Systems and the text of the winning memorial may be found in CURRENT DOCUMENTS, *infra.*

+ On asteroids and comets, see also *Part two: Progress of Space Research 1996, II. Space Studies of the Earth-Moon System, Planets and Small Bodies of the Solar System,* published by the U.N. Office for Outer Space Affairs, 1996.

mountainous region of south-central France helping farmers to track their cattle and horses by tying satellite beacons around their necks in place of traditional triangular bells.

The first U.S. satellite was successfully rocketed into orbit in February 1958. But it still costs *$10,000 to put one pound* of anything *into space.* NASA Administrator, Daniel Goldin, wants it cut to $1,000 a pound in 10 years and to hundreds of dollars a pound in 20. Establishment of a *space venture fund* would help industry to finance experiments. The hope is that eventually any products produced in space would provide incentives to the private sector to build its own free-flying platforms, labs and production facilities.

Brief News in Retrospect

Photos recently taken by the Hubble Space Telescope reveal two galaxies which collided to form the Antennae galaxy 63 million light years away from Earth. By studying such collisions astronomers hope to learn about what was happening in the early universe and what might be in store for our Milky Way galaxy should it collide with the approaching Andromeda galaxy which could happen in 5 billion years.

When *Mars Pathfinder* landed on Mars on Independence Day 1997, concluding a 310-million mile journey and when its companion, the 22-pound six-wheeled, solar-powered *Sojourner* rover, the first mobile vehicle to explore a planet, rolled its ramp onto the Red Planet, it has left its physical tracks as well as its imprint on the history of space exploration. This NASA probe was the first time since Viking I and Viking II landed on July 20 and Sept. 3, 1976, respectively, that images of the planet's surface have been sent to Earth. Despite some of the ups and downs of the mission caused mostly by computer glitches, Pathfinder transmitted 9669 images and 1.2 billion bits of digital data. Sojourner, packed with sophisticated scientific instruments, studied rocks of the Red Planet negotiating boulders several times its size on the way. Pictures transmitted showed boulders on a reddish desert. Every rock apparently came with its own cute little name, many inspired by Earth-based cartoon characters dubbed Yogi, Barnacle Bill, Casper, Flat Top and Scooby Doo. Sojourner's first target Barnacle Bill appeared unexpectedly Earth-like. Robots, like Sojourner, could pave the way for humans, perhaps as early as 2010.

While the Pathfinder mission came to an end on November 4 with its batteries ebbing and instruments freezing, NASA's second probe, the *Mars Global Surveyor* launched Nov. 7, 1996, is planned to enter Mars orbit later this year to study its wind, clouds and dust storms. It was designed to compile global maps of Mars from orbit, return high-resolution pictures and collect data on its atmosphere, mineral composition, interior and evolution. The spacecraft is designed to use aerobreaking - the friction of Mars's atmosphere - to trim the elliptical orbit to a near-circle, 234 miles above the planet. Scientists hope Surveyor will identify the likeliest sites such as areas where there once was water, such as lake shores and mineral remains of ancient hot springs where life might have taken hold on the planet. The issue whether life exists on Mars remains an enigma not likely

to be settled until sample rocks from Mars are collected and brought to Earth for analysis.

Environmentalists strongly protested the launch of the unmanned *Cassini* spacecraft which is destined for Saturn and powered by batteries carrying 72 pounds of plutonium, a deadly radioactive element never fired into space in such quantity. NASA asserts that the batteries are safe and unwarranted protests should not prevent deep-space exploration.* Cassini was launched on October 15, 1997 without a hitch.+

Notwithstanding the mishap during a practice docking that befell *Russia's* 120-ton *Mir* space station after the cataclysmic crash when an unmanned Russian cargo ship smashed into it on June 25, 1997 and punctured the hull of Mir's Spektr module which served as the U.S. science lab and a NASA astronaut's living quarter, the eleven-year-old station is still operational. The Russians launched the Progress cargo craft loaded with equipment and fuel from Baikonur on July 5, 1997. But the old orbiting outpost which has reeled through crisis after crisis since early this year was plagued by a multitude of mishaps ranging from fire, breakdowns of the oxygen tracking system and the main computer, to accidental disconnection of essential cable, broken valves, broken gyroscopes and impaired solar panels. Threatened to save the stricken Mir, the centerpiece of their space program, two Russian cosmonauts blasted off in early August to repair it and revive its function as an orbiting laboratory. Wolf, the sixth U.S. astronaut to live on Mir, changed places with Foale one day after arriving via the shuttle Atlantis which delivered a much needed new computer and vital supplies on Sept. 28, 1997. Also, a Russian and an American astronaut teamed up for a spacewalk outside Atlantis in a historic first. The work on Mir continues with U.S. assistance and participation providing a valuable training ground for both scientists and astronauts in anticipation of similar events that could occur on the planned international space station.

On August 25, 1997, NASA launched a $110 million solar observatory called *Advanced Composition Explorer (ACE)* to orbit as long as five years at a point in space where the gravity of Earth and the gravity of the sun balance each other.

The *Near Earth Asteroid Rendezvous (NEAR)* spacecraft designed for rendezvous with the asteroid Eros in January 1999, captured spectacular views of a miles-deep crater on the surface of another asteroid, a space rock named Mathilde, in an improvised encounter in June 1997.

As a historic first commercial launch from Spaceport Florida and as the first spacecraft that NASA has sent to the Moon since the Apollo program, the *Lunar Prospector* was launched in October 1997.

The 100th *Ariane* launcher lifted off into space in September 1997.

Japan's Advanced Earth Observation Satellite *(ADEOS)* which became operational November 26, 1996 and carried 229 million worth of NASA science instruments ceased functioning on June 30, 1997. According

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* The official U.S. announcement is given under *"Executive Actions," supra..*

\+ On the Cassini mission, see also *"Case Developments", "Executive Actions,"*and *"International Developments," supra.*

to a NASDA report solar array expansion may be blamed for the loss. NASDA's ADEOS II is being developed to serve as a post-ADEOS polar orbiting Earth observation satellite scheduled for lift-off in JFY 1999.

