Proceedings of the Workshop on Space Law in the Twenty-first Century

Organized by the
International Institute of Space Law
with the
United Nations Office for Outer Space Affairs

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Introduction

The Workshop on Space Law in the 21st Century, coordinated by the International Institute of Space Law (IISL), was held between 20 and 23 July 1999 in Vienna, Austria, as part of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III). More than 120 participants attended the Workshop, all contributing to an active discussion on the future of Space Law.

The IISL Workshop comprised eight sessions, covering current concerns in the field of space law. Each session began with the presentation of a discussion paper by an invited speaker, followed by invited papers commenting on the discussion paper, as well as informal discussion and comments. At the end of each session, the Coordinator/Rapporteur of the session presented a summary report on significant issues raised in the session and, following a general discussion, the findings, conclusions and recommendations of the session were consolidated in a single document.

At the conclusion of the eight substantive sessions, the "Workshop Executive Committee", consisting of the chairperson of each session, the Workshop Coordinator, and the President of the International Institute of Space Law, who was the overall chairperson of the Workshop, met to discuss the reports of the sessions. The session reports were integrated into the Workshop's Final Report to the UNISPACE III Conference. The Report of the Workshop was discussed actively and in great detail in Committee I of the UNISPACE III Conference. Reflecting the importance attached to the Workshop by the participants of UNISPACE III, government delegations adopted several of its proposals as part of the UNISPACE III Report, which sets the international agenda for space law and policy in the coming decades.

This publication contains the discussion papers of each session, selected papers presented at the Workshop, the summary reports of each session and the final report of the Workshop, as well as the section of the UNISPACE III Report addressing "International Space Law".

I would like to take this opportunity to express special thanks to Dr. Stephen E. Doyle of IISL for his outstanding support in organizing and managing the Workshop as its Coordinator. The invaluable assistance of Ms. Masami Onoda of the Office for Outer Space Affairs as Assistant Coordinator is gratefully acknowledged. Thanks are also due to Jochen Elsen, Anna Wigler, Alex Hantosi and Ramu Katkuri, who provided assistance to the Workshop and in particular to Charles Davies for compiling and formatting this publication. Finally, the IISL is grateful to all participants for making the Workshop a success, and whose knowledge and vision provided new perspectives of Space Law for consideration in the early decades of the Twenty-first Century.

September 1999,

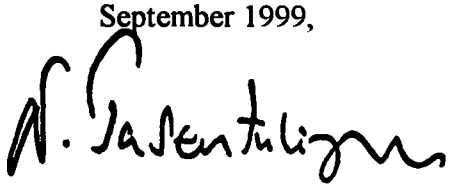

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Table of Contents

Annexes

CONCLUSIONS AND PROPOSALS OF THE WORKSHOP ON SPACE LAW IN THE TWENTY-FIRST CENTURY, ORGANIZED BY THE INTERNATIONAL INSTITUTE OF SPACE LAW

I. Introduction

1. The Workshop on Space Law in the Twenty-first Century, organized by the International Institute of Space Law, noted that the Treaty on Principles Governing the Activities of States on the Exploration and use of Outer Space, including the Moon and Other Celestial Bodies, (General Assembly resolution 2222 (XXI), annex, of 19 December 1966) and other international instruments built upon it had been successful in answering the challenge to create a legal framework for exploration and peaceful uses of outer space and had thereby preserved the space environment for the benefit of humankind. However, the present significant changes in space activities had given rise to a need for further developing that framework, while protecting what the international community had gained.

2. The Workshop also noted that the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space, as a vehicle for law-making within the United Nations, was currently in a unique position to take up issues related to space law in an exploratory way. Those issues could be dealt with by the Legal Subcommittee in a flexible manner, subject to decision by the Committee and the General Assembly on the sequence in which they should be included in the agenda of the Subcommittee.

3. The Workshop proposed the recommendations listed below.

II. Conclusions and proposals

4. The rapid expansion of private activities in and related to outer space requires examination of many aspects of existing space law, in particular:

(a) With respect to space application services, which give rise to responsibility, liability and jurisdiction issues not currently covered by space law;

(b) The impact of commercialization and privatization of space activities on the public service aspects of such services;

(c) Intellectual property rights and technology transfer issues that may require special treatment for global uniformity in practice;

(d) The protection of investors' rights as regards space objects and space artefacts, which may require totally new approaches in order for it to be effective and enforceable;

(e) The nationality of spacecraft;

(f) The protection of the environment, where private entities are currently not held directly accountable.

It is recommended that a new paragraph 319 *bis* be added to the draft report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (A/CONF.184/3 and Corr.1 and 2) as follows:

"319 *bis*. Member States of the United

Nations should initiate discussion of and seek solutions to emerging legal problems of relevance and should, in particular recognize the need to consider the expanding role of private enterprise when making new laws. With regard to the protection of the environment, the establishment of launch standards and environmental impact assessments should be examined. Specialized agencies should consider drafting standards and recommended practices as well as models for partnerships involving public and private enterprises in their respective sectors of space activity. The concept of 'public service' and its various manifestations should be developed further, paying particular attention to the global public interest and to the needs of developing countries. The principles of fair trade should be strengthened. Attention should also be paid to the various aspects of the issues of liability and security of ownership in order to arrive at a coherent global framework. The international organizations concerned should make arrangements for effective and focused joint forums."

5. As the use of outer space expands, it has been proven that many of the resources (orbits, frequencies, access to ground infrastructure, etc.) have turned out to be no longer unlimited. Consequently, such resources should be dealt with by means of coherent frameworks for global resource management. The global public interest in this field can be safeguarded primarily by public institutions. There is currently a need for coordination in this area. It is recommended that a new paragraph 319 *ter* be added to the draft report as follows:

"319 *ter*. Member States of the United Nations should consider possible coordinating frameworks for space-related global resource management. This work should focus on the needs, the potential conflicts, the natural limits, the values, the costs and the growing privatization of space activities. International organizations involved in space activities should seek coordination at an early stage. There is a need to have at least a code of conduct concerning space debris. To this end, previous work in this area should be taken into account with a view to identifying possible models. The Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space, together with its Scientific and Technical Subcommittee, should discuss the topic without delay. The development of a legal regime for low-Earth orbits (LEOs) should be considered, taking into account recent changes in the ITU convention concerning the status of LEOs as limited natural resources. The issue of security of ownership regarding spacecraft should be addressed promptly, for example, by means of an international inventory linked to the Register of space objects maintained by the Secretary-General of the United Nations. The General Assembly should encourage Member States to adhere to the Convention on Registration of Objects Launched into Outer Space (Assembly resolution 3235 (XXIX), annex, of 12 November 1974). In the context of the role of international organizations, the issue of consumer rights should be dealt with. The General Assembly, through the Committee on the Peaceful Uses of Outer Space and/or through special meetings for this purpose, should consider soon how best to coordinate the burgeoning demands on global resources generated by expanding space activities, both governmental and non-governmental."

6. The ongoing development of space activities requires the resolution of a growing number of issues. Space activities are increasingly being affected by the expanding body of international economic law, which is blurring the boundaries

between public and private law and generating more reliance on recommended standards and practices. In this environment, it is important to have appropriate dispute settlement mechanisms for giving effect to the principles of outer space law in a flexible and timely manner. It is recommended that a new paragraph 319 *quater* be added to the draft report as follows:

> "319 *quater*. The General Assembly should consider the development of effective mechanisms for the settlement of disputes arising in relation to space commercialization. Those mechanisms should take into account existing arbitration rules used in international practice for dispute settlement."

7. The expanding growth in areas such as commercial remote sensing services, commercial complexity, the effect on international cooperation and scientific and industrial applications of services necessitates consideration of appropriate regulations. National restrictions on access to data are emerging. It is recommended that a new paragraph 321 *bis* be added to the draft report as follows:

> "321 *bis*. The Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space should initiate the drafting of a treaty covering remote sensing from outer space on the basis of the Principles Relating to Remote Sensing of the Earth from Outer Space (General Assembly resolution 41/65, annex, of 3 December 1986), taking into particular account the expanding growth in commercial remote sensing services and preserving the principle of non-discriminatory access to data."

8. Many emerging issues are influenced by rapid advances in space science and technology. Space law should be based upon a solid foundation of scientific and technological facts to ensure effective legal formulation. Interaction among scientific and legal experts will strengthen the relevance of space law. It is recommended that a new paragraph 321 *ter* be added to the draft report as follows:

> "321 *ter*. The Legal Subcommittee and the Scientific and Technical Subcommittee should in general meet at the same time so that there can be more interaction involving the work of those two bodies."

9. One of the most challenging new developments in space activities concerns expanding global navigation satellite services. It is recommended that a new paragraph 175 *bis* be added to the draft report as follows:

> "175 *bis*. The recommendations set forth in paragraphs [319 *bis*, 319 *ter*, 319 *quater*, 321 *bis* and 321 *ter*] below should apply, where relevant, to GNSS."

III. Final remark

10. The proceedings of the Workshop on Space Law in the Twenty-first Century should be referred to for clarification of the above-mentioned issues and recommendations.

REPORT OF THE THIRD UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE

Section on "International Space Law" (II.V.H.2)

(a) Status: international space law

1. International space law as developed by the United Nations through the Committee on the Peaceful Uses of Outer Space and its Legal Subcommittee reflects the importance that the world community attaches to international cooperation in the exploration and use of outer space. So far, five treaties and five sets of legal principles on matters relating to the exploration and peaceful uses of outer space have been drawn up through the United Nations, gradually establishing a sound legal regime governing space-related activities.

2. The international legal principles in the five treaties[1] have established that the exploration and use of outer space shall be the province of "all mankind"[2], and that outer space, including the Moon and other celestial bodies, is not subject to national appropriation. These legal principles have also ensured freedom of exploration. They have also banned the placement of nuclear weapons and any other kinds of weapons of mass destruction in outer space and provided for international responsibility of States for national activities in outer space, liability for damage caused by space objects, the safety and rescue of spacecraft and astronauts, the prevention of harmful interference in space activities, the avoidance of harmful contamination of celestial bodies and adverse changes in the Earth environment, the notification and registration of objects launched into outer space, scientific investigation and the exploration of natural resources in outer space, as well as the settlement of disputes. Each of the treaties lays great stress on the notion that outer space, the activities carried out there and whatever benefits might accrue from them should be devoted to enhancing the well-being of all countries and humankind, and each includes elements based on the principle of promoting international cooperation in outer space activities.

