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Recent Developments in United Nations Activities Relating to Outer Space

by

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1. INTRODUCTION

The space law-making process in the United Nations began in 1958, when the General Assembly of the United Nations established a special 18-member committee called the "Committee on the Peaceful Uses of Outer Space" (COPUOS), first as an *ad hoc* Committee of the General Assembly,¹ and later, the following year, as a Permanent Committee, when the membership was also increased to 24 member-States.² Sixty-one States are currently members of the Committee.³

The Committee and its Scientific & Technical and Legal Subcommittees together have formulated five space treaties and four sets of legal Principles. The treaties are the Outer Space Treaty of 1967,⁴ which now has 93 Parties, the Rescue Agreement of 1968,⁵ with 83 Parties, the Liability Convention of 1972,⁶ with 76 Parties, the Registration Convention of 1976,⁷ with 38 Parties, and, the Moon Agreement of 1979,⁸ with only 9 Parties. Each of these instruments, with the exception of the Moon Agreement, has been signed by over 100 countries. The four legal principles relating to outer space are the "Declaration" of space legal principles, and the Direct Television Broadcasting, Remote Sensing,

and Nuclear Power Sources Principles.⁹

Thus, the United Nations has achieved considerable results in about three decades of space law-making, when compared to many other branches of international law, and a solid legal foundation has been laid by these treaties and principles.

2. RECENT DEVELOPMENTS IN LAW-MAKING ACTIVITIES

(1) Slow-down in the space law-making process

In recent years, however, the space-law making process in the United Nations has gradually slowed down. The development of various factors have made it a very complex matter. For example, operational areas that now require regulation have become extremely technical in nature. Space technology has proliferated due, in part, to the realization that space exploitation and use benefit not only a small minority of States, but the entire family of nations. There has been a dramatic shift from the emphasis on the use of space for civilian, as opposed to military, uses that has been caused, in part, by the end of the cold war. There has been a tremendous

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world-wide increase of private entities using space for their own commercial ends. The developing countries are becoming increasingly involved in the use and exploitation of outer space. The resulting overall effect of having a greater number of nations participating in the law-making process of the United Nations - some of whom have to take cognizance of the large financial stakes of their private entities involved in space activities - often on very technical issues, have led to the process of law-making becoming tedious and time-consuming, with long, drawn-out negotiations and debates.

(II) NPS Principles

This was demonstrated, for example, during the discussions and negotiations on the Nuclear Power Sources Principles, that were finalized only after a decade of sometimes tortuous debate and negotiations in the Committee.¹⁰ In 1992, the General Assembly adopted a set of Principles Relevant to the Use of Nuclear Power Sources in Outer Space.¹¹ A key element of the Principles was the inclusion of a clause which recommended that they be opened for revision within two years after their adoption by the General Assembly,¹² (i.e. in 1994) in order to consider revisions that might be required by new nuclear power applications and changing radiological protection standards.

Although the issue was discussed in the 1994 and 1995 sessions of both the Scientific and Technical and Legal Subcommittees, no decision was taken to reopen the Principles for revision.¹³ In fact, both Subcommittees agreed, at their sessions in 1995, that "at the present time, revision of the Principles was not warranted",¹⁴ although the item will be kept on both their agendas for their sessions in 1996. If and when they are revised, however, the primary objective of the review process must be aimed at strengthening the guidelines through which NPS systems may be utilized safely and effectively.¹⁵ The issue of space debris and its relationship with the safe use of NPS in outer space, may prove to be one of the more difficult items discussed during the review

process. One way to approach the problem would be to supplement the existing Principles with new provisions. This method, however, would still not fully take into account newer and later technological developments in the field, and the danger could arise that they would become obsolete. The answer to this could lie in the development of international space standards and practices.

(III) Definition and Delimitation of Outer Space and the Character and Utilization of the Geostationary Orbit

Another area in which the space law-making process had made little headway for many years was that of the "Definition and Delimitation of Outer Space and the Character and Utilization of the Geostationary Orbit".¹⁶ However, reasonably substantial progress was made on this topic at the 1994 and 1995 sessions of the Legal Subcommittee. On the issue of the definition and delimitation of outer space,¹⁷ two polarized views still prevail in the Legal Subcommittee. One view is that the question of delimitation is part of the more comprehensive legal question of the applicability of treaties, and that it is thus necessary to have a conventionally defined boundary between airspace and outer space. The contrary view is that the need for such a boundary has not yet been established, and that in the more than 30 years of the peaceful exploration and use of outer space there has never been a practical problem caused by the lack of a boundary between airspace and outer space, and that any attempt to establish such a boundary could cause more problems than it would solve. In an attempt to facilitate progress in consideration of this item, a questionnaire on aerospace objects was finalized at the 1995 session of the Legal Subcommittee.¹⁸ The purpose of the questionnaire is to seek the preliminary views of member States of the Committee on various issues relating to aerospace objects, with the hope that the replies to the questionnaire would provide a basis for the Legal Subcommittee "to decide on how it might continue its consideration" of the agenda item.¹⁹ If followed

through, this would likely take a functional approach to the question.

On the question of the geostationary orbit, which lies at a height of 22,400 miles (approx. 36,000 km) above the equator, it has generally been agreed that the orbit is a limited natural resource that should be used for the benefit of all humankind and that all countries should have equitable access to it. Two opposite viewpoints are also prevalent on this issue. The first is put forward by developing countries or countries which have not had the financial or technical resources to place a communications satellite in orbit. They say that the geostationary orbit requires a special legal regime to regulate access to and utilization of the orbit.²⁰ Some countries, particularly those whose national territories lie along the equator (equatorial countries), have claimed that they should have special access or a reserved right to this orbit. The opposing view is that the legal regulations of the geostationary orbit are inseparably linked with the freedom of outer space and should be governed by the determination of the International Telecommunication Union which has the sole competence for the coordination and regulation of the radio frequency spectrum. In addition, it has been argued that any type of reservation or an *a priori* claim to the geostationary orbit would amount to an appropriation of outer space which is prohibited under the Space Treaty, in Article II.