The heads of countries involved in the International Space Station meeting at the *Tsukuba Space Center* in Japan agreed to cooperate for the long-term stability of the program and the construction of the Space Station without delay.

The *Japanese Experiment Module (JEM)* planned to be attached to the International Space Station which was tested during the shuttle *"Discovery"*-s flight in August, 1997 is scheduled for lift-off in 2001. On the same Discovery flight, a German-built ozone mapping satellite, released by the shuttle, barely avoided collision with a 500-pound piece of space junk rocket motor which was used in the unsuccessful launch of a communication satellite carried up on a shuttle in 1984 and has been in orbit for 13 years. Discovery and its crew were 51 miles ahead of the satellite at the time and were in no danger.

The launch of the Agila 2 satellite on Aug. 20 by *China's Long March 3B* heavy lift rocket marked its third consecutive successful launch of a geostationary satellite this year. Another launch Oct. 17 of the Apstar 2R satellite built by Space Systems/Loral for Hong Kong-based APT Satellite Co. followed on heels of the earlier success.

The *European Robot Arm* is under development by *ESA* to help assemble and service the International Space Station from 1999 on.

India's home-grown research satellite ran into a snag, reaching an elliptical rather than the intended circular orbit, after an otherwise textbook-perfect blast-off of the 468-ton Polar Satellite Launch Vehicle on September 30, 1997.

Hungary has become the 81st member of INMARSAT which already has started a pilot project with Hungaro-camion, a Budapest-based trucking company, to fit trucks traveling throughout Europe, Russia and the Middle East with INMARSAT-C satellite messaging terminals.

B. FORTHCOMING EVENTS

A fourth workshop cosponsored by the Confederation of European Aerospace Societies (CEAS) and the Canadian Aeronautics and Space Institute is planned for January 1998.

The *Second World Telecommunication Policy Forum* will be held in Geneva on March 16-18, 1998 under the theme, "Trade in Telecommunications."

The IISL in cooperation with the *UN Office for Outer Space Affairs* plans to organize a symposium dealing with a Review of the Status of Outer Space Treaties in connection with the COPUOS Legal Subcommittee meeting on March 23, 1998.

The 2nd *ITU World Telecommunications Development Conference* will be held in Valletta, Malta, March 23-April 1, 1998.

Africa Telecom 98 will take place in Johannesburg, South Africa, May 4-10, 1998. Telecom events will increase their frequency from the Year 2000.

The *ILA's Space Law Committee* will hold its session during the 68th Biennial Conference, May 24-30, 1998, in Taipei.

The Second IAA Symposium on *Realistic Near-Term Advanced Scientific Space Missions* is scheduled for June 29 -July 1, 1988 in Aosta, Italy.

The *1998 IISL Colloquium* is to take place Sept. 28-Oct. 2, 1998 in Melbourne, Australia. The following sessions and chairmen are proposed:

Session 1 - Institutional Approaches to Managing Space Resources. Chairmen: T. Masson-Zwaan (The Netherlands) & Representative of Monash University, tbd.

Session 2 - Legal and Policy Aspects of Confidence Building Measures Using Space Technology. Chairmen: T. Kosuge (Japan) & S. Doyle (USA).

Session 3 - Legal and Policy Aspects of Navigation Satellites and Global Positioning Systems. Chairmen: Ms. M. Smith (USA) & He Qizhi (China).

Session 4 - Other Legal Matters, Including the 30th Anniversary of the Rescue Agreement of 1968. Chairmen: M. Komar Kantaatmadja (Indonesia) & F. Lyall (U.K.).

As already mentioned in the 1997 COPUOS Session report, *supra*, *UNISPACE III* will be held in Vienna on July 19-30, 1999.

BOOK REVIEWS/NOTICES

Reviews

PERSPECTIVES ON INTERNATIONAL SPACE LAW, edited by Nandasiri Jasentuliyana (Kluwer Law International 1995), pp. 536.

This book is dedicated to the late Judge Manfred Lachs to honor his lifelong and lasting contribution to international law.

In his editorial introduction, Nandasiri Jasentuliyana, who is Deputy to the Director General of the United Nations Office in Vienna and Director of the U.N Office for Outer Space Affairs, reminds the reader that the publication of the book coincides with the 50th anniversary of the establishment of the United Nations and notes that the major perspectives on international law presented in the book by eminent scholars are arranged under Judge Lachs's four main areas of interest: The Theory and Practice of International Law, the United Nations, the World Court, and Space Law. To these broad categories, a fifth section is added: Judge Manfred Lachs: The Man and his Work.

Preceding the substantive presentations, there are special tributes written by Boutros Boutros-Ghali, the former Secretary General of the United Nations, and Eugeniusz Wyzner, deputy Minister of Foreign Affairs of Poland.

Focusing on "Space Law" that has rightly been described as Judge Lachs's favorite subject and is also this Journal's basic preoccupation, the five contributions provide a thoroughgoing survey of space law developments in the U.N. (N. Jasentuliyana), together with a keen analysis and elaboration of its principles and rules (M. Bedjaoui). Also included are reviews of the legal aspects of military (I. Vlasic) and civilian (A. A. Cocca) applications of space technology, and a thoughtful appraisal of the next steps to be taken by international space law (V. Vereshchetin).

Dr. Jasentuliyana's presentation focuses on the establishment of COPUOS, the process of U.N. space law-making and its main components, including consensus decision making, and the results achieved. This is followed by a survey of the outer space treaties and an overview of the U.N principles on outer space with a discussion of pending legal issues and the anticipated future development of space law by the United Nations.

The elaborations by Professors Vlasic and Cocca deal with two aspects of the applications of space technology, the civilian and the military. The first treatment traces the origins of outer space militarization and the development of a legal regime to govern military uses of outer space and highlights the international law applicable to military space activities. The reader can also find reference to current military space programs as well as issues involved in negotiating prevention of an arms race in outer space and a general appraisal by the author.

On the civilian side, Professor Cocca directs his attention to the what may be regarded as the most significant civilian use of space technology -- telecommunications -- and provides an overview of the respective institutional framework (Intelsat, Inmarsat, Eutelsat, Arabsat, Intersputnik). He touches on issues associated with direct broadcast satellites and also elaborates on the satellite search and rescue system (Cospas-Sarsat), the uses of meteorological and remote sensing satellites, and nuclear power sources in outer space.