3. The five declarations and sets of legal principles[3] adopted by the General Assembly

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[1] The five treaties and agreements are the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (the "Outer Space Treaty"), adopted on 19 December 1966, opened for signature on 27 January 1967, entered into force on 10 October 1967, 95 ratifications and 27 signatures; the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (the "Rescue Agreement"), adopted on 19 December 1967, opened for signature on 22 April 1968, entered into force on 3 December 1968, 85 ratifications and 26 signatures; the Convention on International Liability for Damage Caused by Space Objects (the "Liability Convention"), adopted on 29 November 1971, opened for signature on 29 March 1972, entered into force on 1 September 1972, 80 ratifications and 26 signatures; the Convention on Registration of Objects Launched into Outer Space (the "Registration Convention"), adopted on 12 November 1974, opened for signature on 14 January 1975, entered into force on 15 September 1976, 40 ratifications and 4 signatures; and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (the "Moon Agreement"), adopted on 5 December 1979, opened for signature on 18 December 1979, entered into force on 11 July 1984, 9 ratifications and 5 signatures.

[2] Expression used in article I 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 (General Assembly resolution 2222 (XXI), annex, of 13 December 1966).

[3] The five declarations and legal principles are the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, General Assembly resolution 1962 (XVIII) of 13 December 1963; the Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting, resolution 37/92, annex,

provide for the application of international law and the promotion of international cooperation and understanding in space activities, the dissemination and exchange of information through transnational direct television broadcasting via satellite and the sharing of data and information from satellite observations of Earth's resources, and general standards regulating the safe use of nuclear power sources necessary for the exploration and use of outer space.

4. The Committee on the Peaceful Uses of Outer Space and its Legal Subcommittee are currently considering the question of the review and possible revision of the principles relevant to the use of nuclear power sources in outer space; matters relating to the definition and delimitation of outer space and to the character and utilization of the geostationary orbit, including consideration of ways and means to ensure the rational and equitable use of the geostationary orbit, without prejudice to the role of ITU; and a review of the status of the five international legal instruments governing outer space. It is important to highlight the developments in dealing with some of these topics, for example relative to the geostationary orbit, in the light of the recommendations by UNISPACE 82, that have been reflected in legal instruments developed in other bodies in the United Nations system. This is true for ITU with regard to the implementation of guaranteed equitable access in accordance with what has been established in international conferences and in the constitution and norms of ITU. It is also true for the progress that has been made in studying the topics on the basis of recent proposals and agreements in the Committee on the Peaceful Uses of Outer Space, in particular on the statement that the geostationary orbit is an integral part of outer space.

5. Other intergovernmental organizations, in particular those of the United Nations system, are also contributing to the legal regime governing international cooperative space activities. Among them are ITU, WIPO, WMO and the International Atomic Energy Agency (IAEA). In addition, multilateral and bilateral treaties and agreements have secured the establishment and operation of international and regional space organizations and bodies, such as ESA, the International Telecommunications Satellite Organization, the Arab Satellite Communications Organization, the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), Inmarsat and the International Organization of Space Communications (Intersputnik), and the development of cooperative programmes, such as the Council on International Cooperation in the Study and Utilization of Outer Space, the COSPAS-SARSAT search and rescue satellite system and the International Space Station. Some individual States and groups of States have also added to the corpus of space law through the adoption of their national laws and agreements within the groups governing their activities in outer space and their goals for international cooperative ventures.

(b) Issues and objectives

6. The United Nations has succeeded in progressively developing and elaborating (in accordance with Article 13 of the Charter of the United Nations), in the form of treaties and declarations, a body of principles and norms relating to space activities which is considered a well-established branch of international law governing space activities. In recent years, the increase in space activities has given rise to new, highly technical issues such as, *inter alia*, space debris, the use of nuclear power sources in space and the protection of intellectual property rights. Those subjects pose many challenging legal questions that call for creative solutions through international cooperation if international space law is to keep pace with the rapid advances in space technology and activities. Such solutions

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of 10 December 1982; the Principles Relating to Remote Sensing of the Earth from Outer Space, resolution 41/65, annex, of 3 December 1986; the Principles Relevant to the Use of Nuclear Power Sources in Outer Space, resolution 47/68 of 14 December 1992; and the 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, resolution 51/122, annex, of 13 December 1996.

should be sought on the basis of respect for the principles, declarations and resolutions of the United Nations General Assembly and taking into account the needs of developing countries.

7. Innovations in space technology are also bringing activities geared towards the exploitation of natural resources in outer space and on the various celestial bodies within the realm of feasibility. In view of the apparent lack of international consensus on the principles embodied in the Moon Agreement, as shown by its relatively low level of ratification, issues relating to the ownership of and equitable access to such resources should require further substantial consideration and study within the field of international law.

8. Since UNISPACE 82 (see paras. 21-27 above), the world has witnessed a considerable growth in the commercialization and privatization of space-related activities. That trend has led to significant increases in the number of non-state actors involved in the exploration and use of outer space, as well as the number of different activities in which they are engaged. Satellite telecommunications, satellite navigation and positioning, the provision of launching equipment and services and remote sensing are, in some cases, already developing into rapidly growing private industries. Similarly, activities such as space tourism, the mining of asteroids and other celestial bodies and waste disposal in outer space are being seriously considered as possibilities for private space enterprise in the not too distant future. These activities have given rise to new legal challenges.

9. Member States of the United Nations should initiate discussion of and seek solutions to emerging legal problems of relevance and should, in particular, recognize the need to consider the expanding role of private enterprise when making new laws. Specialized agencies should consider drafting standards and recommended practices as well as models for partnerships involving public and private enterprises in their respective sectors of space activity. The concept of "public service" and its various manifestations should be developed further, paying particular attention to the global public interest and to the needs of developing countries. The principles of fair trade should be strengthened. Attention should also be paid to the various aspects of the issues of liability and security of ownership in order to arrive at a coherent global framework. The international organizations concerned should make arrangements for effective and focused joint forums.[4]

10. The Committee on the Peaceful Uses of Outer Space should give attention to various aspects of space debris. The Committee on the Peaceful Uses of Outer Space should also consider the legal issues regarding low-Earth orbits (LEOs), taking into account recent changes in the ITU convention concerning the status of LEOs as limited natural resources. The issue of security of ownership regarding spacecraft should be addressed.[4]

11. The Member States should consider the development of effective mechanisms for the settlement of disputes arising in relation to space commercialization. Those mechanisms should take into account existing arbitration rules used in international practice for dispute settlement.[4]

12. A further pressing concern is the fact that many States have not yet become parties to the outer space treaties concluded within the framework of the United Nations. Despite annual resolutions by the General Assembly inviting States to consider ratification or accession to the treaties, the apparent decline in the willingness of States to bind themselves to the terms of successive treaties[5] tends to undermine the normative authority of the later international agreements. The Committee on the Peaceful Uses of Outer Space and its Legal Subcommittee have solicited the views of States regarding the

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[4] Proposed by the Workshop on Space Law in the Twenty-first Century, organized by the International Institute of Space Law.

[5] For example, the 1979 Moon Agreement has been ratified by only 9 States and signed by an additional 5 States, as opposed to the Outer Space Treaty of 1967, which has been ratified by 94 States and signed by an additional 27 States.

obstacles that impede ratification of the five international legal instruments governing outer space [6] and have begun a review of the status of those legal instruments with a view to initiating discussion on the situation. The exercise has also drawn attention to the fact that actual adherence in practice by States to the provisions of the treaties to which they are parties is less than optimal, itself a matter requiring immediate consideration. In this regard, States are urged to ensure that their national legislation conforms with the treaties.

13. The role of the Committee on the Peaceful Uses of Outer Space and its Legal Subcommittee as mechanisms for the elaboration of necessary and appropriate principles and rules regulating outer space needs to be strengthened in order to meet the requirements of a rapidly advancing field of human activity. This might entail consideration by them of such issues as those already suggested by Member States for inclusion in the agenda of the Legal Subcommittee: commercial aspects of space activities (e.g. property rights, insurance and liability); legal aspects of space debris and review of existing norms of international law applicable to it; comparative review of the principles of international space law and international environmental law; review of the principles on direct television broadcasting and remote sensing of Earth, with a view to the possible transformation of those texts into treaties; examination of the procedures resulting in the Agreement relating to the implementation of part XI of the United Nations Convention on the Law of the Sea as a possible model to encourage wider accession to the Moon Agreement; and improvement of the Convention on Registration of Objects Launched into Outer Space.[7] The agreement reached by the Committee on the Peaceful Uses of Outer Space at its forty-second session, in 1999, on new agenda structures for its two subcommittees should make it possible to enrich considerably the work of the Legal Subcommittee.

14. The Committee on the Peaceful Uses of Outer Space should analyse the desirability of drafting new legal instruments relating to various space applications, taking into particular account the commercial growth of some of these applications.[4]

15. The Legal Subcommittee and the Scientific and Technical Subcommittee should in general meet in such a way that there can be more interaction involving the work of those two bodies.[4]

16. The Committee on the Peaceful Uses of Outer Space should also consider legal and other aspects relevant to GNSS.[4]

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[6] The views received from Member States in that regard can be found in the note by the Secretariat of 2 March 1998 (A/AC.105/C.2/L.210 and Add.1).

[7] These proposals can be found in the report of the Legal Committee on the work of its thirty-seventh session (A/AC.105/698), paras. 67-69.

EXISTING UNITED NATIONS TREATIES: STRENGTHS AND NEEDS

SESSION 1

Chair: Dr. Eilene Galloway (United States of America)
Coordinator/Rapporteur: Dr. Kai-Uwe Schrogl (Germany)

SESSION ONE

Existing United Nations Treaties: Strengths and Needs

Discussion Paper

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Introduction

The purpose of this discussion paper is to offer an assessment of the up-to-date space legislation accomplished within the United Nations and to make a brief outlook for further endeavours to continue in its development.[1] In dealing with the subject of legal issues of outer space, however, we must bear in mind that the present regulation of space activities consists of and is growing in two layers of legal norms:

The first layer is represented by the international law of outer space that governs activities of international persons, i.e. States and international intergovernmental organisations.[2] The essential part of it has been created by the United Nations and this foundation of space law should be respected by all. In addition to it, a growing number of bilateral and multilateral treaties of different kind, mostly dealing with international cooperation and individual projects thereof, have been concluded between two or more States and international organizations during recent decades.

Besides the United Nations, other international bodies of the United Nations system, such as ITU, UNESCO, FAO, WMO, IMO, WIPO and IAEA participate in the development of space law. Valuable is also the active participation of a number of organisations outside the UN system, in particular that of the European Space Agency, INTELSAT, INTERSPUTNIK, EUMETSAT, EUTELSAT, INMARSAT and others.