(IV) Outer Space Benefits

The agenda item of "Outer Space Benefits", as the second pending issue is popularly called,²¹ has progressed well in the past two years.²² This agenda item aims for the development of a legal regime that embodies and promotes the principle of Article I of the Outer Space Treaty, that the exploration and utilization of outer space should be carried out for the benefit and in the interests of all States, taking into particular account the developing countries. This item is on the agenda because it is the view of many countries that there is a lack of any legal effort to ensure that space exploration and

application of space technology benefits all countries. Therefore, member States are now looking to move beyond Article I of the Outer Space Treaty, possibly to codify the rights and responsibilities of countries with respect to international cooperative space activities, and not let the Article stand, as some States view it, merely as an artifact or a moral appeal to the space-faring nations.²³

Currently, there are three draft sets of principles before the Legal Subcommittee. The first, co-sponsored by several developing countries,²⁴ had formed the basis for discussions on this agenda item for some years. They are aimed at meeting the concrete needs and expectations of all countries, particularly those of developing countries. The central thrust of the draft Principles is that of the means of access by all countries - especially the developing countries - to the benefits of space technology, and this, ultimately, is a question of the nature of international co-operation among States. In a more general sense, the co-sponsors are saying that they believe that the technological gap between the developed and the developing countries has become too vast and that they wish to reverse the trend, at least to some degree, by the application of these Principles. They also seem to say that they have lost their confidence in the moral appeals as embodied in the spirit of Article I of the Outer Space Treaty, and that the remedy lies in the establishment of an international legal framework regulating space co-operation and requiring the developed countries to co-operate within specified limits.

Recently the developed countries have shown a willingness to discuss the matter, though somewhat reluctantly. At the 1994 session of the Legal Subcommittee, some delegations had expressed specific concerns regarding the draft Principles. One was the fact that, until now, a high level and long history of successful co-operation in the peaceful uses of outer space has existed without the proposed principles. The delegations were also concerned that they could be put in a position where they would not have a choice as to which programme to open to co-

operation and what information they could share with developing countries. Another concern related to the issue of adequate compensation for technology transfers.

As a result of these discussions, France and Germany submitted a working paper at the 1995 session of the Subcommittee.²⁵ The paper rests on two basic considerations: "(i) first, that States are free to determine all aspects of their cooperation, whether it is bilateral or multilateral or whether it is commercial or non-commercial, including of course development cooperation; and, (ii) second, that States shall choose the most efficient and appropriate mode of cooperation in order to allocate resources efficiently."²⁶

The paper is divided into three short parts, the first which lays out general elements of international cooperation in the peaceful uses of space, the second describes the modes of such cooperation, and the third lists possible areas in which this cooperation could be carried out.

Towards the end of 1995 session, the Chairman of the Working Group established to consider the matter in the Legal Subcommittee produced an informal working paper representing a merger based on the texts of the two working papers, with additional language of his own, with the hope that the document would facilitate debate in the Working Group, in order to progress on the issue at its next session.²⁷

Another possible approach that might satisfy both positions would be to identify specific forms of co-operation that could be the subject of specific agreements. By gradually elaborating a series of fairly narrow agreements and by gradually converting these into binding form, a legal framework for international co-operation, based on the spirit of Article I of the Outer Space Treaty, could progressively be developed. This process, whereby sorts of "standard contracts" would be developed, could be slow, but it might allow for possible success.

3. RECENT DEVELOPMENTS IN SCIENTIFIC & TECHNICAL ACTIVITIES

Recent developments in United Nations

scientific and technical activities relating to outer space that could impact, in the future, on the space law-making field, include concerns about the safety of space activities, including the question of the space debris and protecting the space environment, and the possible convening of a Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE-III).

(I) The Space Debris Issue

The problem of space debris poses an increasing hazard to the exploration and utilization of space.²⁸ After many years of discussions in the Committee and the Scientific and Technical Subcommittee, the item of space debris became a separate agenda item at the 31st session of the S&T Subcommittee, in 1994.²⁹ At this session, the Subcommittee began its consideration of the item and considered scientific research relating to space debris, including relevant studies, mathematical modeling and other analytical work on the characterization of the space debris environment. During the discussions in the Legal Subcommittee later in the year,³⁰ the matter of space debris was raised. Some delegations were of the opinion that an international agreement on the problem of space debris might be necessary in the future and they were of the opinion that the Subcommittee should begin consideration of the matter. This was opposed by those who thought that a legal discussion of the issue was premature and that the S&T Subcommittee should first be given time to thoroughly consider all the technical and scientific aspects of the issue. Although these views were reiterated at the 1995 session of the Legal Subcommittee,³¹ the matter formed part of the informal discussions of the meeting, as the IISL organized, for the benefit of delegations, a legal Symposium on the *Technical and Policy Issues Related to the Use of the Space Environment*.³² The Scientific and Technical Subcommittee made further progress in its deliberations on this item at its 32nd session in 1995. It developed a multi-year plan, in order to advance in its consideration of the

matter at future sessions.³³

(II) UNISPACE-III

The developing countries have, for several years, been urging that a third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE-III) should be held.³⁴ Since Unispace '82,³⁵ the international political situation has changed; tremendous advances have been made in space technology and its applications and there is an increased awareness of their potential terrestrial benefits; and, there is growing recognition of the special role that space technology can play in areas of universal concern, such as the environment and disaster warning, mitigation and relief, and the potential role of space technology in enhancing peace and security. These are some of the reasons put forward to justify the holding of a third UNISPACE Conference. The possible holding of a third such Conference was discussed at length at the 1994 and 1995 sessions of the Scientific & Technical Subcommittee and COPUOS.³⁶ As a result of the discussions, the Committee agreed, at its 1995 session, that "a third UNISPACE conference could be held before the turn of the current century".³⁷ The Committee is expected to make a final decision on the matter at its 1996 session.³⁸

4. THE U.N. AND SPACE LAW: A LOOK TO THE FUTURE

The international community has established the basic framework for a law in outer space. It can look back, at the years that have passed since the space age began, and be satisfied with the work done to regulate the peaceful exploration and use of outer space. Now, however, the international community will have to seek new ways for space law-making, to keep up with the ever-rapid progression of space technology. As seen above, space debris and UNISPACE-III are two of the most important issues being currently debated in COPUOS.