In explaining the reference to "classicism" and "revolution" in his contribution, Judge Bedjaoui states that "the fundamental principle of State sovereignty" may be characterized as a "classical," whereas the "common heritage of mankind" as a "revolutionary" principle. He identifies four main factors which, in his view, influence and determine the elaboration of the rules of space. They include technological changes, recourse to principles of general international law and the U.N. Charter, specific features of the environment, including physical conditions in space, and lastly, political, economic and military factors.

As to the next steps to be taken by international space law, Judge Vereshchetin notes, first of all, the inadequacy of space law insofar as the legal regulation of manned space flight is concerned. He feels that appropriate fora in the United Nations and elsewhere should focus their attention on this topic that has also been the focal point of a research project undertaken by three leading academic institutions in Germany, the Soviet Union and the United States and which he, together with Professor Böckstiegel and this reviewer, co-directed.

There can be little doubt that the legal regulation of manned space flight could be a primary candidate for serious consideration by the international community as we approach the turn of the century. Equally important in Judge Vereshchetin's view, which this reviewer equally shares, would be a study and eventual clarification of aspects of the legal regime applicable to aerospace planes and consideration of limited arrangements and agreements based on available scientific data and technology insofar as the protection of the space environment, especially orbital debris, is concerned.

In light of the many years of enlightening contacts that this reviewer was fortunate to have on the occasion of his lectures at The Hague Academy of International Law, during brainstorming workshops in the Peace Palace and at meetings of the International Institute of Space Law, and in view of the ever present warm friendship Judge Lachs always exhibited, it is, perhaps, not inappropriate to record the genuine admiration and highest esteem that this writer has had for Judge Lachs who also honored the University of Mississippi with delivery of a distinguished lecture and this Law Journal with a thought-provoking study.

It is my belief that Judge Lachs would have been very pleased to read the scholarly contributions addressing his favorite topic. The high quality and genuine care of editorial workmanship of Dr. Jasentuliyana and the personnel associated with him in the United Nations and its Office for

Outer Space Affairs stands out as a most appropriate and fitting way to commemorate the passing away of a truly outstanding humane world leader, a bridge builder between East and West and warm friend of people all over the world.

Stephen Gorove
Chair, Ed. Bd., J. SPACE L.

OUTLOOK ON SPACE LAW OVER THE NEXT 30 YEARS, Editor-in-Chief, Dr. G. Lafferranderie; Co-Editor, Ms. D. Crowther (Kluwer 1997), 473 pp.

Dr. Lafferranderie, the editor-in-chief, and Ms. Crowther, the co-editor have put together an extremely high quality volume, containing pieces by more than 30 international law scholars and legal practitioners from ESA countries, some of whose writings are seldom available in English. Most of the contributions are well researched and documented and raise a number of interesting questions with the aim of examining the status of space law today, with the Outer Space Treaty as its foundation, and its future directions. The editors purposely omit coverage of the controversy over peaceful uses of outer space and instead have the contributors address one of twelve categories, in addition to Dr. Lafferanderie's contributions: (1) the role and governance of the actors engaged in space activities; (2) the status of outer space and its use; (3) the definition and legal treatment of space objects, (this includes an article on the space station legal arrangements and an article describing a possible legal framework for a lunar base); (4) treatment of man in space (the one contribution on this topic focuses on the actual space station arrangements for astronauts); (5) liability; (6) registration, jurisdiction and control; (7) settlement of disputes; (8) forms of international cooperation; (9) protection of the environment of earth and space; (10) remote sensing; (11) commercial activities; and (12) the role of UNCOPUOS and other international fora and agreements. Unfortunately, space does not allow a thorough description of each of the high-quality contributions. Thus, only a few are described below.

Prof. P. Malanczuk examines the role of states, international organizations, and private entities in general international law and in space law. He concludes that the general framework set up by the OST is likely to hold for another 30 years with two exceptions. First, he notes that international organizations were not permitted to accede to the OST, although they were allowed to accede to subsequent outer space treaties. Secondly, he notes that the gaps in the law with regard to responsibility and liability for private operators will need to be tackled. Further, he speculates that one day there could be a subject of international law not mentioned in the OST, the category of insurgents, which would raise interesting questions as to the application of Art. II of the OST.

Prof. G. Venturini offers a description of the regulatory history of satellite communications and its effects on intergovernmental cooperation and private (non-governmental) ventures. She points to a number of difficulties that will be encountered with the increasing numbers of

private satellite service providers, particularly when the large international consortia offering LEO services become operative. As the hundreds of satellites belonging to a private LEO system will have a relatively short life and will have to be frequently replaced, states will have to deal with whether all of the launches have to be registered, whether they can really maintain jurisdiction and control over all of the system's satellites, and the liability implications of launches for each of some hundred satellites from their territories.

Mr. S. Mosteshar describes the impact of commercialization on the past, present, and future regulatory regimes of the ITU and the WTO's General Agreement on Trade in Services, stressing the need for collaboration between the WTO and the ITU. He notes that with the challenges posed by the global nature of LEO and MEO activities, there is a case for a new regime applicable to systems spanning two or more States. One regime would rely on an intergovernmental agreement providing for mutual recognition of authorizations of a system by one State Party. The other would allow for direct authorization of systems by the ITU.

Ms. A-M Balsano and Mr. B Smith describe the role that intellectual property rights (IPR) play in terrestial matters and analyze whether current use of IPR promotes or hampers the use of outer space. They conclude that the use of IPR in space suffers from inadequacies, inequality, and ultimately "from potential conflicts with the founding principles both of national IPR law and of international law". They suggest that COPUOS, in conjunction with WIPO, draft an instrument to make IPO applicable internationally to space activities to avoid the danger that nation states will make national IP laws applicable (as the U.S. has done).