The second layer of the legal regulation of space activities has been developing for years by means of national laws adopted by individual space-faring States. They govern their own activities as well as activities of their nationals, both physical and juridical persons. The role of national regulations by individual States has been increasing simultaneously with the growing involvement of non-governmental entities in different space projects. However, national laws, as well as the activities of private entities performing them under the jurisdiction of individual States, should remain in full harmony with international obligations arising from the international law of outer space which should be respected as the basis of all "space law".

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1 The opinions expressed in this paper are those of the author and do not necessarily reflect the views of the United Nations or other national and international organisations in which he is active.

2 Individuals, which are now mostly recognized in theory and practice as the third category of international law subjects, have not yet played an active role in the field of international space law. However, this may change in the future.

Achievements of the United Nations in the establishment of international space law by a series of space treaties

Let us first concentrate on the role and achievements of the United Nations in the establishment of international space law as a special system within the present international law. Its purpose is to govern all activities, or different categories of such activities, in and relating to outer space including celestial bodies.

It is generally known that the space legislation in the United Nations has been worked out through the Committee on the Peaceful Uses of Outer Space (COPUOS), which was established by General Assembly resolution 1348 (XIII) of December 1958, first as an Ad hoc body, and then transformed one year later by resolution 1472 (XIV) of 12 December 1959 into a permanent organ of the General Assembly. During its existence, the membership of the Committee was expanded several times and by its present number (61 States) includes approximately one third of the whole UN membership. Since the early 1960's, the COPUOS has become the focal point for all space-related cooperative programmes furthered by the United Nations. Two subcommittees, one Legal, the other Scientific and Technical, each composed of the same Member States as the parent body, were created for detailed consideration of specific proposals and suggestions concerning scientific, technical and legal problems submitted by the COPUOS members for the development of international cooperation in the field of space exploration for peaceful purposes. In addition to the Member States, a number of international organizations, both intergovernmental and non-governmental, which are dedicated to the development of international space cooperation, have been granted the status of observers in the Committee and its subcommittees. In this way, the basis for a meaningful discussion on space issues has been enlarged. From among the specialised organisations of the UN system, the participation of the ITU has proven to be very valuable, particularly when discussing the issue of Geostationary Satellite Orbit. The European Space Agency has been one of those actively participating organizations, too. Moreover, some non-governmental organizations, such as COSPAR, IAF and ILA, have been granted the observer status within COPUOS and participate regularly in its work.

Right in the beginning of the COPUOS deliberations, an important decision was made which since then has characterised its working methods up-to-now: the conclusions to be adopted by the Committee and both its subcommittees should be subject to agreement without need for voting.[3] It should be observed that the COPUOS thus became the first UN body which started applying in its proceedings a principle that has become later known as rule of consensus and expanded in the practice of the United Nations and also in other international organizations. The application of this rule has mostly had positive effects on the work of the Committee and its subcommittees, particularly during the first decades of their activities. Its extensive interpretation and application, however, has also created problems.

From the substantive point of view, the COPUOS and its Legal Subcommittee, in which the consideration of legal aspects of space activities has been effected now for almost four decades, adopted the method of a progressive elaboration of appropriate space law instruments. The rule of law in outer space should thus be established not by a single, all embracing international convention, but step-by-step, by a number of legal instruments dealing with the most urgent problems of space activities. Moreover, the initial discussions in the Legal Subcommittee led to the conclusion that the first legal basis for space activities should be conceived rather in principles than in detailed rules, in order to reach the necessary agreement relatively soon. In this way, the founding space legislative document of the United Nations emerged as the 1963 Declaration of Principles Governing the Activities of States in the Exploration and Use of Outer Space, which was adopted in the form of a UN General

[3] Cf. the statement of the Chairman of the COPUOS in Verbatim Records of the Ninth Meeting held on 29 March 1962, UN Doc. A/AC.105/PV.93/1962, p.3.

Assembly resolution.[4] The same approach was also maintained when this Declaration was being transformed into a legally binding instrument, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, which was opened for signature on 27 January 1967 and entered into force on 10 October the same year. Needless to say that the 1967 Outer Space Treaty (OST) became the most important space law instrument of our times, enjoying the widest acceptance by the international community from among all the UN space treaties.[5] It also became one of the significant instruments of the contemporary international law in general, which contributed to its progressive development and codification in the meaning of the UN Charter Article 13. It is possible to affirm that its principles have been recognized by the international community as a whole, thus forming a part of general international law.

Under the scope of this paper, it is not necessary to analyse this instrument in greater details. Nevertheless, it must be emphasized that the OST included some very important elements which impressed the characteristic features on the whole international space law of our times. Already its leading principle, though its wording has been an apparent compromise, spelled out not only the main purpose of the international cooperation in space activities, but also expressed the requirement for the exploration and use of outer space to be carried out for the benefit and in the interest of all countries; these activities must remain "the province of all mankind".

The Outer Space Treaty also enshrined such important principles as freedom in the exploration and use of outer space, freedom of scientific investigation in outer space and international cooperation in such activities. Furthermore, it is hardly possible to overestimate the value of the principle of non-appropriation of outer space, including the Moon and other celestial bodies, by any means. It must be emphasized that the principle of non-appropriation relates to outer space as a whole, no exception has been admitted, and therefore no part of outer space (or any celestial body) can be exempted from the impact of this principle.

A special significance must be also attached to the principles of international responsibility of States Parties to the Treaty for national space activities, whether such activities are carried out by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions of the OST. This principle goes farther than the norms of general international law relating to State responsibility. For by the declaration of responsibility which relates equally to State and non-State activities, and also by the requirement of authorization and continuing supervision of the non-governmental entities by the "appropriate" State, the States assumed in fact a direct responsibility not only for their own space activities but also for the activities of their non-governmental entities in outer space.

Moreover, the principle of international liability for damage of the State that launches or procures the launching of a space object and the State from whose territory or facility an object is launched for damage to another State or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, was established. This was done without hesitation and reservations which have usually characterized the process of negotiation on liability for damage in other legal fields. And the way for the application of this principle directly at an intergovernmental level without exhausting the local remedies has been opened.

These are but few examples of the major input done by the OST to the progressive development of international space law. On the other hand, some issues were crossed over by halfway compromises and some other issues, perhaps more prospective than impending at that time, have been totally missing in the OST. Thus, e.g., a dual system of space demilitarisation was established. While the Moon and other celestial bodies should be used exclusively for peaceful purposes, in

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[4] Cf. resolution 1962(XVIII) adopted by unanimity on 13 December 1963. See its text in United Nations Treaties and Principles on Outer Space, United Nations, New York, 1997/UN Doc. A/AC.105/572/Rev.2, pp. 37 s.

[5] See its text in United Nations Treaties and Principles on Outer Space, pp. 4 s. As of March 1998, 94 States ratified the OST and moreover, 27 States signed it.

outer space per se, only the stationing of nuclear weapons or any kinds of weapons of mass destruction was banned. At the time of conclusion of OST, this solution was a significant step forward, but the danger of an arms race in outer space, as evidenced by the later developments, has not been fully stopped. Furthermore while declaring - and thus undoubtedly legalizing - the exploration and use of outer space, including the Moon and other celestial bodies, as well as the scientific investigation thereof, the OST has not contained any explicit principle that would be to explore and exploit the space natural resources. At the time of elaboration of the OST, these problems still seemed to be too remote or perhaps they were deliberately left aside. Moreover, only some rudimentary elements relating to the position of international organisations have been provided in the OST. And last but not least, no special system of the peaceful settlement of international disputes has been provided under the Treaty régime except for "appropriate international consultations" that should be effected in the case of possible interferences among the space activities of the States Parties to the OST.

The fundamental role of the OST was confirmed by the fact that some of its principles created bases for further steps in the progressive development of outer space law. Four other UN space treaties were concluded during the period following the entry of the OST into force:

The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, which elaborated the principles of Article V of the 1967 Outer Space Treaty; it was opened for signature on 22 April 1968 and entered into force on 3 December the same year;

The Convention on International Liability for Damages Caused by Space Objects, which elaborated the principle of Article VII of the 1967 Outer Space Treaty; it was opened for signature on 29 March 1972 and entered into force on 1 September 1972;

The Convention on Registration of Objects Launched into Outer Space, which elaborated the first principle of Article VIII of the 1967 Outer Space Treaty; it was opened for signature on 14 January 1975 and entered into force on 15 September 1976; and

The Agreement Governing the Activities of States on the Moon and Other Celestial bodies, which was based on the principles of the 1967 Outer Space Treaty relating to the Moon and other celestial bodies either generally or explicitly; it was opened for signature on 18 December 1979 and entered into force on 11 July 1984.[6]

This treaty-making process, however, stopped after the adoption of the last of these instruments, the 1979 Moon Agreement, which has collected so far the signatures and ratifications of a relatively small number of States Parties, though it was adopted by the UN General Assembly also by consensus as the other UN space treaties. The main reason for the hesitation of a great number of States to adhere to the Moon Agreement seems to be the dissatisfaction with the provisions of Article 11 of this instrument, which deals with the legal status of the Moon and its natural resources that have been declared as "the common heritage of mankind". The elaboration of this principle does not satisfy either the technically advanced industrial nations, or the developing countries.

Yet the solution of this issue as it was adopted in 1979 seemed to be an adequate compromise that enabled the finalization of a lengthy work on this instrument. Unlike the legal régime provided for the seabed and ocean floor beyond the limits of national jurisdiction in the 1982 United Nations Convention on the Law of the Sea, the legal régime of the common heritage of mankind with regard to the Moon and its resources has been conceived only in general terms, requires only the exploitation of the natural resources of the Moon to be governed by the future international legal régime and its establishment has been postponed until such exploitation is about to become feasible. In the equitable sharing in the benefits derived from the Moon resources, which should be ensured for all States Parties, special consideration should be given "to the interest and needs of the developing countries, as well as efforts of those countries which have contributed

[6] See the texts of these instruments in United Nations Treaties and Principles on Outer Space, pp. 10 s., 14 s., 23 s. and 28s..

either directly or indirectly to the exploration of the Moon". On the other hand, the exploration and use of the Moon remain a right of all States Parties and the freedom of scientific investigation has been also preserved. The States Parties to the Moon Agreement have the right to collect on and remove from the Moon samples of its mineral and other substances of the Moon in quantities appropriate for the support of their missions. Finally, the future legal régime of the Moon would not necessarily lead to the establishment of a special institutional machinery for its application (as is, e.g., the Seabed Authority provided in the 1982 UN Convention on the Law of the Sea as reformed by the 1994 Agreement relating to the Implementation of part XI of the Convention)[7] for the 1979 Moon Agreement speaks only about "appropriate procedures" to be adopted.