(I) Legal Aspects of Space debris

Considering the debate in the Legal Subcommittee and the Committee, it would be sometime before international regulations are formulated to deal with this issue. It is possible, however, that existing space law can be applied to the space debris problem. There have been several proposals to deal with space debris that include applying existing principles of space law such as improving the requirements for information imposed by the Registration Treaty³⁹ and clarifying the Liability Convention so that it would refer to space debris.⁴⁰ Also, it may be possible, by relying on already existing principles of space law, to have a regulatory mechanism in the form of a body of recommended standards and practices which could be reviewed in COPUOS.⁴¹ This will be discussed in greater detail below.

(II) Establishing International Standards and Recommended Practices.⁴²

As noted above, the rapid development of space technology is one primary reason why the evolution of space law has been affected, and the momentum of space law legislation slowed down. Current space law-making procedures normally jointly regulate both the political and technical aspects of a problem, and this is sometimes resented by space-faring nations, who see this as stifling their activities in space.

The remedy, then, would be to separate, as much as possible, the regulation of the political and scientific/technical aspects of the use of space technology. One approach that not only would do this, but would also promote greater standardization in technical areas, would be the adoption of international space standards and recommended practices.

Space standards recommended practices would also make the existing space Treaties and Principles more meaningful. For example, the five outer space treaties lay out general legal rules without providing specific standards or procedures by which the treaties are to be implemented and by which space activities can be

controlled. In doing so, they create technical and legal weaknesses in the treaties. To give just two examples: in the **Outer Space Treaty**, Article IX requires States to "adopt appropriate measures" so as to avoid the harmful contamination of the Earth and outer space environments while conducting space activities. However, the Treaty does not recommend the measures that are to be taken. Further, the Article establishes no standards or criteria as to what constitutes "harmful contamination", "adverse changes", or "harmful interference" to the Earth or space environments. In the **Liability Convention**, procedures for rendering assistance as provided for in Article XXI (which deals with the large-scale danger to human life by damage caused by a space object on Earth) are not established.⁴³

More importantly, there are also new technical issues such as N.P.S., on which principles have been adopted but work is continuing in COPUOS, and space debris, already under consideration in the S&T Subcommittee, which would need not only a high degree of technical work but also where pace would have to be kept with rapidly advancing state of technology.

To take account of these and other factors the time has perhaps come to look for new and innovative ways in space-law making. For instance, the international community might want to begin to earnestly look at the formulation - with the strong support of scientists and other experts - for subjects of a more technical nature, of easily amendable technical standards and recommended practices for space activities. This will not only allow the law to keep pace with rapidly changing technology, but it will also fill gaps and weaknesses in, and supplement, the existing space law treaties and principles. The United Nations, through COPUOS, could follow the example set by international organizations such as the Montreal-based International Civil Aviation Organization (ICAO),⁴⁴ W.H.O. and I.M.O., and adopt international standards and practices for topics such as space debris, the outer space and Earth environments, safety of space operations, manned space flight, and space navigation.

An Expert Group of scientists and lawyers could be set up to work together. The Group could be a special standing group, either attached to the Scientific and Technical Subcommittee or alternately, the Group could be established within the framework of a convention drafted to serve as the enabling legislation for such standard-setting. The Expert Group could then formulate international space standards and practices for topics like: the outer space and Earth environments, space debris, safety of space operations, search and rescue, operation of spacecraft, materials processing in space, aerospace planes, manned space flight, space navigation, and so on. One major benefit in the space law-making process that would result from this would be that the political and technical aspects of space technology would be separated, and the future use of space science and technology would not be hindered by protracted political discussions. More importantly, this procedure would allow the law not only to keep up with the rapidly evolving technology connected with space science, exploration and use, but also to up-date it consistently, and keep it in line with the latest technology.

(III) Commercial Use of Outer Space

Another topic that could be subject to international regulation by the United Nations in the future is that of international space commerce, which is rapidly proliferating.⁴⁵ The legal implications of matters such as international commercial launch services,⁴⁶ the liability aspects of such services, intellectual property rights,⁴⁷ insurance,⁴⁸ product liability insurance and materials processing,⁴⁹ could one day be subject to regulation. In fact, the question of commercialization is linked to the question of sharing benefits of space activities, and this currently is an agenda item in the Legal Subcommittee.

Laws formulated in an era when the word "privatization" had not even been coined cannot contain potential problems caused by the increasing commercialization of outer space. A

recent newspaper report claims that the US Patent Office had "awarded a patent" to the American aerospace company TRW for its "invention of the 'medium earth orbit'," from where a series of satellites would transmit telephone calls to any point on earth.⁵⁰ This is a good example of the uncertainty that lies ahead, in the absence of clear legal guidelines in the area of space commercialization.

(IV) Manned Space Flight

International space flights have become so common that they do not dominate newspaper headlines, as they once did. The major space-faring countries have been making gradual progress in their plans for establishing a permanently manned international space station. Ambitious projects for the further exploration of, and settlement on, the Moon and Mars are being planned. However, there is a lack of a substantive body of international regulation with regard to manned space flight, notwithstanding applicable provisions in existing space law. When humankind does realize its ambitions and ventures further into space, comprehensive rules would be needed to regulate international manned space flight.⁵¹

(V) Other Matters

Other future space applications that will need well-formulated international regulation include the planned global navigation satellite system (GNSS) for civil aircraft, the proposed hand-held mobile communications systems, for example, that has been proposed by Inmarsat, and COPINE, the planned "Cooperative Information Network Linking Scientists, Educators and Professionals in Africa".

Plans have been developed for satellite-based civil aircraft navigation systems such as ICAO's Communication, Navigation, Surveillance/Air Transport Management system (CNS/ATM) to improve on the existing terrestrial air navigation system, the basic structure of which has remained unchanged since its adoption shortly

after the Second World War. Although it has been modified several times since then, to keep pace with development in technology, modern advances in air transport technology, traffic growth requirements and increased use of long-distance aircraft for passenger and cargo carriage has necessitated the implementation of an air navigation system that would last well into the next century. This task was taken up by the International Civil Aviation Organization (ICAO), which established, in 1983, a Special Committee on Future Air Navigation Systems (FANS), which concluded, in general, that only a satellite-based navigation system could adequately tackle the growing needs of current and future international civil aviation. Thus was born the CNS/ATM systems.⁵² The CNS/ATM systems are expected to complement the current Instrument Landing System (ILS), and the futuristic Microwave Landing System (MLS). There is still some way to go, however, before the legal institutional arrangements to implement the systems are complete.⁵³

Further, although plans are also being made to set up global mobile telephone systems,⁵⁴ the legal aspects of these systems are yet to be fully explored. For example, the International Mobile Satellite Organization (Inmarsat)⁵⁵ recently announced its intention to inaugurate personal satellite communications services by the end of this century.⁵⁶ Inmarsat has therefore created an affiliate structure to handle the "Inmarsat-P" global mobile telephone system business. The affiliate has been tentatively named "I-CO Global Communications Ltd."⁵⁷ The affiliate aims to have launched 12 satellites into intermediate orbit by the end of this century,⁵⁸ that would fully enable it to meet its basic service objective, which is to reproduce, as closely as practicable, the service characteristics of terrestrial cellular handheld telephones in outdoor environments.