Mr. H. Tuinder and Ms. Masson-Zwaan provide a thorough overview of space law training and education, in terms of location and methodology and publications. They also describe the training efforts directed at the transfer of space know-how to less developed countries. They recommend that space law education be expanded in order to allow more involvement on the part of developing countries in the creation of space law and offer suggestions for how that could be accomplished.

Prof. K.-H. Böckstiegel analyzes the law and practice regarding space-related dispute settlement to date and possible options for the future, concluding that there is a need for new efforts and procedures to settle inter-state disputes and disputes arising between states and international organizations. But for disputes between private enterprises or between states and private enterprises, he concludes that current business law and practice's reliance on international commercial arbitration suffices.

Ms. Benkö and Mr. K.-U. Schrogl examine Article I of the Outer Space Treaty by describing the developments that have taken place through the years on the meaning of "space benefits" and international cooperation up to the adoption of the 1996 Declaration on space benefits. They conclude that the 1996 Declaration marks the end of a North-South debate,

instead providing an authoritative interpretation of the cooperation principle.

Prof. F. Von der Dunk examines whether UNCOPUOS should continue to provide the cradle for international space law and whether it can. He concludes affirmatively. Mr. M. Ferrazani argues that examples of soft law in space activities need to be examined more closely and raises the question of whether soft law will exist in parallel with or in lieu of legal developments at COPUOS

Of particular interest is Prof. A. Kerrest's discussion of the legal aspects of sea launches. He first examines the legality of using the sea for the launch of spacecraft. He concludes that it is doubtful whether the establishment of a launch base at sea conforms with international sea law, because the cumulative duration of launch periods could restrict navigation and other marine activities. He then analyzes the legal implications of the launch of spacecraft from sea, pointing out the dangers posed, but notes that he believes that there are some barriers to the frequent occurrence of worst-case-scenarios (such as launch state shopping).

In conclusion, the book contains quite a large number of high quality pieces, generally well-edited, and provides interesting reading on a number of space law topics. Other strong chapters are written by: Mr. H. Wassenbergh, Dr. M. Bourély, Dr. H. Curien, Mr. A. Farand, Mr. O. Ferrajolo, Mr. R. Gimblett, Dr. S. Hobe, Mr. R. Kröner, Ms. M. Spada, and Professors B. Cheng, S. Courteix, M. Gilbert, G. Ghidini, S. Marchisio, F. Pocar, L. Rapp, G. Sgrosso, and C. Zanghi.*

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Notices

INTERNATIONAL SPACE LAW MISCELLANEA - LIBER AMICORUM HONOURING PROFESSOR DR. ANDRZEJ GÓRBIEL IN HIS 65TH ANNIVERSARY, edited by Edward J. Palyga, (Andrzej Frycz Modrzewski Foundation, Warsaw 1995), pp. 214.

This paperback honoring Professor Andrzej Gorbiel, a distinguished Polish scholar and frequent writer in the field of space law, contains a rich collection of contributions from many well-known authorities.

Within the confines of a brief review it is not possible to dwell on the various subjects worthy of analysis and consideration. By way of a bird's eye view, reference may be made to the variety of discussed topics such as the history of European space cooperation with a focus on ESA, ITU highlights, the peaceful uses of outer space, international space organizations, commercial space activities, developing nations, principles

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* For a listing of all authors and the titles of their articles, see "Contributions to Books" under CURRENT DOCUMENTS, *infra.*

space objects, protection of the space environment, space debris, future developments, and the legal framework of the Mir space station.

While several of the subjects have been much more extensively dealt with in specialized treatises, there is a distinct merit in having them presented in a single publication, notwithstanding the occasional overlappings. The twenty-five space law and policy studies elaborated by experts from sixteen countries, which are supplemented with a biographical sketch and a bibliography of Professor Gorbiel's writings, are a genuine indication of the great esteem in which Professor Gorbiel is being held.

OUTER SPACE - PROBLEMS OF LAW AND POLICY, by Glenn H. Reynolds & Ropert P. Merges, (2d ed., Westview 1997), pp. 446.

This book, the second edition of a similarly entitled book published some eight years earlier, is a compilation of brief excerpts from scattered articles, international treaties, domestic laws and executive pronouncements since the dawn of the space age. The materials are arranged under broad categories which include fundamental principles, multilateral space treaties, telecommunications, launch services, private commercial activities, intellectual property, remote sensing, commercial space launches, the governance of space societies and SETI, and are introduced and interspersed with notes by the authors. While the book in its current form does not appear to be suitable for an introductory course on space law, it might well be tailored as a graduate course or seminar for students who have satisfied the prerequisite of a basic course. If so, the authors may wish to stress that the various choices and alternatives to be considered bear witness to the old axiom that law is the science of thinking. Such approach might reflect well on Yale, the modern cradle of policy sciences, the institution from which both of the authors have graduated.

FROM IMAGINATION TO REALITY: MARS EXPLORATION STUDIES OF THE JOURNAL OF THE BRITISH INTERPLANETARY SOCIETY, edited by Robert M. Zubrin (Am. Astronautical Soc'y Science and Tech. Ser., vols. 91 & 92, Univelt 1997), pp. 376 & pp. 364.

This collection of articles from selected issues of the British Interplanetary Society examines the ideas, the why-s and wherefore-s, of Mars exploration and development. The first volume (vol. 91), identified as Part I, focuses on precursor missions, including concepts for *in situ* utilization of Mars as well as early piloted missions, including human aspects, a day in the life of a Mars base. The second volume (PART II) deals with base building, including resources for human settlement, interplanetary transportation system to Mars, aspects of colonization, terraformation, and planetary habitability. While lacking specific legal analyses, the various scenarios presented provide a fertile ground for consideration of possible legal issues which are likely to surface in connection with resource utilization, human settlement and colonization.

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Manfred Lachs Space Law Moot Court Competition 1997

Case Concerning Commercial Very High Resolution Remote Sensing Systems
OPENSKEY vs. ANTIPAPADIA

General Issues Presented

Whether the downgrading of spatial resolution of a remote sensing satellite image in the case of a specific country is in conformity with international law;

Whether remote sensing satellite data may be intercepted by a state without approval of the operator state of the satellite;

Whether remote sensing data which proves to be incorrect can result in liability under international law of the state which is responsible for the satellite operation.