The lack of support for the Moon Agreement has created a difficult problem, because a visible gap now exists in the up-to-date international legal system of outer space. The more so, since the provisions of the 1979 Agreement relating to the Moon should also apply to other celestial bodies within the solar system, other than the Earth, except in so far as specific legal norms enter into force with respect to any of these celestial bodies. This gap now concerns all celestial bodies of our solar system.

Regulation of space activities by United Nations principles

Though the elaboration of further UN space treaties was discontinued after 1979, the work of the COPUOS and its Legal Subcommittee in the progressive development of the legal régime of outer space was not interrupted. During the last two decades, United Nations sets of principles adopted by the General Assembly became a suitable form for regulating some special categories of space activities for which the international community has not yet been prepared to negotiate legally binding instruments. As of now, four such sets of principles have been worked out and declared by the UN General Assembly in its respective resolutions:

The Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting, adopted by resolution 37/92 on 10 December 1982;

The Principles Relating to Remote Sensing of the Earth from Outer Space, adopted by resolution 41/65 on 3 December 1986;

The Principles Relevant to the Use of Nuclear Power Sources in Outer Space, adopted by resolution 45/68 on 14 December 1992; and

The 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, adopted by resolution 51/122 on 13 December 1996.[8]

It must be admitted that the negotiation on the first of these sets of principles, lasting for many years, was negatively influenced by ideological controversies of the cold war. The vote effected on its adoption was a retreat from the rule of consensus that should govern the decision-making on space matters. But it must be also recalled that this decision was not made in the COPUOS or its Legal Subcommittee, but in the General Assembly under its own Rules of Procedure.

On the other hand, the 1986 Remote Sensing Principles seemed to be a successful achievement in which a fair compromise between the interests of the sensing States, i.e. States possessing the necessary space capabilities, and the needs of the sensed States, including most of the developing countries, was found.

The set of NPS Principles has been but a limited achievement in this category of legislation. Though some innovatory elements were brought into the regulation of this kind of activities (such as the storing of NPS objects in sufficiently high orbits after the

[7] See these instruments in Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs: The Law of the Sea, United Nations, New York, 1997, pp. 7 s. and 214 s..

[8] See the texts of the UN Principles in United Nations Treaties and Principles on Outer Space, pp. 39 s.

operational part of their missions, the safety assessment and notification of reentry), the NPS Principles have to apply, according to the preamble of this document, only to "nuclear power sources devoted to the generation of electric power on board space objects for non-propulsive purposes, which have characteristics generally comparable to those of systems used and missions performed at the time of the adoption of the Principles". Therefore, the Principles are not applicable to the NPS serving other purposes, including nuclear propulsion for long-distance flights into interplanetary space and to the celestial bodies of our solar system. The expected reopening of these Principles, which was promised to be effected no later than two years after their adoption, has been delayed several times.

The final document of this series, the so called Benefit Principles, mostly reflects the existing practice of international space cooperation and does not include new regulatory principles. While all States, particularly those with relevant space capabilities, should contribute to promoting such cooperation, particular attention should be given to the benefit and the interests of developing countries with incipient space programmes.

These sets of principles also recall and elaborate some of the provisions of the 1967 Outer Space Treaty. However, having been inserted in General Assembly resolutions, they are not legally binding instruments. Nevertheless, they have also had a certain legal significance by establishing a code of conduct recommended by the UN General Assembly and reflecting a legal conviction of the present international community relating to these issues.

Further possible development of international space law in the United Nations

In the evaluation of the achievements of the United Nations in the progressive development of international space law all positive elements should be brought to the foreground. They are certainly more numerous than it was possible to mention in this brief assessment. At the same time, it is evident that not all impending issues arising from the actual growth of space activities have been resolved thus far, some of them having been bridged by rather vague compromise provisions or even left apart.

The attention was already drawn to the principle of international responsibility for national activities in outer space which the States Parties to the 1967 Outer Space Treaties assumed including their duty of assuring that all national activities are carried out in conformity with the provisions set forth in the Treaty. This important principle, which reflected one of the essential compromises opening the door to the final agreement on the OST, is and should remain valid. However, a number of questions have arisen in recent years in connection with the growing volume of space activities of private enterprises. They are now engaged in the space business not only as suppliers of space objects or instruments to State agencies, but also by launching their own objects and as operators of whole space systems. Moreover, the process of privatisation of some international space organisations, which thus far have had an intergovernmental character, also raises some questions relating to this topic. These questions should be studied in the light of the present space law and adequate answers must be provided soon in order to ensure a sound development of the space commercial business.[9]

For years, many legal experts have been drawing attention to the fact that a significant gap exists in the 1967 Outer Space Treaty and the other UN space treaties due to the lack of a definition of "outer space", notwithstanding that the UN space documents use the term "outer space", "space activities", "space objects", etc., and attach to these terms important legal consequences. One of these is the fundamental

[9] The item entitled "Commercial aspects of space activities" was suggested and the work plan for its implementationwas submitted by Argentina during the informal consultations of the COPUOS Legal Subcommittee on new items for its agenda. Cf. Report of the Legal Subcommittee on the work of its thirty-eighth session (1-5 March 1999), UN Doc. A/AC.105/721, 30 March 1999, pp.9 and 15. At the non-governmental level, an exploratory project concerning these issues, which is called "Project 2001 - Legal Framework for the Commercial Use of Outer Space", designed by the Institute of Air and Space Law and Chair of International Business Law, University of Cologne, Germany, co-sponsored by DLR-German Aerospace Center, is being developed to be finalized and submitted to an international conference on the entire project in 2001.

difference between the legal régime of outer space, which is based on the principle of freedom of exploration and use of outer space (including the Moon and other celestial bodies), and the legal régime of airspace, the parts of which above the territories of individual States are subject to their complete and exclusive sovereignty. Although in practice it has become more or less clear where the area of outer space begins, attempts to adopt a legally binding delimitation between airspace and outer space, or at least to agree on a recommended interpretation of these notions, have failed in spite of lengthy, but often rather superficial discussions on this issue. Also an explicit recognition of the right of passage for a space object of one State for the purpose of reaching orbit or returning to earth through the airspace of other States has not been achieved up-to-date. Nor has such a right been generally accepted as firmly established in customary international law. The attempts to bring a new light to consideration of these issues by studying the legal aspects of aerospace objects, which have been undertaken in the COPUOS Legal Subcommittee in recent years, have not led to some clear and convincing conclusions thus far.[10]

Under the scope of the same item "Definition and Delimitation", the Legal Subcommittee has been also occupied for years by discussions on the legal status of the Geostationary Satellite Orbit. The long-lasting exchange of views on this issue has mostly concentrated on the dilemma whether the GSO is an inseparable part of outer space or a particular area to be governed by a special legal régime. Another issue relating to the GSO has been the question of the respective competences of the COPUOS and the ITU to deal with this subject. In recent years, this discussion has been leading to a more analytical and rational approach which might enable a compromise solution of this problem.[11]

In accordance with its original mandate, the COPUOS Legal Subcommittee should also start studying new legal issues which emerge from the present and expected development of space activities, report on them regularly to the Committee, and through it to the General Assembly, and propose adequate measures for their solutions. In these endeavours, the Legal Subcommittee should closely cooperate with the Scientific and Technical Subcommittee of the COPUOS and vice versa, the Scientific and Technical Subcommittee should not hesitate to address the Legal Subcommittee with requests for expert legal opinions. After all, a close cooperation and interaction of both subcommittees was one of the aims of the COPUOS when it was establishing them as its subsidiary bodies in 1962. Up-to-now, such cooperation has been rather exceptional, but it was successfully effected during the elaboration of the NPS Principles.

One of the impending subjects that needs to be studied by both subcommittees under the scope of their competences, is the protection of space environment against the generation of space debris. This issue has already been explored in the Scientific and Technical Subcommittee for several years and the conclusions of its deliberations on this point have been at the 1999 session of the Subcommittee.[12] The work of the

[10] Under the scope of consideration of this problem, a questionnaire on possible legal issues with regard to aerospace objects was elaborated in a special working group of the Legal Subcommittee which was addressed to Member Stares of the COPUOS and a number of replies were received. Cf. UN Doc, A/AC.105/635 and Add. 1-5, and UN Doc. A/AC.105/C.2/L.204 which presented a "Comprehensive analysis of the replies to the questionnaire on possible legal issues with regard to aerospace objects" prepared by the Secretariat. However, the discussion on the basis of these documents did not proceed further at the last session of the Legal Subcommittee. Cf. Report of the Legal Subcommittee on the work of its thirty-eighth session (1-5 March 1999), pp. 6 s. and 12s..

[11] Cf. the reflection of the recent stage of discussion on this issue particularly in the report of the Chairman of the Working Group on this subject in Report of the Legal Subcommittee on the work of its thirty-seventh session (23-31 March 1998), UN Doc. A/AC.105/698, 6 April 1998, Annex I, pp. 15 s..

[12] The Scientific and Technical Subcommittee started the consideration of space debris in 1994 and adopted a multi-year work plan covering specific topics of this issue. In 1999 the Subcommittee adopted a technical report which should be submitted to the COPUOS for its 1999 session, UNISPACE III, the Legal Subcommittee and other international organisations. During the discussion in the Scientific and Technical Subcommittee, a number of delegations expressed the view that "there should be follow-up activity by the Legal Subcommittee on the technical report on space debris" and that COPUOS "might wish to have the Legal Subcommittee consider presenting its views on the applicability of the existing outer space treaties in relation to space debris". Other delegations, however, considered such a discussion as premature and it should be postponed "at least until the technical report had been thoroughly analyzed by

(because of a lack of financial and technical opportunities).

But for precisely that last reason the absence of many states from the latter category is quite surprising. As any effective application of the common heritage of mankind-principle to the moon would result in a relatively beneficial position for the developing states at large, their almost comprehensive absence amongst parties (and signatories) would not seem to make sense. This analysis in any case precludes justification of any attitude which lays the blame for non-adherence to the Moon Agreement squarely with the industrialised states. Therefore, while I could agree with the author that the solution of 1979 at that time seemed to provide an adequate compromise, any such adequacy in retrospect must surely be seen to have evaporated fairly quickly and comprehensively. The 'solution' failed to appease either 'side' of the 'dividing line', if one wants to phrase it in those terms. To the extent that there is any elaboration of the principle of the common heritage of mankind at all – which I find missing, particularly when one compares again with the Law of the Sea Convention – it has failed to draw more than marginal support. I would concur with Professor Böckstiegel's comment made in 1993 at the IISL Colloquium in Graz, that the Moon Agreement is dead. It certainly has not been revived since then.

Nevertheless, whether focused on exploitation of the moon or seen from a wider perspective – including e.g. the exploitation of (opportunities in) outer space for satellite communications or satellite remote sensing purposes – it might be worthwhile to contemplate to what extent sector-specific regulations should be allowed to regulate economic activities in the absence of coherent and comprehensive economic regulatory principles similar to what space law *stricto sensu* currently provides e.g on the military uses of outer space or on liability issues.