Another future space application that would require legal regulation is COPINE, the planned satellite-based information system that would link scientists, educators and professionals in Africa. Initially, it would aim at improving the

collection, transmission, distribution and exchange of information particularly in areas such as science and technology, agricultural research and development, management of natural resources and the environment and health-care and education, within and among participating African countries as well as within the international community. The technical aspects of the system are still being discussed. Once finalized, the regulatory aspects of the system would need to be addressed, before the system is fully implemented.

(VI) Policy & Legal Issues at UNISPACE-III

If, indeed, a UNISPACE-III is convened, the possible space policy and legal issues that could be covered may include a review of policy and legal matters affecting international cooperation in space activities, a review of the current status and the need for continued progressive development and codification of the law of outer space, establishment of guidelines for international cooperation in space exploration and utilization, and examination of links between space law and other branches of international law, such as environmental law. An important decision for UNISPACE III would be to initiate the process for establishing international space standards and recommended practices.

CONCLUSIONS

During the first twenty years of COPUOS, five treaties and four sets of legal principles were negotiated and adopted, an unprecedented rate for law-making in international law. More recently, however, the momentum of space law legislation has slowed down. The space law-making process has become extremely complex. It has now begun to focus on specific areas of space technology, its applications and scope rather than on the general public international law principles that were promulgated at the beginning of COPUOS. Thus, the law for space activity now requires more clarification and precision for addressing an extremely

sophisticated and diverse space industry, especially one that has become so privatized and commercially intense.

The interests and will of States to negotiate and promote international cooperation in space exploration and utilization, however, continues. Therefore, although its focus may be more specific, it appears that the United Nations and the Committee on Peaceful Uses of Outer Space will remain essential fora for the development of international space law.

Nevertheless, important fora such as the International Institute of Space Law can make a substantial contribution to future space law by continuing to provide an input to the deliberations of the Committee, both inside the meetings of the Legal Subcommittee of COPUOS, and outside these meetings at its annual colloquia, through legal papers submitted by its members. Of particular note is the contribution that the IISL has been making over the years, to the debates in the Legal Subcommittee of COPUOS, by organizing, during Subcommittee sessions, legal Symposia on space-related matters. This gives the delegations an account of the latest developments and important legal issues involved in various space activities. It is hoped that this association will not only continue, but will strengthen considerably, in the future.

ENDNOTES

1. G.A. Res. 1348 (XIII) of 13 December 1958, by which the General Assembly, "[c]onsidering that an important contribution (could) be made by the establishment within the framework of the United Nations of an appropriate international body for cooperation in the study of outer space for peaceful purposes", set up the 18-Member State *ad hoc* Committee on the Peaceful Uses of Outer Space. The Committee was requested to report to the General Assembly on, *inter alia*, the following: The activities and resources of the United Nations, of its specialized agencies and of other international bodies relating to the peaceful uses of outer space; the nature of legal problems which may arise in the carrying out of programmes to explore outer space; and, the future organizational arrangements to facilitate international

co-operation in this field within the framework of the United Nations.

2. See, G. A. Res. 1472A (XIV) of 12 December 1959 which established the permanent Committee.

3. Gradual increases over the years have brought the membership of COPUOS to 61 States. G.A. Res. 1721 E (XVI) of 20 December 1961 increased the number to 28; G.A. Res. 3182 (XXVIII) of 18 December 1973 increased it to 37; and G.A. Res. 32/196 of 20 December 1977 increased it to 47. The General Assembly, by Resolution 35/16 of 3 November 1980 and by its decision 45/315 of 1990, increased the membership of the Committee to 53 Member States. At its 49th Session in 1994, the General Assembly, by Resolution 49/33 of 9 December 1994, increased this number to 61. Thus, the following States are members of COPUOS (the italics indicate the 8 States that became members in 1994). The Turkey-Greece and Portugal-Spain rotating membership scheme ceased when the current "sitting" members, Greece and Spain and their alternates, Turkey and Portugal, got "full" membership status in 1994): Albania, Argentina, Australia, Austria, Belgium, Benin, Brazil, Bulgaria, Burkina Faso, Cameroon, Canada, Chad, Chile, China, Colombia, Czech Republic, Ecuador, Egypt, France, Germany, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Italy, Japan, *Kazakhstan*, Kenya, *Korea*, Lebanon, Mexico, Mongolia, Morocco, Netherlands, *Nicaragua*, Niger, Nigeria, Pakistan, *Peru*, Philippines, Poland, *Portugal*, Romania, Russian Federation, *Senegal*, Sierra Leone, *South Africa*, Spain, Sudan, Sweden, Syrian Arab Republic, *Turkey*, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay, Venezuela, Viet Nam and Yugoslavia. *Korea* and *Nicaragua* will alternate, every three years, with *Malaysia* and *Cuba*, respectively.

4. *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, Opened for signature at London, Moscow and Washington on 27 January 1967, entered into force on 10 October 1967, 610 U.N.T.S. 205; 18 U.S.T. 2410, T.I.A.S. 6347; (1967) 6 I.L.M. 386.

5. *Agreement on the Rescue of Astronauts, The Return of Astronauts and the Return of Objects*

Launched into Outer Space, Opened for signature at London, Moscow and Washington on 22 April 1968, entered into force on 3 December 1968, 672 U.N.T.S. 119; 19 U.S.T. 7570, T.I.A.S. 6599, (1968) 7 I.L.M. 151. In addition to the 83 State Parties, the European Space Agency (ESA) has declared its acceptance of the rights and obligations provided for in the Convention.