Statement of Facts

The Republic of Starstripe licensed the private company Goldstar to construct and sell the commercial remote sensing satellite Golden Eye to

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* For CURRENT DOCUMENTS I, II, III, see 25 J. SPACE L. 76-89 (1997).

the Kingdom of Openskey. Golden Eye is capable of delivering Very High Resolution (VHR) data with a ground resolution between 1 and 5 meters.

The instruments on board Golden Eye have an optical capacity and an active synthetic aperture radar (SAR) capability and there is limited on board processing and recording of data. Also the satellite is equipped with an optical telecommunication transponder for intersatellite links which makes high bit data relay possible with the command station.

Golden Eye was successfully launched by the State Secondandia from the territory of the Republic Starstripe and subsequently was sold to the private company Superview Inc., which has its headquarters in Openskey, but is incorporated elsewhere.

Superview Inc. is a typical large multinational company and has shareholders all over the world. Superview Inc. is licensed by Openskey to carry out commercial VHR activities in conformity with international law including space law. Superview, Inc. pays Openskey 10% of the revenue it receives from the sale of sensed data. Openskey has a national space law which contains the provisions in the Annex. Agreements have been concluded between Superview Inc. and the governments of Papadia and Antipapadia to receive data directly from Golden Eye. In these agreements, which also were approved by the Foreign Ministry of Openskey, technical assistance is provided by Superview Inc. to Papadia and Antipapadia, and ground stations are delivered by Openskey to the respective countries. Both agreements refer to the conditions of the license of Superview Inc. as an integral part of the agreement.

Papadia and Antipapadia, which were separated from each other after a lengthy civil war, are located in the same geographic region and are both comprised of a group of small islands. The sea area in which they are situated contains many minerals, and large oil fields are supposedly located in the disputed territorial sea between Papadia and Antipapadia. Two oil companies, Drillwell Inc. and Sinkbetter, Inc., have long-standing close contacts with the governments of Papadia and Antipapadia respectively, due to the existence of these strategic oil fields. Drillwell Inc. is incorporated under the law of Papadia, and Sinkbetter Inc. is incorporated under the law of Antipapadia.

The first large client of Papadia for VHR data is Drillwell, Inc. which, based on the data delivered through the ground station of Papadia,

started to search for oil in a small coastal area in the middle of the disputed territorial sea between Papadia and Antipapadia.

Antipapadia at the same time contracted with Sinkbetter Inc. and Sinkbetter, based on the data gathered through the ground station of Antipapadia, starts an oil search some 12 kilometers (8 miles) east of the area where Drillwell Inc. is searching. This area, as well, is situated in the middle of the disputed territorial sea between Papadia and Antipapadia. Both Drillwell and Sinkbetter are licensed through the respective Papadian and Antipapadian ministries to carry out exploratory drilling and subsequently to exploit any oil fields they find in the disputed areas.

The ground stations of Papadia and Antipapadia for receiving the VHR data from Golden Eye are technically different. Papadia, which still maintains close political and economical ties with its former colonial power Starstripe, purchased from Openskey the latest technology and software for processing all the data. Antipapadia, which after its separation from Papadia became part of the movement of progressive former colonial countries, has only limited access to space technology, due to limited economic resources. Consequently it was only able to purchase much less advanced hardware and software for processing the VHR data. Moreover, in the license of Goldstar to export Golden Eye to Openskey, a provision was included which gave Starstripe the right to demand a downgrading of the data in furtherance of the national security interests of Starstripe.This provision was also included in the licence from Openskey to Superview, Inc. and was made known to Papadia and Antipapadia when they signed the agreements with Superview, Inc.

Tensions have arisen between Papadia and Antipapadia due to the plans of both oil companies to start exploratory research in the disputed sea areas by sending special ships for experimental drilling. Both countries send warships to the disputed zones. A situation of international tension is reported by the press.

The data received from Golden Eye, according to press reports, also has military significance and enables both countries to monitor the other country's military activities. Papadia requests Starstripe to intervene in the conflict and also requests the Secretary General of the United Nations to discuss the situation in the Security Council. The Security Council subsequently adopts a Resolution calling upon the two countries to refrain

from any further controversial actions in the disputed area and to enter directly into negotiations concerning the disputed sea area. The Resolution does not mention space activities nor the use of satellite derived information.

Openskey, after discussions with Starstripe, orders Superview Inc. to switch-off the satellite signals intended for the ground station of Antipapadia. Superview complied with this order.

At the same time, the oil companies Drillwell Inc. and Sinkbetter Inc. published the first results of their test drilling. It appears that Drillwell found an undersea oilfield which will justify commercial exploitation. It is located entirely in the disputed area. Sinkbetter, on the contrary, did not locate any oilfield. After having made an investigation with experts from Antipapadia, the conclusion was drawn that due to the technical inferiority of the ground station and processing facilities, it could not carry out its research with the data obtained through the Antipapadian ground station. It was also discovered that the data received by Antipapadia had been deliberately and constantly downgraded by Superview Inc. on request of the Government of Openskey. In the process of downgrading, some of the data received in Antipapadia was carelessly but unintentionally transformed in such a way that with the processing software Antipapadia possessed the data was being represented incorrectly.

Antipapadia, after having received the experts' report, decided to buy a state-of-the-art mobile ground station. In order to be sure to receive the VHR data in good order, Antipapadia started secretly to operate the mobile ground station from the territorial waters of Papadia. Antipapadia delivered VHR data to Sinkbetter, which, according to press releases, will take one more month to acquire enough data to start new research. At the same time, the Government of Antipapadia published pictures of secret Papadian military bases to the international press, which it claims clearly show the military build-up by Papadia. These pictures were derived from the satellite data obtained from Golden Eye through Antipapadia's recently acquired mobile ground station.

After these publications, Starstripe requests Openskey to switch off Golden Eye when it is in the coverage area of the ground stations in Papadia and Antipapadia until the disputed reception of data by

Antipapadia ends, and until Papadia and Antipapadia resolve their territorial dispute. Based on this request, Openskey decides to suspend the license of Superview Inc. to operate Golden Eye, and its control is taken over by the army of Openskey. Neither Papadia nor Antipapadia have received any data from Golden Eye since this decision.