7. I respectfully disagree with the author's evaluation of the remote sensing principles as presenting a *compromise*, fair or not, between the interests of sensed and sensing states. It may be that the particular Resolution has been accepted by consensus, and that may be a valuable thing, too. Also, the rights of the sensed state are (indeed) made reference to. Yet, the Resolution itself does not provide any details of pre-existing rights or even indicate any, let alone further elaborate such rights. In view of the fact that at the same time the freedom of undertaking space activities is explicitly reconfirmed in the guise of freedom of remote sensing, it is obvious that the Resolution leaves no room for prior consent of the sensed state, or exclusive or even preferential access to the data. All that remains, is the 'non-discrimination' principle – i.e. sensed states can at least assume not to be treated *worse* than other states interested in the same data – and this is moreover not an absolute principle, but merely presented as a basis for data distribution, subject moreover to the 'reasonable cost terms'-provision. This may be fair or not – largely depending upon your perspective on the structure of the world economy and society – but it can hardly be called a compromise.

8. The author rightly touches again upon the lack of definition of 'outer space', which lies at the basis of the discussions on any existence of a right of (innocent) passage for a spacecraft through foreign airspace and on the status of the geo-stationary orbit. These issues also relate to the functionalism-spatialism dichotomy, and provide proof that discussion thereof is not merely a theoretical exercise, but has some very concrete legal ramifications which may shortly take the shape of practical disputes.

As touched upon in the paper, for example the discussion as to whether ITU should not be given the lead in providing for and elaborating the legal regime for (use of) the geo-stationary orbit directly stem from these problems. Efforts to discuss this matter within UNCOPUOS should therefore be applauded, even if a number of important states are still averse to conclusive steps in this regard. To the extent that such adversity is fed by private enterprise, wishing to avoid any undue constraints on their commercial activities, it might be time to tackle these issues head-on.

9. The subject of space debris and related environmental concerns, of crucial importance to the future of the whole space endeavour if not of humanity as such, is rightly given a prominent place in the paper. I agree with the author that, at this point, the ball lays in the court of the technicians, and in the wake thereof

probably of economists and politicians. I firmly believe that the major breakthroughs on this issue in the last resort require the political will to spend the money required to realise the various technical and other measures available.

Lawyers should be relatively modest in this area; their major contribution would lie in giving legal shape to whatever political and economic solutions would be globally or at least generally accepted. Examples of such solutions have been put forward from the legal side recurrently in the past years, such as those regarding safeguard funds for damage by space debris coming from unidentified sources, and obligations for launching parties to take certain precautions and/or provide certain funds and/or financial guarantees.

10. The author rightly points out that, probably for the first time since a number of years, some worthy governmental initiatives have been taken recently in the area of dispute settlement. Most notably, an optional declaration to accept, on a reciprocal basis, in advance a Claim Commission's judgement under the Liability Convention as binding, is a step in the good direction. Nevertheless, one should caution that also in this area the main efforts required will lie outside the legal field proper. Once the major part of states accepts that for effective settlement of disputes it is necessary to establish independent mechanisms or even bodies, that it is inevitable that sovereignty will be taking a back seat in some respects, in the world of international law sufficient legal dispute settlement mechanisms abound which could be used, if necessary after adaptation or by copying, for space dispute settlement as well.

In conclusion, the paper by giving a comprehensive and insightful analysis and evaluation of space law *stricto sensu* and its relation with space law *lato sensu*, brings into focus a number of crucial legal issues which would merit considerable attention by the governments assembled at the present UNISPACE with, hopefully, one particular abstract idea at least in the back of their minds: to enhance the working of the current legal framework for space activities, with the ultimate goal to make the human space endeavour more fruitful, effective and beneficial for all.

Commentary Paper

S. Bhatt

Introduction

I am pleased to offer my comments in this shorter paper on Professor Kopal's learned discussion paper on the subject of "Existing United Nations Space Treaties: Strengths and Needs". These comments are made in a wider perspective of IISL workshop subject "space law in the 21st Century", and the UNISPACE III Conference. Space law is based on community expectations (Professor Myres MeDougal). It is a creative discipline for the progress of mankind (Professor Oscar Schachter). It rests on the consent of states (Dr. Nagendra Singh former Judge and President of ICJ). Therefore existing strength and needs of space treaties are to be seen keeping in view space goals of benefits for all, poverty removal, promoting knowledge and research and achieving harmony and creative unity of mankind.

Salient Points of Professor Kopal's Paper

Professor Kopal makes a survey of the achievements of the UN in space law-making which has proceeded step by step laying down leading principles from time to time. Space law is obeyed by all states, he says. He points out the following major shortcomings in the regime of space law: the OST does not have provision for economic exploitation, it has no mechanism for the settlement of disputes, the Moon Agreement of 1979 has not been accepted by advanced states so far, the regulation of NPS has met with limited success, the space benefits principles though not legally binding provide for a code of conduct for states, the problem of definition of space remains to be solved, there is need for protection of space environments, and effectiveness of legal instruments needs to be improved by more states becoming parties to them. Space law can be further developed, says the author, by new legal principles, new General Assembly resolutions and by

new agreements. The existing instruments can be amended, Professor Kopal concludes.

Professor Bhatt's Comments and Proposals

I offer the following comments on Professor Kopal's paper.

The Problem of Definition of Outer Space: Need for Temporary Boundary

This problem may be resolved by agreeing to a temporary boundary at a vertical distance from earth of say 100 to 200 kilometers for a specified period of time, say 30 years or so with the provision of innocent passage, and states having rights to withdraw in case security considerations are involved. We have an analogy from Antarctica Treaty. Thus the regimes of airspace and outer space can be treated separately.

Outer Space Benefits

There is a UN Declaration of 11 June 1996 on this subject. Based on a predominant concern of mankind and mutual benefits and interests of all states, we may evolve a legal instrument for states for international cooperation for space benefits. It should be a voluntary and a cooperative effort.

Space Environment

In view of global developments in the field of environment (Stockholm Declaration 1972, UN Charter of Nature 1982), we may draft an "Outer Space Environment Act" which will include protection of space environment, sustainable development, interaction with other planets, and space law interaction with scientific research. Law is to be seen in the framework of universe, said Justice Holmes of United States. This requirement applies much more to space law.

Amendments to Space Instruments

I agree with the amendments proposed by Professor Kopal. Further, in Art. VI of OST we may include private business entities. For dispute settlement we may add arbitration clause where states agree.

An International Organizations for Outer Space

Cooperation is needed sooner than later for overall management of international cooperation in outer space for the 21st Century and for achieving progress of mankind. ICAO and other specialized agencies offer models which can be improved. The COPUOS can be developed for this purpose.

Progress of Mankind

I am hopeful that UNISPACE III will provide a new impetus to space law and space exploration towards economic benefits and overall progress. Progress, as historian Gibbon says, is "the pleasing conclusion that every age of the world has increased, and still increases, the real wealth, the happiness, the knowledge, and perhaps the virtue, of the human race." Humankind seems set for much progress in space exploration for the 21st Century.

Commentary Paper

Eilene Galloway

Strengths and Needs

The reaction of the international community to the 1957 thrust of rocketry that could be used for war and peace is embodied in the legal framework created by nations cooperating in the United Nations. Their objective was to prevent outer space from becoming an arena for

warfare and ensure that the new environment be used for peaceful purposes to benefit all mankind. The strength of the system is evident from the fact that for 42 years we have avoided war in outer space or directed toward the Earth. Basic policies were formulated by a combination of scientists and engineers who were working on the International Geophysical Year, national political decisionmakers who recognized the international nature of space activities, and the United Nations which served as a forum for negotiations.

The guiding principles adopted for exploring and using outer space were implemented by national and international organizations with funded programs. The United Nations organized the Committee on the Peaceful Uses of Outer Space (COPUOS) with the Scientific/Technical Subcommittee and the Legal Subcommittee. Effective working procedures were adopted: (1) decisionmaking by consensus which strengthens compliance; (2) expanding principles of the 1967 Outer Space Treaty into new treaties, thus ensuring consistency in advancing space law; and (3) passing declarations on problems that might later become treaties.

By the beginning of UNISPACE III, it became apparent that there was general agreement on preserving what has proved successful in combining policies, organizations and programs, and turn attention to updating and refining the system which effectively enhanced international space cooperation. As we approach the 21st century, new trends are discernible and provide opportunities to plan for the future.

Arms Control

Arms control for outer space is the priority problem. Unless we preserve outer apace as a safe orderly environment, it will be impossible for space technology to provide benefits for humankind. We cannot take peace for granted and it is necessary to broaden the scope of disarmament. Methods should be sought for coordinating COPUOS with overall UN disarmament activities. COPUOS might have a representative on the UN Disarmament proceedings for subjects concerning outer space; or a representative from the UN Disarmament body could inform COPUOS at its annual meetings of matters involving the maintenance of peace in outer space. Attention should be given within the UN structure to coordination of information and actions on arms control with special attention to outer space.

Space Science, Technology and Law

Legal guiding principles must be based on identified unchanging facts of space science and technology. Satellites are planned and constructed for specific orbital positions which can produce information to and from the Earth. Earthbound legal concepts are not always applicable to the unique characteristics of outer space. This means that close relations must obtain between lawyers, engineers and scientists, and especially between those in the Scientific and Technical Subcommittee and the Legal Subcommittee, taking into account also the political and economic factors which influence decisions on what should be permitted or prohibited.

International Cooperation in Using Orbits: Geostationary Orbit (GSO), Medium Earth Orbit (MEO), Low Earth Orbit (LEO), and Elliptical Orbits.

There is need for a comprehensive integrated analysis of the GSO, MEO, and LEO and Elliptical orbits for purposes of international cooperation on organization and regulation. Thus far these regions are primarily dealt with separately in connection with functions that are being performed: communications, navigation, remote sensing, meteorology, space debris, commercialization, etc. The role of the International Telecommunication Union (ITU) in connection with the GSO and space communications is well developed but as more traffic develops in all other orbits, we can anticipate problems of international organization, information flow, and allocation of resources. It will be necessary to determine what regulation is necessary to ensure peaceful fair usage. The similarities and differences in usage of orbits need to be studied. Is it

prudent to organise a separate regulatory system for each orbital region? How would their interrelationships be handled? This problem requires the cooperation of scientists, engineers and lawyers to plan for the future. A Workshop could be organised by the Scientific and Legal Liaison Committee of the International Institute of Space Law and the International Academy of Astronautics to study tho problem. The Scientific and Technical Subcommittee and Legal Subcommittee of COPUOS could also undertake the study as a Special Project.