6. *Convention on International Liability for Damage Caused by Space Objects*, Opened for signature at London, Moscow and Washington on 29 March 1972, entered into force on 1 September 1972, 961 U.N.T.S. 187; 24 U.S.T. 2389, T.I.A.S. 7762. In addition to the 76 State Parties, the European Space Agency (ESA) and the European Telecommunications Satellite Organization (EUTELSAT) have declared their acceptance of the rights and obligations provided for in the Convention.

7. *Convention on Registration of Objects Launched in Outer Space*, Opened for signature at New York on 14 January 1975, entered into force on 15 September 1976, 1023 U.N.T.S. 15; 28 U.S.T. 695, T.I.A.S. 8480; (1975) 14 I.L.M. 43. In addition to the 38 State Parties, the European Space Agency (ESA) has declared its acceptance of the rights and obligations provided for in the Convention.

8. *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, Opened for signature at New York on 18 December 1979, entered into force on 11 July 1984, 1363 U.N.T.S. 3; (1979) 18 I.L.M. 1434.

9. (a) *The Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space*, adopted on 13 December 1963 (G.A. Res. 1962 (XVIII)); (b) *The Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting*, adopted on 10 December 1982 (G.A. Res. 37/92); (c) *The Principles Relating to Remote Sensing of the Earth from Outer Space*, adopted on 3 December 1986 (G.A. Res. 41/65); and (d) *The Principles Relevant to the Use of Nuclear Power Sources in Outer Space*, adopted on 14 December 1992 (G.A. Res. 47/68). These Principles and the five outer space treaties can be found in *United Nations Treaties and Principles on Outer Space*, U.N. Doc. A/AC.105/572, of March 1994.

10. See, N. Jasentuliyana, "Multilateral Negotiations on the Use of Nuclear Power Sources in Outer Space" (1987) XIV *Annals of Air and Space L.* 297, for the historical background for placing the Principles on Nuclear Power Sources on the agenda.

11. *Supra*, note 9. The Principles begin by declaring that activities involving the use of nuclear power sources in outer space are to be carried out in accordance with international law (Principle 1). They recognize that the use of nuclear power sources may be essential to some space missions, but that such use involves some risk of accidental exposure to the public of harmful radiation or radioactive material (at the Preamble). Laying out guidelines and criteria for safe use, they state that, in order to minimize the quantity of radioactive material in space and the risks involved, the use of nuclear power sources in outer space are to be restricted to those space missions which cannot be operated by non-nuclear energy sources in a reasonable way (Principle 3). Nuclear reactors may be operated on interplanetary missions, in sufficiently high orbits, or in low-Earth orbits if they are stored in sufficiently high orbits after the operational part of their mission (Principle 3, para. 2(a)). Also they should not be made critical, and they should be designed and constructed to ensure they cannot become critical, before reaching their operating orbit (Principle 3, paras. 2(d) & (e)). Radioisotope generators should be designed to be able to withstand atmospheric re-entry and surface impact without spreading radioactive material into the environment (Principle 3, para. 3). The Principles oblige a State launching a nuclear power source to make a thorough safety assessment of the mission and all systems involved, and to make the results of the assessment publicly available (Principle 4). In case of a malfunction of a space object with nuclear power sources on board, with a risk of re-entry of radioactive materials to Earth, the launching State is obliged to inform other States and the Secretary-General of the United Nations, of this event (Principle 5), and provide assistance to eliminate any harmful effects caused by this re-entry (Principle 7). The NPS Principles, restating basic principles of space law, note that States are internationally responsible for national activities involving the use of nuclear power sources in outer space (Principle 8), and that a launching State is liable for any damage caused (Principle 9).

12. *Ibid.* at Principle 11.

13. See, Doc. A/AC.105/571 of 10 March 1994, *Report of the Scientific and Technical Subcommittee on the Work of its Thirty-First Session* (21 February-3 March 1994) at paras. 53-62 and Annex III [hereinafter *S&T 31st*]; Doc. A/AC.105/573 of 14 April 1994, *Report of the Legal Subcommittee on the Work of its Thirty-Third Session* (21 March- 5 April 1994) at paras. 23-30 and Annex I [hereinafter *LSC 33rd*]; Doc. A/AC.105/605 of 24 February 1995, *Report of the Scientific and Technical Subcommittee on the Work of its Thirty-Second Session* (6-16 February 1995) at paras. 63-74 [hereinafter *S&T 32nd*]; and, Doc. A/AC.105/607 of 19 April 1995, *Report of the Legal Subcommittee on the Work of its Thirty-Fourth Session* (27 March -7 April 1995) at paras. 24-29 [hereinafter *LSC 34th*].

14. *S&T 32nd, ibid.* at para. 65 and *LSC 34th, ibid.* at para. 26.

15. See, for greater detail, N. Jasentuliyana, "An Assessment of the United Nations Principles on the Use of Nuclear Power Sources in Outer Space" (1993) 36 *Colloquium on the Law of Outer Space* 312.

16. The full title of this item is: "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".

17. In the United Nations, the *Ad Hoc* Committee, in 1959, first considered the question of the definition of outer space and it concluded that it was not a problem calling for priority consideration: see, Doc. A/4141 of 14 July 1959, *Report of the Ad Hoc Committee on the Peaceful Uses of Outer Space* at 25 [hereinafter *Doc A/4141*]. The matter was subsequently raised off-and-on in the early sessions of the Legal Subcommittee, without any substantial result. Eventually, the General Assembly, in its resolution 2222 (XXI) of 19 December 1966 requested COPUOS "to begin ... the study of questions relative to the definition of outer space ...". The question of the definition of outer space was put on the agenda of the sixth session of the Legal Subcommittee under the rubric "Study of the questions relative to: (a) the definition of outer space; (b) the utilization of outer space and celestial bodies, including the various implications of space communications": see, *Report of*

the Legal Sub-Committee on the Work of its Sixth Session (19 June - 14 July 1967) to the Committee on the Peaceful Uses of Outer Space, Doc. A/AC.105/37 of 14 July 1967, at para. 4(4). The matter has been on the agenda of the Legal Subcommittee ever since, with the agenda item going through several changes in its title, until the LSC settled on the current version at the twenty-fourth session of the Legal Subcommittee, in 1985.