Openskey and Antipapadia have decided to bring their dispute before the International Court of Justice for resolution of the issues stated below. There are no issues as to the Court's jurisdiction.

Issues before the International Court of Justice

1) Whether Antipapadia is violating international law by intercepting and publicly distributing the signals of Golden Eye, and, if so,

a) whether Antipapadia is liable to Openskey for the loss of revenue suffered by Opensky due to the switching-off of the satellite while within the coverage areas of the Papadian and Antipapadian ground stations; and,

b) whether Antipapadia should stop making this information public and should destroy or return to Openskey all data received.

2) Whether Openskey violated international law by switching-off Golden Eye while it was within the coverage of the Antipapadian ground station;

3) Whether Openskey violated international law by delivering to Antipapadia a ground station with hardware and software technically inferior to that purchased by and used in the Papadian ground station.

4) Whether Openskey violated international law by the intentional downgrading and unintentional transformation of Golden Eye data transmitted to Antipapadia, and, if so,

a) whether Openskey is liable for the costs incurred by Antipapadia in the unsuccessful exploratory research; and,

b) whether Openskey should compensate Antipapadia for the loss of expected oil revenues suffered by Antipapadia.

Instructions to the students:

You should prepare one memorial for the Applicant (Openskey) and one memorial for the respondent (Antipapadia). You should assume that all of the states referred to in this case are parties to all of the relevant international treaties and conventions and have adopted the United Nations General Assembly Resolution concerning "Principles Relating to Remote Sensing of the Earth from Outer Space" (G.A. Res. 47/68). None of the States referred to in this case are parties to the UNCLOS III Treaty.

Annex

Openskey Law on Space Activities (Excerpts)

Preamble:

Having Regard the Increasing Commercial Uses of Outer Space and the Obligations for the States Party to the United Nations Space Treaties and Resolutions;

Taking Into Account the Articles of the Outer Space Treaty and especially Articles VI, VII and VIII;

Recalling the United Nations General Assembly Principles Relating to Remote Sensing of the Earth from Outer Space;

Believing that this Law will help strengthen the Leadership of Openskey;

Article 1

This Law applies to activities in outer space (space activities). In addition to activities carried out entirely in outer space, also included in space activities are the launching of objects into outer space and all measures to manoeuvre or in any other way affect objects launched into outer space.

Article 2

Space activities may not be carried out from Openskey's territory by any party other than the Openskey state, without a license. Nor may an Openskey natural or juridical person carry on space activities anywhere else without a license.

Article 3

A license to carry on space activities is granted by the Openskey government.

A license may be restricted in the way deemed appropriate with regard to the circumstances. It may also be subject to required conditions with regard to control of the activity or for other reasons. Inspection of the space activities of license holders is exercised by the authority decided by the Government.

V.

6TH MANFRED LACHS SPACE LAW MOOT COURT COMPETITION 1997

"OPENSKEY v. ANTIPAPADIA"

SUMMARY OF THE MEMORIAL FOR THE APPLICANT

Ranjani Srinivasan, Amine Laachani, Jean-François Renaud
University of Paris XI

Winner of the "Journal of Space Law" Award for the Best Memorial

In the case of Openskey versus Antipapadia, each state accuses the other of violating international law and, as a result, causing severe harm to the other.

A careful analysis of the facts of the case and the law applicable to this dispute demonstrates, however, that the violations of international law were clearly committed by the respondent state of Antipapadia, while Openskey acted in good faith, and in total conformity with its rights, international obligations, and responsibilities.

The respondent state of Antipapadia clearly violated international law in intercepting and publicly distributing Golden Eye data, based on property law and copyright law.

Article 8 of the 1967 Outer Space Treaty, highlighted in Openskey's national law on space activities, establishes the legal link between the satellite Golden Eye and the state of Openskey. It states that: "*A State party on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such an object...*" The facts make clear that Openskey is the state of Registry of the satellite

Golden Eye, meaning that, in virtue of article 8 of the OST, it exercises jurisdiction and control over the satellite, its instruments and its products including the data gathered and processed by the satellite's instruments. In illegally intercepting data not intended for it, Antipapadia clearly violated international law.

Going beyond its clear violation of Openskey's jurisdiction and control over the satellite, Antipapadia also violated international copyright law, in particular the provisions of the Bern Convention for the Protection of Literary and Artistic Works of 1886 to which both Openskey and Antipapadia are parties. Remote sensing data fall clearly within the scope of Article 2 of the Bern Convention, and therefore qualifies for protections provided for by this Convention.

The two conditions for protection, originality and human authorship, are fulfilled. Remote sensing data, gathered by computerized instruments, are programmed from the Earth by human beings who select a whole range of parameters such as the viewing angles or spectral bands, and are therefore original and bear the mark of a human author. Moreover, the transmission of data from a satellite to a ground station is considered to be the material support in which the work is fixed. According to article 9 and 11 of the Bern Convention, the unauthorized reproduction and public communication are prohibited.

Not only are Golden Eye data protected by the Bern Convention, but also by the World Intellectual Property Organization Copyright Treaty of 1996. Under Article 5 of this treaty, Golden Eye data are protected as databases. Firstly, satellite data represent a potential image in a file format. This file is represented in the form of a 1 and 0 grouping. The combination of digital binary data in the file constitutes a database. As for the requirement of originality, the elements of the file are humanly selected with due regard for the future image to be created. The organization of the file is by no means random; rather the voluntary action of its author. From another angle, the satellite transmits a number of satellite photos, therefore a number of satellite images expressed as files. The grouping of these files is constitutive of a database, stocked in the satellite and organized with careful consideration for the site chosen to be observed. In both cases, the condition of originality is fulfilled.

Golden Eye data are therefore protected intrinsically under the Bern Convention, and as databases according to the WIPO Copyright Treaty. Antipapadia engaged in the unauthorized reproduction and public communication of protected, copywritten data, clearly transgressing international copyright law at Openskey's expense.