One aspect of this problem could be dealt with by the following proposal:

Proposal for an International Regulatory Framework for Air/Space Traffic

Increased launchings of satellites, particularly in low earth orbit, will necessitate a regulatory framework that is more comprehensive and coordinated than existing practices. The need for monitoring should not be allowed to drift into patterns of activity with unintended consequences. Now is the time for the effective establishment and operation of standards and recommended practices to ensure a safe, orderly and peaceful space environment for expanding space activities. One approach is the possibility of extending the Jurisdiction of the International Civil Aviation Organization (ICAO) to include relevant components of space traffic management. This proposal for an aerospace inquiry is timely because ICAO's 180 Member States have endorsed and are "implementing the development of a satellite-based system concept to meet future communications, navigation, surveillance/air traffic management (CNS/ATM) needs of civil aviation." ICAO defines the teak as "essentially the application of high technologies in satellites and computers, data links and advanced flight deck avonics, to cope with tomorrow's growing operational needs." (ICAO's Aims, Standardization CNS/ATM Regional Planning Facilitation, Economics, Technical Co-operation for Development and Law. ICAO, Montreal Canada.)

A commission should be created to survey existing organizations and procedures for regulating civil aviation and space subjects, estimate the probable future expansion of those activities, identify and analyse options for an international system that can assure safe, efficient and peaceful services. It is necessary to compile information on current monitoring practices, the status of national space registries and treaty-required reports in the United Nations. A comparative study of directing planes and space objects should reveal civil aviation practices that could be applicable to satellites. A roster is needed of experts who can formulate international standards and recommended practices while avoiding unnecessary restrictions. ICAO's success with managing civil aviation should be studied to determine whether thore are organizational and management practices that are applicable to space traffic and foreseeable aerospace traffic. Is it feasible to incorporate some space functions into ICAO's existing organization, e.g., the Air Navigation Bureau, the Air Transport Bureau or Technical Cooperation Program? Should a new ICAO Aerospace Bureau be established or should relations be handled by Agreements on matters with which they converge? We need to establish essential technical and scientific requirements without which space operations cannot be conducted successfully, and to which political entities must make adjustments.

Space Exploration

The 1967 Outer Space Treaty provides for a two-path approach to outer space: exploration and uses. At the present time emphasis is on the various uses, probably because of the increase in commercial applications. In planning for the 21st century, we must continue to emphasize the values from exploration of the solar system and the Universe, thus ensuring that nations will appropriate adequate funds for exploration.

Definition of Legal Terms

Both the IISL and tho Legal Subcommittee could work on defining the legal terms that need to be clarified as well as the methods available for this purpose. The terms that require clarification include: space object,

responsibility of States for space activities, liability for damage, legal responsibility for commercial international ventures, the common heritage of mankind, province of mankind, settlement of disputes, astronaut, scope of information needed for registration of space objects, celestial bodies, appropriate State, launching authority, nationality of the State, aerospace object, non-state entities, etc. Again, this task needs to be performed with due regard for immutable scientific facts that affect operations in outer space.

Concepts of Area and Function

The development of space applications indicates that sovereign states found ways of coping with non-sovereign areas by regulating functions. We are not confined to formulating law by area or function because we use both continuously and have done so for outer space matters for 42 years. When the space age began, some organizations, notably those concerned with communications and meteorology, added space technology to improve functions they were already performing. New national and international organizations were created to carry on specific functions in the area of outer space. Now we have a new dimension added to planning for the future: the Global Positioning Service (GPS) which can quickly provide precise information on the place and time of an event as well as data on moving objects. This capability should be taken into account in discussions on delimitation.

What is Space Law?

The five UN-formulated space treaties are basic in providing guiding principles for States in the conduct of space activities. However, national and international space activities have spread to such a variety of applications, some conducted by non-State entities, that additional legal sources must be used for regulating operations designed to preserve outer space as a safe orderly environment. The impact of space activities affects the Earth with problems related to aviation, space debris, property rights, insurance, liability, etc. The laws of different nations become involved, creating the necessity for harmonizing national and international law. The settlement of disputes may require reference to a variety of laws, depending on the subject. We are not dealing solely with law for the area of outer space but more specifically with the legal aspects of space exploration and ever-expanding space activities on the Earth. It is therefore necessary to expand our concept of space law.

The Moon Agreement and Other Celestial Bodies

Only nine nations have ratified the Moon Agreement since it was recommended by the United Nations General Assembly 20 years ago: Australia, Austria, Chile, Mexico, Morocco, Netherlands, Pakistan, Philippines and Uruguay. Objections to provisions regarding the establishment of an international Regime to govern the exploitation of the Moon's natural resources when feasible, and differences over the interpretation of the Moon's natural resources as "the common heritage of mankind", have kept spacefaring nations and others from ratification. When the UN General Assembly reviewed the treaty in 1994, ten years after it had gone into force upon ratification by five nations, it found no evidence of feasibility for exploitation of natural resources and no action was taken.

Evidently we cannot depend upon the passage of more time to result in acceptance of this document by the international community. We are left, however, with a problem which demands attention. Article I (1) of the Moon Agreement provides that "The provisions of this Agreement relating to the Moon shall also apply to other celestial bodies within the solar system, other than the Earth, except insofar as specific legal norms enter into force with respect to any of these celestial bodies". "Specific legal norms" for celestial bodies other than the Earth are not now being considered in planning for the future and, furthermore, we have no legal definition of "celestial bodies".

I am, therefore, recommending that the International Institute of Space Law appoint a standing Committee on Legal Aspects of International Space Cooperation on Celestial Bodies to study and analyze

this problem with a view toward its consideration later by the Legal Subcommittee of COPUOS.

Additional attention to the Moon Agreement situation could be given by the IISL in a workshop Comparing the Moon with Antarctica where agreed principles combine opportunities for scientific research and commercialization.

Commentary Paper

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International Space Law, elaborated by COPUOS and consisting of five international space treaties regarding the exploration and peaceful uses of outer space, plus five sets of legal principles, has come to a standstill stage.

In view of this, the Legal Subcommittee of the COPUOS has introduced a new topic in its Agenda related to the "Review of the status of the five international legal instruments governing outer space", and has noted that there are various circumstances that impede ratification of the legal instruments governing outer space.

Privatisation and commercial uses of outer space, has led to the application of other instruments.

Consequently, the existing norms should be analysed, examining the possible complementation of Space Law in force with international norms that regulate private space activities. The Liability Convention should define private liability so as to prevent national authorities from applying their own interpretations of the Convention through national law. There should not be forgotten the principles established by UNGA Resolution 51/122 about International Cooperation which establishes that contractual aspects of the activities of international cooperation should be equitable and reasonable and should absolutely pay due consideration to the legitimate rights and interests of the interested parties, as for example the rights of intellectual property. These represent a security for industrial investments in highly risky technologies. To attract private investors in outer space, legal certainty is a prerequisite to assure responsibilities in case of violation.

The Legal Subcommittee must balance the needs and rewards of the various actors of space activities and must work on a legal framework that could lead them to the XXI century with the minimum of conflicts and the maximum of progress and cooperation.

Another topic of great importance is the one of space debris. The Scientific and Technical Subcommittee is considering the issue, but it has not been included in the Legal Subcommittee Agenda yet.

It should be noted the lack of enough regulation of the issue, in reference to the liability for the damages caused by space debris. The Outer Space Treaty and the Liability Convention established the international liability of launching states for the damages caused by space objects or its "component parts", on earth, air space or outer space. It can be deduced that space debris are part of space objects, and consequently it can be applied the liability regime of the Outer Space Treaty and the Liability Convention. The most difficult issue is to identify the origin of a component part of a space object. It is necessary then to count on a more precise regulation that should define the concept of space debris, set certain guidelines in order to avoid the production of debris and establish measures to reduce its growth. In reference to this topic, in the Registration Convention, the problem is how to define and identify space debris. It should be supported the proposal of creating a world-wide monitoring entity or an international guarantee fund with the main and proportional contribution of those who use and take profits from space activities, and according to the danger they create and their frequency. Anyway, the Convention should be amended in accordance with the Committee.

In reference to the Moon Agreement, it can be found some gaps and non-definite terms , as the "common benefit of Mankind", considered now as its "heritage". The Law of the Sea negotiations, with its 1994 Protocol could be taken as an example.

Through the debate of the five space treaties in the Legal Subcommittee, the principles in force could be developed; filling the gaps and the present conflicts that conducted to the standstill situation. The present state of space industry requires more precise rules. The existing treaties and principles have often a very generic character.

This growing evolution of space science and technology, supports the idea of the need of creating an international space organisation. The COPUOS, as the sole body that treats space issues in a global way, is not enough, due to its membership (61 members), to its non-permanent character, and to the scarce resources assigned. That organisation would have mainly the task of controlling the compliance of space norms in force and of preserving the use of space environment so as to avoid its contamination.

While this does not occur, it should be strengthened the role of COPUOS for two reasons: first of all, to continue with its work of elaborating the rules of Space Law and secondly, because it is the main centre of coordination of International Cooperation in these issues.

States have reaffirmed their will of international cooperation by approving UNGA Resolution 52/122,

The political context has changed. The Cold War is over, and there exist cooperation links between developed countries (for instance in the International Space Station) and between developing countries.

Developing countries have serious difficulties to participate in the use of space technology and to have access to it. Among other reasons , because the prices they must pay are too high or their lack of confidence in their own scientific and technical capacities. That is why training of human resources must be considered as an essential target. But, through cooperation, these obstacles may be overcome.

The countries of the American continent, through the Space Conferences of the Americas, have looked for cooperation mechanisms for certain projects that imply the use of space technology; despite they have not reached the expected success.

There are certain areas where cooperation may bring major benefits: the monitoring of space environment and the prevention of natural disasters. That is why we consider that the action in these areas must be strengthened.

There exist misinformation in many countries about the benefits brought by space technology. It is necessary that decision-makers of each country become aware of the fact that it is necessary to participate in the development of space technology. It is desirable to reach multilateral consensus about space objectives and to achieve agreements at the highest decision level.

International cooperation should be promoted by attending, participating and giving opinions at the specialised fora such as COPUOS.

Uruguay is member of the Committee since 1981 and has supported its work in the sense of deepening and adhering to the legal regime in force, having always in mind the basic concept of the Common Heritage of Mankind.

Cooperation must be practised among all countries, developed and developing, and, in fact, must be materialised through the active participation in the elaboration of Space Law and in the ratification of the legal instruments in force.