For a review of the subject-matter of the definition/delimitation question, see, Doc. A/AC.105/C.2/7 of 7 May 1970 and Doc. A/AC.105/C.2/7/Add. 1 of 21 January 1977, *The Question of the Definition and/or the Delimitation of Outer Space: Background Paper Prepared by the Secretariat*. For a comprehensive review of both topics of the agenda item, i.e. the definition question and the geostationary orbit matter, see e.g. N. Jasentuliyana, "The International Regulatory Regime for Satellite Communications: The Meaning for Developing Countries" (1994) 2 *Asian Yrbk. Int'l L.* 49; D. Goedhuis, "Some Observations on the Problem of the Definition and/or the Delimitation of Outer Space" (1977) II *Annals Air & Space L.* 287; B. Cheng, "The Legal Regime of Airspace and Outer Space: The Boundary Problem; Functionalism versus Spatialism: The Major Premises" (1980) V *Annals of Air & Space L.* 323; S. Mishra & T. Pavlasek, "On the Lack of Physical Bases for Defining a Boundary Between Air Space and Outer Space" (1982) VII *Annals Air & Space L.* 399; and, M. Benkő & W. de Graaff, "Questions Relating to the Definition/Delimitation of Outer Space and Outer Space Activities and the Character and Utilization of the Geostationary Orbit" in M. Benkő, W. de Graaff & G.G.M. Reijnen, *Space Law in the United Nations* (Dordrecht, The Netherlands: M. Nijhoff, 1985).

18. At the 31st session of the Legal Subcommittee in 1992, the delegation of the Russian Federation submitted a working paper (Doc. A/AC.105/C.2/L.189) on questions concerning the legal regime for aerospace objects. At the 32nd session of the Subcommittee in 1993, the Chairman of the Working Group on agenda item 4 of the Subcommittee (definition of outer space and utilization of the geostationary orbit) circulated an informal working paper called "Draft questionnaire concerning aerospace objects" (Doc. A/AC.105/C.2/1993/CRP.1). The Chairman's paper was based on the Russian working paper, and contained questions both of a technical and legal nature relating to aerospace objects. At its thirty-

fourth session, the Working Group finalized the questionnaire, now entitled, "Questionnaire on possible legal issues with regard to aerospace objects" (Doc. A/AC.105/C.2/1995/CRP.3/Rev.3 of 31 March 1995, which still remains an Informal Working Paper Submitted by the Chairman of the Working Group): see, LSC 34th, *supra* note 13 at Annex I, appendix.

19. LSC 34th, *ibid.* at Annex I, para. 29.

20. See generally, the Colombian working paper, "Geostationary satellite orbit" (Doc. A/AC.105/C.2/L.192 of 30 March 1993) which proposes principles for such a special regime. The paper was introduced by Colombia at the 32nd session of the Legal Subcommittee, held from 22 March-8 April 1993. See, paras. 24-38 of Annex II of the Subcommittee's report (A/AC.105/544 of 15 April 1993). The paper is annexed to the report. It can also be found in the reports to the 33rd and 34th sessions of the Subcommittee, held in 1994 and 1995, *supra* note 13. The paper seeks to ensure the rational and equitable use of the GSO. It has been submitted to develop legal principles, such as equity and efficacy, already norms of positive law as contained in the ITU Convention and Regulations, and which regulated certain aspects of the use of the GSO. The goal of the working paper is to find a legal solution to guarantee, in practice, equitable access to the Orbit, through the establishment of certain preferential rights for developing countries and countries that currently do not have access to the GSO, without prejudicing the technical role of the ITU in this matter. At the 1995 session of the Legal Subcommittee, the debate was constructive enough for the sponsor to declare his intention of submitting, at the 1996 session of the Subcommittee, a revised version of the paper, as well as an annex giving an explanation of the ideas raised in the working paper.

21. The full title of this agenda item is: "Consideration of the legal aspects related to the application of the principle that the exploration and utilization of outer space should be carried out for the benefit and in the interests of all States, taking into particular account the needs of developing countries". See generally, N. Jasentuliyana, "Article I of the Outer Space Treaty Revisited", (1989) 17 *J. Space L.* 129.

22. The Legal Subcommittee, at its 26th and 27th sessions held in 1987 and 1988, resp., considered and finalized the choice of this new item, before placing it

on the agenda at its 28th session, in 1989: *see*, Docs. A/AC.105/385, 411 and 430, being the reports of the 26th to 28th sessions of the Legal Subcommittee.

23. For a detailed up-to-date discussion of this issue, *see*, N. Jasentuliyana, "Ensuring Equal Access to the Benefits of Space Technologies for all Countries" (1994) 10 *Space Policy* 7.

24. *See*, LSC 34th, *supra* note 13, for the Working Paper jointly co-sponsored by Brazil, Chile, Colombia, Egypt, Iraq, Mexico, Nigeria, Pakistan, Philippines, Uruguay and Venezuela, "Principles Regarding International Cooperation in the Exploration and Utilization of Outer Space for Peaceful Purposes" (Doc. A/AC.105/C.2/L.182/Rev.2 of 23 March 1995). Principle I, after partly re-stating Article I, paragraph 1, of the Outer Space Treaty, urges all States with space capabilities to promote cooperation with countries with less developed space capabilities. Principle II addresses the issue of ensuring equal access to the applications of space technology. Principle III primarily addresses the question of promoting indigenous capabilities in space science and technology application in developing countries through international cooperative mechanisms and Principle IV refers to the conditions under which such cooperation should be established and implemented. The need to utilize space technology and applications as a vehicle to protect and preserve the Earth and space environments is covered by Principle V. The next Principle deals with the role of the United Nations and its Programme on Space Applications in international space cooperation.

25. The paper, entitled, "Consideration of the legal aspects related to the application of the principle that the exploration and utilization of outer space should be carried out for the benefit and in the interests of all States, taking into particular account the needs of developing countries" (Doc. A/AC.105/C.2/L.197 of 27 March 1995) is reproduced in LSC 34th, *ibid*.

26. The statement by the German delegation at the 34th session of the Legal Subcommittee. *See*, A/AC.105/C.2/SR.584 of 5 April 1995.