It is freely admitted by the respondent state of Antipapadia that it engaged in a violation of territorial sovereignty of a neighboring state. However, this present litigation is not the forum in which to discuss such a

violation, and Openskey is not the state to discuss it. Nevertheless, this action underlines Antipapadia's bad faith and its willingness to transgress a basic precept of international law in order intercept data not intended for it.

However, as a corollary issue, the United Nations Security Council Resolution was ignored by Antipapadia. The Security Council passed a resolution requesting both states to "*refrain from any further controversial actions in the disputed area.*" The territorial invasion is clearly one such controversial action.

As a result of the transgressions of international law Antipapadia willingly undertook, Openskey suffered certain harms, which it continues to suffer as a result of Antipapadia's actions.

Firstly, Superview, a judicial entity of Openskey, is losing revenue for every day that Golden Eye remains switched off while in the coverage area of the Papadian and Antipapadian ground stations. The state of Openskey collects 10% of Superview's revenue from the sale of data, and is therefore also suffering financially at this moment. Openskey is entitled to request all lost revenues, including those of Superview, in virtue of article 8 of the Outer Space Treaty. As the bearer of Superview's international responsibility, Openskey feels able to represent Superview's interests, which are ultimately those of Openskey, before the respected ICJ.

The lost revenue for the total switch off of satellite signals is neither indirect nor remote, rather a direct result of Antipapadia's actions. Relevant conditions, elaborated by the PCIJ in the 1928 Chorzow Factory Case must be juxtaposed to the facts. Firstly, an internationally illegal act must have been committed. Antipapadia, in intercepting and publicly distributing data not intended for it and protected by copyright law, committed one such international illegal act. Secondly, the illegal act must be attributable to a state. The Government of Antipapadia is clearly the perpetrator of these illegal acts. Finally, a causal link must be established between the illegal acts and the harm suffered. As a result of Antipapadia's illegal acts which may have exacerbated an already tense regional situation, the state of Openskey was obliged to switch off Golden Eye while within the coverage areas of both the Papadian and Antipapadian ground stations ; and consequently was deprived of considerable revenue.

As for the intercepted data which are currently being used to exacerbate international peace and security, what is important in this case is that the Golden Eye data should no longer be illegally exploited. We propose that Antipapadia destroy the data. As this can be an expensive undertaking, we are prepared to accept the return of data and Antipapadia'a good faith that no copies have been made, and destroy the data ourselves.

The claims espoused by the state of Openskey have now been presented. The questions concerning the ground station, the switch off and the downgrading of remote sensing data will now be addressed, illustrating that Openskey acted within its rights and in good faith.

The facts of the case present very clearly that both countries were aware of the quality of equipment purchased, according to question 11 of Questions to the Court. Both countries purchased equipment they could afford, one having more economic means than the other, and in full knowledge of the quality of equipment purchased.

Openskey acted in the spirit of commercial freedom. We are before a commercial remote sensing contract and a commercial transaction for the ground station. Openskey sold to each country that which it could afford without practicing any discrimination, bias or favoritism. It is important to remember that Sinkbetter Inc. did start an oil search only eight miles from that of Drillwell Inc. based on data from the Antipapadian ground station, meaning that the station did process the data properly.

Concerning the United Nations Convention on Contracts for the International Sale of Goods, Openskey acted in full conformity with this convention. The ground station of inferior technological quality, which Antipapadia purchased in full awareness of its capabilities, was duly delivered. Moreover, the goods served the purpose for which they were intended, which is collection and processing of remote sensing data.

It is true that Principles II, V, VI and VII of the Remote Sensing Principles mention the idea of cooperation and consideration of the limitations, both economic and technological, of lesser developed countries. These principles, which have no legal force in and of themselves, are very important to the development of a global remote sensing community. However, they do not create obligations on other states to provide anything but non discriminatory, equal treatment. In the case in point, provisions regarding the right to development enunciated in the remote sensing principles do not oblige Openskey to establish pricing structures according to the level of a country's development. Were this to happen, discrimination would be against countries detaining more financial resources. All countries are entitled the same price for the same product, including Antipapadia.

Furthermore, being free to establish a commercial relationship with who it pleases, Openskey contracted with Antipapadia in an effort to give it access to outer space and derive the positive benefits thereof, on the same terms as all other clients.

Above all, when it became necessary to eavesdrop on a private communication of satellite signals not intended for it, Antipapadia was then able to afford a technically superior ground station.

Openskey did not violate international law by switching off the satellite signals intended for the Papadian ground station. Rather, it acted within its legal rights and international responsibilities.

While a satellite such as Golden Eye can be switched off to one country and continue to deliver signals to another, even when the two countries are in close proximity, this is not the case in the present situation. The Golden Eye coverage area or satellite footprint covers both countries, which is why the facts of the case indicate that even after this switch off, the signals were available over the whole coverage zone. The switch off of satellite signals intended for the Antipapadian ground station was not a "black out" as the term may suggest, but a severe downgrading of data. A ground station with inferior technical capabilities would no longer receive such signals, however the signals were still present over the coverage area. With its state of the art mobile ground station, Antipapadia should have been able to receive Golden Eye signals over the whole coverage area, including from its own territory. Whether in Papadian or Antipapadian territory, the signals were equally downgraded and equally receivable, depending on the ground station.

According to the facts of the case, Openskey acted entirely within its rights in downgrading data. "Agreements were concluded between Superview and the governments of Papadia and Antipapadia. Both agreements refer to the conditions of license of Superview Inc. as an integral part of the agreement. In the license of Goldstar to export Golden Eye to Openskey, a provision was included which gave Starstripe the right to demand a downgrading of the data in furtherance of the national security interests of Starstripe. This provision was also included in the license from Openskey to Superview." The reason for this lengthy citation is to demonstrate that a provision giving Starstripe the right to demand a downgrading of data was included every step of the way. Furthermore, Openskey could also demand a downgrading, according to Question 15 of the Questions to the Court.