Conclusion

Space activities are developed by a selected group of states. Developing countries that mostly do not participate in space activities must strengthen their technological capacity and, through "international cooperation" must take advantage of the available means at the regional level, according to universal objectives and efforts. They should also become aware of the real and practical possibilities offered by the Space Age. They should demonstrate their interest in

them, claiming their rights, but at the same time, assuming the correlative and ineludible responsibilities.

By the ratification or adherence to the legal instruments that rule outer space, developing countries, with their compromise of action, shall give impulse to the strengthening of its legal regulation.

The present situation shows us privatisation and commercialisation of space activities, the appearance of national laws that rule them and the fact that there are many states that are reluctant to assume their responsibilities, which is the major concern.

The scientific-technological activities cannot continue developing without legal rules. That is why it appears imperative to return to the COPUOS as the body where scientific-technological and scientific-legal issues meet.

Progress cannot be reached if we disregard Humankind, reflected in the nations that make up the COPUOS. There, resolutions are taken by consensus and afterwards, approved by the United Nations General Assembly, the UN body where almost all the countries of the world are represented.

Powers that want to continue developing their actions in the field of FACTS, feel bothered by regulations and consider them unnecessary obstacles, with less PRACTICAL value. In an ecumenical activity that is province of Humankind, the selfish interest of some, should not prevail over the others interests. It cannot be admitted that way of reasoning because every individual activity is conditioned by the principles established by the CORPUS JURIS SPATIALIS.

Every activity has a cooperative substratum. There exist interdependence relationships, an obligation to cooperate, to make consultations. It is impossible to go ahead without a SCALE of VALUES. It cannot be admitted the view of those that, in the name of pragmatism or of the market freedom, pretend to apply the principle of "the first come, the first served". This way of thinking should appear disgusting to an average juridical conscience.

Developing countries must double their efforts to make prevail the view of reinforcing the role of COPUOS against those that support the contrary idea.

Commentary Paper

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Most of the Western schools of thought usually do not divide general international law into special branches and institutes. The Russian (as well as the former Soviet) school of law divides general international law into branches.

This is the reason for some discussion between the author of the report, Professor Kopal, and one of the discussants.

According to the Russian legal school of thought any group of legal norms and principles of international law which is characterised by a high degree of codification and by certain principles regulating this particular sphere of international relations may be regarded as a branch of general international law.

There is no doubt that fundamental principles of general international law are fully applicable to all spheres of international relations including outer space activities.

At the same time, some principles of outer space law are only applicable to international relations in the process of the exploration and uses of outer space. They are not typical for international relations in other spheres. For example, the exploration and use of outer space for the benefit and in the interests of all countries (Art. I of the Outer Space Treaty of 1967); State responsibility for all national activities in outer space (Art. VI of the same Treaty), etc.

There is no doubt that the international community witnesses a very high degree of codification of outer space law. The UN Outer Space Committee should be paid great tribute for its achievements in this sphere.

As is known the Legal Subcommittee of the COPUOS has in its current agenda the item "Review of the Status of the Five International Legal Instruments Governing Outer Space".

There are some signals that the debate in the Legal Subcommittee may provoke a sort of "recodification" of outer space law.

There is nothing unusual in this approach. Indeed, in only 15 years after the adoption of the Geneva Conventions of 1958 on the law of the sea the international community started revisiting the law of the sea which resulted in the adoption of the UN Convention on the Law of the Sea of 1982.

Twenty years have elapsed since the last of the five treaties governing outer space activities was adopted. The changes and new developments in outer space activities have been even more impressive than in the maritime activities. Therefore, it may be logical to return to some outstanding problems of the legal regulations of the outer space activities.

Yet a piece-meal approach to the review of the five treaties may hardly be successful.

Each of the five treaties has a provision dealing with its possible amendment. Such amendments may be proposed only by States Parties. The "club" of States Parties to each of the five treaties is different. Therefore, any piece-meal approach may cause much more inconsistencies among the amended provisions of the treaties.

The realistic approach may be a holistic one, when a special conference will be entrusted with the task of drafting an overwhelming document which may encompass all the five existing treaties (with possible modifications) and other provisions existing in the form of declarations of principles or not covered even by recommendations.

We share the view of Professor Kopal that the principle of international responsibility of States for all national activities in outer space should remain valid. Its importance will be even on the rise, since outer space activities will have greater impact on the life of generations to come. Therefore we do not share the view that problems arising in connection with space activities of private enterprises should be studied. We firmly believe that these problems should be left for national legislations.

Coming back to the issue of branches of international law we support the idea of elaboration of the definition of outer space in the light of substantial differences between outer space law and air law.

We believe that there exist at least the following differences between the two branches:

- air space is divided into national air space and international air space while outer space is indivisible and not subject to national appropriation;
- any objects carrying nuclear weapons or any other kinds of weapons of mass destruction may not be stationed in outer space while there is no such restriction in relation to air space;
- States have no obligation to explore and use air space for the benefit and in the interests of all countries, which is the case in relation to outer space;
- States are not internationally liable for damage to other States or to their natural or juridical persons caused by private air enterprises but are internationally liable for damage caused by any space object launched from its territory or facility;
- there is no international Register for aircraft engaged in international air services while such a Register is maintained in relation to launched space objects;
- States have no right to conduct remote sensing activities from foreign air space but have the right to carry out such activities in relation to foreign territories from outer space.

These and other differences between the two branches of international law dictate the need for the delimitation of the two spatial spheres.

Summary Report

The five main UN space treaties were discussed with a special emphasis on the strengths and needs for further development. It was recognised that the existing space treaties, especially the Outer Space Treaty, are a still valid and efficient foundation for Outer Space Affairs but clarification of some provisions and supplements for certain problems is required today.

The Legal Subcommittee is – following the revision of its agenda structure – in the unique position to task up issues in an explorative way ("single issues/discussion items") as well as substantive items under workplans. The following issues can therefore be flexibly accommodated on the agenda of the LSC. UNISPACE/UNCOPUOS should decide on the sequence of their inclusion in the agenda.

- Study on the implementation of the space law instruments (including the sets of principles) by States (prepared by an IISL Working Group).
- Investigation in the binding nature of space law instruments for non-signatory States (prepared by an IISL Working Group).
- Investigation in the problem of the nationality of spacecraft.
- Regulation of space activities conducted by private entities on a commercial basis encompassing questions of reliability, dispute settlement and the enactment of harmonised national space.
- Need for a "Outer Space Environment Act" encompassing the definition of space debris with regard to the concept of "space object".
- Elaboration of a legal regime for Low Earth Orbits taking into account recent changes in the ITU Convention concerning the status of LEOs as limited natural resources.
- Identification of problems and elaboration of principles for technology transfer in international cooperation.
- Establishment of a joint UNCOPUOS/ITU Working Group for the harmonisation of work to be done in the future.
- Concluding the discussion on delimitation possibly with drawing a temporary boundary.
- System for dispute settlement (session 7).
- Creation of a bibliography of definitions (IISL).
- Investigation in the possibility to draft a comprehensive "Treaty on the Law of Outer Space/Magna Charta for Outer Space" (prepared by a IISL Working Group).

EXPANDING GLOBAL LAUNCH SERVICES

SESSION 2

Chair: Professor E. Back Impallomeni (Italy)
Coordinator/Rapporteur: Dr. Frans von der Dunk (The Netherlands)

SESSION TWO

Expanding Global Launch Services

Discussion Paper

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Introduction

Over the past five years, the character of space launch services has changed in a number of ways.

First, the role of governments as the main procurers of their 'own' national launch services has been declining, and other entities, primarily national and international telecommunications companies and organizations are taking over as the main customers; put differently, competition between international launch providers, for commercial customers worldwide, has rapidly increased.

Second, the deployment of communications satellite constellations such as Iridium, Globalstar and Orbcomm since 1997 has brought a shift from traditionally mostly single payload launches into geostationary orbit (GEO) to more and more commercial multiple payload launches into low earth orbit (LEO).

Governmental and private industry analyses regard these trends as long-term phenomena. Some figures to illustrate these points. According to the U.S. Federal Aviation Administration, the number of commercial launches worldwide has nearly tripled from 14 in 1994 to 36 in 1998, representing 15 percent and 44 percent respectively of worldwide launch activities.[1]

In 1998, launch service providers of five countries, with Europe counted as one country, took care of these 36 commercial launches, as follows:

Country	Number of launches
U.S.A.	17
Europe	9
Russia	5
Ukraine	1
China	4

The same government source reports that, of a grand total of 167 spacecraft launched in 1998 on 82 launches, 104 spacecraft were of a commercial nature, of which 82 had a LEO destination; 78 of the latter were for the account of Iridium, Globalstar and Orbcomm. These appeared on the launch manifests of primarily U.S., but also Russian (7), Ukrainian (12) and Chinese (8) launch companies. Europe only performed GEO launches in 1998.

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[1]See *Commercial space transportation: 1998 year in review*, FAA Associate Administrator for Commercial Space Transportation (AST) (January 1999)

Another U.S. government study forecasts the following global demand for commercial launch services for the period 1999-2010 (in average number of launches per year):

GEO satellites:	25 launches of medium-to-heavy launch vehicles
LEO/MEO/elliptical satellites:	15 launches of medium-to-heavy launch vehicles
LEO satellites:	11 launches of small launch vehicles
Total launches per year:	51 (+40%)
Total launches in 12 years period:	610, for a total of 1369 satellites.[2]

A private market research firm gives the following forecast for the years 1999-2008, a 10-year period, including an approximate total value of the satellites concerned:

commercial communications satellites: (value: US $ 49.8 billion)	1.017
commercial earth imaging satellites: (value: US $ 3.5 billion)	40-50
military satellites: (value: US $ 35.1 billion)[3]	305

The above sources do not provide data on (other) government launches in the same period (scientific, experimental, Space Station etc), but, as indicated above, the trend definitely points at a preponderance of launches for global and regional commercial communications satellite systems. These systems in turn serve communications conglomerates, which provide worldwide (mobile) phone, data, internet, navigation and other communications services. This global telecom market with an estimated value of some US $ 600 billion, is growing dramatically, supported *inter alia* by the - start of - worldwide liberalization of telecommunications through a 1997 WTO agreement

One of the consequences of the above 'market realities' is that the launch service providers are increasingly faced with requirements of *commercial/private enterprise (-oriented) customers* (this does not necessarily exclude governments contracting for domestic or foreign launch services), and in that respect they have to live up to the expectations of their customers like any other service industry. The more 'result oriented' the industry is, the more demanding it may be as a customer.

One approach to the question of the legal and political aspects of expanding global launch services is therefore to look at these requirements and demands, review the impediments, which may stand in the way of them being met, and look for possible remedies of a legal or political nature, including, space law.