27. *See*, Informal Working Paper Submitted by the Chairman of the Working Group (Doc. A/AC.105/C.2/1995/CRP.5 of 6 April 1995, as amended), entitled, "Working paper on a declaration on international cooperation in the exploration and use of

outer space for the benefit and in the interests of all States, taking into particular account the needs of developing countries," in LSC 34th, *supra* note 13.

28. *See*, for example, H. Baker, "Current Space Debris Policy and its Implications" (1989) 32 *Colloquium on the Law of Outer Space* 59; I.H.Ph. Diederiks-Verschoor, "The Increasing Problem of Space Debris and their Legal Solutions" (1989) 32 *Colloquium on the Law of Outer Space* 77 [hereinafter *Space Debris Solutions*] and, C.Q. Christol, "Scientific and Legal Aspects of Space Debris" (1993) 36 *Colloquium on the Law of Outer Space* 368.

29. *See*, S&T 31st, *supra* note 13 at 12-13.

30. *See*, LSC 33rd, *supra* note 13 at para. 19.

31. *See*, LSC 34th, *supra* note 13, at para. 19.

32. The papers presented at the Symposium are reproduced elsewhere in this volume.

33. *See*, S&T 32nd, *supra* note 13 at para. 83, which reads as follows:

"In order to advance in its consideration of space debris, the following work plan was adopted by the Subcommittee:

1996: Measurements of space debris, understanding of data and effects of this environment on space systems

Measurements of space debris comprise all processes by which information on the near-Earth particulate environment is gained through ground- and space-based sensors. The effect (impact of particulates and resulting damage) of this environment on space systems should be described.

1997: Modelling of space debris environment and risk assessment

A space debris model is a mathematical description of the current and future distribution in space of debris as a function of its size and other physical parameters. Aspects to be addressed are:

- Analysis of fragmentation models

- Short- and long-term evolution of the space debris population
- Comparison of models.

The various methods for collision risk assessment should be critically reviewed.

1998: Space debris mitigation measures

Mitigation comprises reduction of the space debris population growth and protection against particulate impact. Measures for the reduction of space debris growth include methods for debris prevention and removal. Protection against space debris includes:

- Physical protection with shielding
- Protection through collision avoidance.

Each session should review the current operational debris mitigation practices and consider future mitigation methods with regard to cost efficiency."

34. See, in particular, the working papers submitted by Pakistan ("Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space": A/AC.105/C.1/L.191 of 22 February 1994), India ("Preliminary Concept Paper for UNISPACE-III": A/AC.105/C.1/L.195 of 22 February 1994 and "Holding of a third UNISPACE Conference—Answers to a few key questions": A/AC.105/1995/CRP.9") and the Group of 77 (A/AC.105/C.1/L.199 of 2 March 1994). Also see, A/AC.105/575 and Add. 1 of 9 May 1994 and 1 December 1994, resp., "Matters Related to the Possible Holding of a Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space: Report by the Secretariat".

35. By the 1960s, the rapid growth of space technology, and its potential for important applications, was already clear. This led to the convening in Vienna, in 1968, of the first United Nations Conference on the Exploration and Peaceful Uses of Outer Space: See, "Space Exploration and Applications: Papers Presented at the United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 14-27 August 1968" (United Nations, Sales No. E.69.I.16, vols. I and II). UNISPACE, as the Conference came to be known, reviewed progress in space science, technology and

applications and called for increased international cooperation. As a result, the United Nations Programme on Space Applications was created in 1970 to assist developing countries in using space-related technologies for development. The Space Applications Programme was mandated to create awareness on the part of policy makers and interested government agencies of the benefits that could be derived from the applications of space technology and to encourage training and education programmes to enable officials from developing countries to gain practical experience in these applications.

Over the course of the 1970s, space applications programmes were developed by the United Nations and the specialized agencies concerned with telecommunications, meteorology, disaster warning and relief, environmental monitoring and remote sensing for agriculture, forestry, geology, cartography and other resource development applications.

An updated review of the progress in space activities was conducted at the Second UNISPACE Conference, also held in Vienna, in 1982: See, generally, UN Doc. A/CONF.101/10, and Corr. 1 and 2, Report of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 9-21 August 1982. The Conference gave a new impetus to the Programme on Space Applications, which was strengthened and oriented to promote indigenous capabilities in developing countries. *Inter alia*, the Programme was directed to focus its attention on issues such as promotion of greater exchange of actual experiences with specific applications, promotion of greater cooperation in space science and technology between developed and developing countries as well as among developing countries, organization of seminars on advanced space applications for managers and leaders of space applications, dissemination of information on new and advanced technologies and applications, with emphasis on their relevance and implications for developing countries, and the provision of technical advisory services on space applications projects, upon request by Member States or any of the specialized agencies: See, GA Res. 37/90 of 10 December 1982.

36. See, S&T 31st, *supra* note 13 at paras. 109-116 and Annex II, paras. 20-21; A/49/20, *Report of the Committee on the Peaceful Uses of Outer Space* (6-16 June 1994) at paras. 144-149; S&T 32nd, *supra* note 13 at 129-131 and Annex II, paras. 13-59; and, A/50/20, *Report of the Committee on the Peaceful*

Uses of Outer Space (12-22 June 1995) at para. 157-165.

37. See, A/50/20, *ibid.* at para. 157.

38. *Ibid.* at para. 163.

39. See, Space Debris Solutions, *supra* note 28 at 79 (referring to proposals by K.-H. Böckstiegel).

40. *Ibid.* (referring to a proposal by T. Masson-Zwaan).

41. See, N. Jasentuliyana, "Space Activities and International Environmental Protection: Perspectives on the United Nations Role" (1990) 33 *Colloquium on the Law of Outer Space* 152 at 154; and, N. Jasentuliyana, "Celebrating Fifty Years of the Chicago Convention Twenty-Five Years after the Moon Landing: Lessons for Space Law" (1994) XIX-II *Annals Air & Space L.* 429 [hereinafter *Standards*].

42. See, *Standards, ibid.*, which is a detailed discussion on the issue of formulating international standards and recommended practices for space law, based on those of the International Civil Aviation Organization (ICAO).