Openskey and Starstripe had then the right to request the downgrading of data in the interests of national security. It is evident that in the modern world, national security issues often extend beyond the territorial boundaries of a nation. National security interests are also determined by a state and a state alone, and are linked to the sovereignty of a state. These interests are not subject to discussion in international fora such as thus one; suffice it to say that Openskey felt that downgrading, entirely legal in international law, was necessary. Furthermore, following the example set by EOSAT, SPOT, ESA and NASDA, Openskey declines any liability for the quality and continuity of data. The mentioned operators,

originating in various parts of the world and of public and commercial goals, illustrate an evolving practice in the remote sensing industry, a practice undertaken by actors most interested.

The 1986 Remote Sensing Principles enunciate in Principle XII the concept of access to data :" As soon as the primary data... are produced, the sensed state shall have access to them on a non discriminatory basis..." Openskey fully believes in the goals of these principles.

The remote sensing principles of 1986 set a standard of behavior in this rapidly evolving industry. The fact, however, that the resolution was adopted by consensus does not give it the necessary *opinio juris* to create binding customary law. Moreover, the resolution was subject to unilateral declarations of states particularly interested. This fact clearly subtracts from any possible *opinio juris*. No customary practice has yet confirmed Principle XII in a given commercial situation such as this one. Therefore, Openskey is not bound by Principle XII of the remote sensing principles. Acting in the spirit of promoting international peace and security which Antipapadia choose to exacerbate, Openskey felt it judicious to undertake the downgrading, which simultaneously protected national security and provided equal treatment to both clients.

Continuing with the issue of data downgrading before this Court, Openskey is accused of violating international law in downgrading and unintentionally transforming data intended for the Antipapadian ground station. As already demonstrated, Openskey had the full right to downgrade data according to agreements passed between Antipapadia and Superview.

Further, following the common commercial practices of the industry enunciated previously, Openskey declines all liability for the quality of data and the unintentional transformation of data due to the rightful downgrading. EOSAT, Spot Image, NASDA, ESA and Radarsat do not provide guarantees of data accuracy or the suitability of the data for any particular purpose. The mentioned remote sensing operators represent a cross section of commercial as well as research oriented remote sensing systems, thereby demonstrating a practice common in the field.

As for the unintentional transformation of data, all parties in their briefs have acknowledged that the transformation of data was unintentional. The remote sensing activities, from the sale of the ground station to the delivery of data, were all carried out in good faith from Openskey's side. Openskey never intended to transform data, and was not aware of the potential for data transformation.

Corollary to the foregoing, no claim implicating Openskey's responsibility is valid. Returning to the conditions for the reparation of damages discussed earlier, an internationally illegal act must first be

ascertained. This is impossible to establish, as Openskey did have the full right to request the downgrading of data, and Antipapadia was fully aware and accepted this.

Further, again relating to common industry practices, Openskey is not liable for the quality of data upon reaching the ground station. Antipapadia claims that Openskey should reimburse it for costs incurred in the unsuccessful oil research. Remote sensing data cannot be guaranteed to fit any particular purpose due to its evolutionary nature. Oil research was undertaken on the volition of the Antipapadian government, and is in no way the responsibility of Openskey. The costs incurred are remote and indirect, and therefore not within the scope of Openskey's international responsibility.

As for the future oil revenues claimed by Antipapadia, these oil revenues are purely hypothetical. The territorial dispute between the two neighboring states must be resolved before Antipapadia can possibly call the oil fields their own. As the dispute has yet to be resolved, and this dispute is not the subject of this litigation; a claim of future losses for presently hypothetical revenues can be deemed entirely extraneous.

VI.

INTERNATIOHAL COURT OF AVIATION AND SPACE ARBITRATION

ICASA

COUR INTERNATIONALE D'ARBITRAGE AÉRIEN ET SPATIAL

CIAAS

6, Rue Galilée - 75008 Paris, France

The specificity, the technical nature and the complexity of disputes arising from aviation and space activities require to settle such matters through recourse to a specialized Arbitration Tribunal. Now then, no international arbitration organisation specifically for aviation and space had been in existence so far.

Accordingly the Société Française de Droit Aérien et Spatial has initiated to create a Court of Arbitration specifically and exclusively for resolving disputes directly or indirectly related to aviation and space activities.

The court is a Society ("Association") with its headquarters in Paris, France. However, 17 countries are already represented.

Membership of ICASA is open to any individual, company or entity, whatever its nationality may be, such as corporations, societies, trade organisations, state and government authorities and public or private

entities engaged in any activities whatsoever that is directly or indirectly related to the aviation and space sectors.

The administrative affairs of the Society shall be conducted by its administrative organs, these being the general meeting of the members, the board appointed by the members at the general meeting, and by en executive council ("bureau') appointed by the board from among its members and assisted by an administrative secretariat.

The arbitral affairs of the Court of Arbitration shall be monitored by a committee named the Arbitration committee and by the Arbitration Tribunals constituted for each dispute submitted to the Court.

The arbitrations are conducted pursuant to the provisions of the Rules of Arbitration which are set forth by the Arbitration Committee.

The Arbitration Committee draws up a list of Arbitrators agreed by the tours after prior approval by the board. However, the parties may designate one or more Arbitrators not included on the list drawn up by the Court.

The Rules stipulate the appointment of technical Experts listed according to their specialization and recommended by the Court.

The international character of the Society implies that the parties may agree to arbitration in venues in any country of their choice; likewise, the parties are entirely free to decide together upon the law applicable, the number of Arbitrators, and the language of arbitration.

The Rules of Arbitration provide for an emergency or summary arbitration procedure which the parties may implement when they deem urgent protective measures to be necessary.

The duration of arbitrations is very brief.

The arbitrations are strictly confidential and the Arbitral Awards are not subject to appeal.

The administrative costs are very reasonable and the Arbitrators' fees are assessed on a time basis in accordance with a published scale which is updated at regular intervals.

A copy of the By-laws and of the Arbitration Rules in French, English, Spanish, Italian and German can be requested at the administrative secretariat of the Court: 29, Avenue Georges Mandel - 75116 Paris, France. Tel: (33) 1 45 77 08 52 - Fax: (33) 1 44 05 15 20.*

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* For multilingual (including English) texts of the By-laws and Rules of Arbitration of the International Court of Aviation and Space Arbitration, see 193 R.F.D.A.S. (No. 2, 1995).

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