43. Other examples are: (i) In the **Outer Space Treaty, 1967**, *Art. V* calls on States to render astronauts assistance in the event of an accident, distress, or emergency landing, without giving the procedure to be followed for doing so; (ii) In the **Rescue Agreement, 1968** the procedures to be followed in case assistance is rendered to astronauts in distress, in case of search and rescue operations, and for other actions that may be taken under the treaty, are not elucidated; (iii) In the **Registration Convention, 1974**, *Art. VI* would become more practical if standards had been established for the provision of assistance called for in the Article; further, the lack of registration of space debris and chemical and other pollutants and effusions released by space objects during or after launch, is a serious weakness in the Convention; (v) In the **Moon Agreement, 1979**, in *Art. 7*, the "measures" to be taken to prevent the disruption of the Moon environment are not spelt out; further, no criteria defining the "harmful" contamination of the Moon are provided; Standards and procedures for activities under *Arts. 8 and 9* (the pursuit of activities on the Moon and the establishment of stations on the Moon, respectively) are not given; the

"practicable measures" for safeguarding life on the Moon, under *Art. 10* should be standardized; *Art. 11* would have had more meaning if the international regime and the "appropriate procedures" in paragraph (5) had been more technically detailed. If the technicalities of the international regime of *Art. 11* had been furnished, the Moon Agreement could have become more acceptable to States; the consultation procedure envisaged in *Art. 15* is not prescribed.

It could be said, however, that the **Registration Convention** does made provisions, to an extremely limited extent, for what may be called international space standards. These international "standards" are found in *Art. IV* of the Treaty, which reads as follows:

1. Each State of registry shall furnish to the Secretary-General of the United Nations, as soon as practicable, the following information concerning each space object carried on its registry:

(a) name of launching State or States;

(b) an appropriate designator of the space object or its registration number;

(c) date and territory or location of launch;

(d) basic orbital parameters, including:

(i) nodal period,

(ii) inclination,

(iii) apogee,

(iv) perigee;

(e) general function of the space object.

[rest omitted]

44. For the setting of standards and recommended practices by ICAO, see *Arts. 37, 38, 54(1), 57, and 90* of the *Convention on International Civil Aviation* (the "Chicago Convention"), Opened for signature at Chicago, Illinois, on 7 December 1944, 15 UNTS 295; ICAO Doc 7300/6. Over 180 States are Parties to the Chicago Convention.

45. See, for example, S. Gorove, "Implications of International Space Law for Private Enterprise" (1982) VII *Annals of Air & Space Law* 319; K-H. Böckstiegel, "Commercial Space Activities: Their Growing Influence on Space Law" (1987) XII *Annals of Air & Space Law* 175 (1987); and He Qizhi, "Legal

Aspects of Commercialization of Space Activities" (1990) XV *Annals of Air & Space Law* 333.

46. See, for example, P. Nesgos, "Commercial Space Transportation: A New Industry Emerges" (1991) XVI *Annals of Air & Space Law* 393.

47. See, for example, F. Lorient, "Propriété intellectuelle et droit spatial" (1979) IV *Annals of Air & Space Law* 553.

48. See, for example, J-L. Magdelénat, "Spacecraft Insurance" (1982) VII *Annals of Air & Space Law* 363 and I.H. Ph. Diederiks-Verschoor, "L'assurance des satellites" (1985) X *Annals of Air & Space Law* 319.

49. See, for an overview, I.H. Ph. Diederiks-Verschoor, *An Introduction to Space Law* (Deventer, The Netherlands: Kluwer Law and Taxation Publishers, 1993).

50. See, "Clash Over 'Patent on Space' Looms for Telecoms Groups", in *Financial Times*, 8 May 1995, page 1.

51. In this regard, several international institutions prepared, in 1988, a *Draft Convention on Manned Space Flight*. These are the Research and Study of Space Law and Policy Center of the University of Mississippi Law School, USA, the Institute of Air and Space Law of Cologne University and the Institute of State and Law of the Academy of Sciences of the USSR. The Draft Convention is reproduced in: (1991) *Soviet Journal of Int'l L.* 75 (in Russian); (1990) 18 *J. Space L.* 209; and, (1991) *ZLW* Heft 1, S.3-8.

52. For greater details, see "ICAO's Communications, Navigation, and Surveillance/Air Traffic Management (CNS/ATM) Systems", a presentation made by J. Chagas, Chief, Communications Section, Air Navigation Bureau, ICAO, at the UN 16th Session of the *Ad Hoc* Inter-Agency Meeting on Outer Space Activities, Vienna, 3 October 1994; and, R.I.R. Abeyratne, "The Evolution from FANS to CNS/ATM and Products Liability of Technology Providers in the United States" (1994) 43 *ZLW* 156.

53. This applies as well to Inmarsat's plan to allocate transponders on its Inmarsat-3 satellites for civil users of the U.S. operated Global Positioning

System (GPS), and the Russian Global Navigation Satellite System (GLONASS). See, for a detailed report on the GPS system, the United States National Research Council's recent publication, *The Global Positioning System: A Shared National Asset* (Washington, D.C.: National Academy Press, 1995).

54. See, for example, E. Booker, "The Whole World in Your Pocket: Low-orbit Satellites Could Allow You to Make Mobile Calls from Anywhere to Anywhere" (7 September 1992) *Computerworld* 24; R.J. Cochetti, "Mobile Satellite Services: An Overview of Major GEO, LEO, MEO and HEO Systems" (November 1994) *Via Satellite* 26; T. Furnish, "Quest for the Cordless Society" (November 1993) *Space*; and, J. Neher, "World is Up for Grabs in Cellular Phone Rush" *International Herald Tribune* (27 April 1994) at 1.

55. To reflect properly the role of the Organization in the modern world, the Inmarsat Assembly of Parties, at its 10th (Extraordinary) Session, held from 5-9 December 1994, adopted and confirmed amendments to the Inmarsat Convention and Operating Agreement to change the name of the Organization from "International Maritime Satellite Organization (INMARSAT)" to the International Mobile Satellite Organization. Although created to serve maritime traffic with telecommunications services, a major part of its current system now serves land- and air-mobile communications services.

56. Wright, "Mobile Satellite Communications in Developing Countries: The Role of Inmarsat" (1994) 18 *Telecommunications Policy* 5 at 6-7: The service, called Project 21, aims at providing customers with a variety of personal satellite communication services. The "core" of the project is "Inmarsat-P", a handheld satellite cellular telephone service.

57. P. Seitz, *Comsat Argues for Inmarsat-P Role* 24 *SPACE NEWS* (8-14 May 1995).

58. *Ibid.*