After all, space law, like other branches of international law, should first and foremost address *real* problems and matters of space trade and commerce, which are sure to produce these to an increasing degree.

Launch services: the customers' requirements

Reliability of launch services

Any annual review of worldwide launch activities will not fail to highlight both the successes and failures of the launches performed. The reliability 'quote' of the launch systems concerned are of interest to the insurance community and to the customers alike. But all

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[2] See *1999 Commercial space transportation forecasts*, FAA's Associate Administrator for Commercial Space Transportation (AST) and the Commercial Space Transportation Advisory Committee (COMSTAC) (May 1999)

[3] See *Satcom market buffeted by economic uncertainties*, Marco Antonio Caceres, Teal Group Corp. (January 11, 1999), Aviation Week & Space Technology Online <http://www.aviationweek.com/aviation/sourcebook/99satel.htm> The military forecast is based on an estimated 15 satellites per year launched by the Russians, and 10-11 per year launched by the U.S, with Europe, China and some other countries responsible for the remainder.

established launch providers have experienced failures both with the proven and the new launch vehicles, affecting the confidence of the parties concerned, at least temporarily. Examples are the Space Shuttle disaster in 1986, and, much more recently, the failed first European Ariane 5 launch in 1996, the Russian Proton in December 1997, the Japanese H-2 in February 1998, the U.S. Delta 3 and Titan 4 in August 1998, the Ukrainian Zenit 2 in September 1998, and in the first 5 months of 1999 four more U.S. failures involving the Delta 3, the Titan 4 (2) and the Athena 2. A private industry database on all spaceflights performed shows 60 significant launch failures since 1990.[4]

A number of suggested explanations for this recent string of U.S. failures includes an overreliance on computer models instead of flight testing, too few experienced engineers for too many programs, the pressure to reduce cost in the face of foreign competition, and an "unprecedented number of customers in science, communications and other industries clamoring to get their payloads into space."[5]

Whether the launch failures occur in the U.S., Brazil or Japan, the effects are worldwide because of the international customer base and the latter's requirements. In fact, the limited number of countries with a launch industry creates a vulnerability of the industry *in toto* for disruption of services to their customers. It is not uncommon to have lengthy post-accident investigations, pending the outcome of which the launcher or even the complete launch family remains grounded: it took one and a half years before the Space Shuttle resumed services; the recent Delta 2 failure caused a 4 month hiatus in Delta 2 launches; the Proton failure of December 1997 grounded that vehicle for 3 months and flights of the Titan 4 have been postponed indefinitely. This may seriously affect the continuity or feasibility of those (planned) activities/services which depend on the launch industry, such as the global telecommunications and meteorological services industry.

Whether and how soon these technical problems may be solved in each case depends on national high tech knowledge and their expertise. We emphasize the word *national*, because the space industry, and the launch industry more in particular, is subject to, if not the victim of, a number of aspects and factors typical for that industry, which hamper international cooperation:

- Military-strategic background
- National prestige
- National security
- Foreign policy

Important to understand nations' attitudes towards the sharing of this technology with 'outsiders' is the fact that the launch vehicles are often regarded as dangerous, similar to military missiles.[6] In fact, the transfer of know-how about launch vehicles and launch technology from one country to another is discouraged through national export controls, which in many cases treat launch vehicles as missiles, that is as a means of delivery systems for weapons of mass destruction (WMD, *i.e.* nuclear, chemical and biological weapons).

Basis for these national controls is a multilateral regime, the *Missile Technology Control Regime* (MTCR) of 1987. This regime includes *Guidelines for sensitive missile-relevant transfers* and an *Equipment and Technology Annex*, which require the participating countries to exercise "particular restraint" in the consideration of transfers of complete rocket systems which include ballistic missiles, space launch vehicles, and sounding rockets, all with certain performance criteria, and complete subsystems, as well as the specially designed production facilities for these (sub) systems, including the equipment and technology,

[4] The U.S. -based Aerospace Corporation, as quoted in NYT (May 12, 1999) at 1 ("Series of rocket failures unnerves U.S. space launching industry")

[5] Id. As another space programs expert, John Pike, quoted in the same article notes, "[s]pace launch vehicles are inherently unreliable and people should understand that this is still a risky business."

[6] President Kennedy, asked in an interview in the early 1960s to explain the difference between the rocket that put John Glenn into orbit and a missile carrying a nuclear bomb, was reported to have answered with one word: "attitude!"

"regardless of their purpose, and there will be a strong presumption to deny such transfers." (emph. add.)

As these MTCR controls concern transfers to "*any* destination beyond the Government's jurisdiction and control", the 32 participants possessing any of the above systems or technology are supposed to also exercise these controls when exporting to, or cooperating with, their colleagues within the Regime, and not only vis-à-vis non-adhering countries. Finally, and of considerable importance for the issue discussed here is the provision in the Guidelines, which specifies that the latter

"are not designed to impede national space programs as long as such programs *could* not contribute to delivery systems for weapons of mass destruction." (emph. add.)

Together with the above-mentioned control criteria this would imply that only then will there be any international cooperation in the field of launching (technology) when the 'transferring' party concerned is absolutely certain that the equipment or technology will not end up in the wrong hands. That, of course is a matter of national interpretation.

The U.S. view, that the commercial prospects of new launch systems in general are so poor that the country concerned will almost invariably turn the technology to military use or sell it to another country with military ambitions, and strongly suggests that, in that country's view, there is no such thing as certainty about peaceful, national space launch programs remaining totally innocent in the MTCR sense of the word.

This approach taken together with the other launch industry-specific factors mentioned above, makes almost certain that Arianespace, Lockheed Martin, Boeing, and of course, the Chinese, Russians and Japanese will have to solve their own problems of faulty, underperforming or otherwise unreliable launch vehicles in isolation and without the assistance of their colleagues/experts in other countries.

A recent example of the consequences of this thinking was the 1998 uproar caused by U.S. satellite manufacturer's technical assistance provided to the Chinese Great Wall Industry Corporation, the Long March launch company in the aftermath of three launch failures since 1992 involving Hughes and Loral satellites. The respective manufacturer's technological advice, which included satellite-launcher interface aspects and was aimed at getting a more reliable Chinese launch product for their satellites, resulted in accusations of an unlawful transfer of sensitive technology which not only improved the reliability of the Long March launcher but *could* also have brought improvements to Chinese missiles.[7] The result of this 'affair' was legislation providing for a considerable tightening of U.S. export controls on satellites and launchers/missiles, including provisions which attached draconic conditions to Chinese launches of U.S. satellites.

The above missile controls have another unwelcome effect from the point of view of the launch industry's customers, *i.e.* that it is extremely difficult for prospective newcomers to enter the launch 'business', if the new launch company concerned is situated in a country without a missile/launch tradition and lacks the corresponding expertise. In an environment which is unfriendly to more countries possessing launch abilities, innovative ideas, which could perhaps lead to new launch technology concepts, more reliable and/or versatile vehicles and/or cheaper operations, cannot come to fruition by exposure to, or challenges by, expert industries of the 'traditional' launch countries. This stifles progress and oligopolizes the launch industry, both as a technology and as a trade in services.

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[7] See *U.S. national security and military/commercial concerns with the People's Republic of China*, Report of the Select Committee, U.S. House of Representatives (unclassified, redacted May 1999 version of the full report of Jan 1999), also referred to as the Cox Report, <http://www.house.gov/coxreport/>. The text of the relevant 'Overview' part of the Report (sub D) reads as follows: "In the aftermath of the three failed satellite launches since 1992, U.S. satellite manufacturers transferred missile design information and know-how to the PRC without obtaining the legally required licenses. This information has improved the reliability of PRC rockets useful for civilian and military purposes. The illegally transmitted information is useful for the design and improved reliability of future PRC ballistic missiles, as well."

Finally, the above environment prevents (or) at least strongly discourages mergers/take-overs or strategic alliances among launch companies of different nationality, whether 'old' or 'new', to the extent they involve a possible exchange of technology.

The above, and in particular the 'China affair' brings us to a second element of great importance to the customers of the launch industry, namely the availability of an alternative launch provider in the case of a launch failure and, more in general, a free choice of launch service providers of different capabilities and nationalities; in other words: international competition.

Availability of competitive international commercial launch services

A satellite owner faced with the sudden unavailability of the launcher it contracted for will not easily find alternative space transportation at short notice.

There are a number of predictable practical problems:

- Depending on the type of launch (GEO or LEO/MEO) and launch vehicle required (heavy, medium or light) the launch manifests of the launch companies may be full and the waiting lines may therefore be long.
- Satellite-launcher interface is not standardized. In fact, each launch is rather unique in the sense that launcher and satellite are more or less 'made for each other'. Hence, satellites have to be adapted to fit the new launcher (and/or vice versa): this takes time and engineering effort;
- a new contract will have to be concluded with the new launch company (including a new arrangement with the insurers).

But, there are also problems of a regulatory and political nature which affect a free and easy choice of alternative launch service providers. For *e.g.*, the medium-to-heavy lift launch vehicles range, the customer could in principle choose between three U.S. launchers (*Atlas, Titan* and *Delta*) produced by Lockheed Martin and Boeing, the European *Ariane*, the Russian *Proton*, the Chinese *Long March*, the Ukrainian *Zenit* and the Japanese *H-2*. Apart from practical factors which further limit the choice (not all of the above launchers have the same capacity, the Titan is in principle reserved for military launches, the H-2 production is limited, etc.), neither China, Russia, nor the Ukraine is completely free to offer its services to foreign clients.

The U.S. government concluded *launch trade agreements* with these countries, which not only provide rules of 'fair trade' behavior, but also limit the *number* of launches of Western-made satellites that may be performed during the period of validity of the agreement and outlines the *prices* and price conditions that may be quoted by these countries' launch companies for the launches to be performed for Western clients. These launch trade agreements are the result of a combination of the need of the U.S. satellite manufacturers for additional launcher choice (originating in the post-Space Shuttle disaster period), a policy of engagement with potentially proliferatory countries, and concerns that non-market economy practices applied to commercial launch activities would create havoc among the U.S. launch companies.

The latter concern was understandable in 1988, when the U.S. satellite manufacturers promoted China's entry into the launch market: the U.S. private launch industry was still in its infancy and considered vulnerable to low cost competitors. Since a few years, however, the situation is completely different. Similar 'market entry' agreements have been signed with Russia and Ukraine and, in view of increasing demand on the part of the satellite manufacturers and owners, the U.S. Administration has successively liberalized these agreements (in the sense of permitting a larger number of launches of Western satellites by the countries concerned).[8]

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[8] Arianespace, in the late 1980s and early 1990s, felt even more uncomfortable about the market entry of these 'non-market economy' launch providers than its U.S. colleagues, as it made its living to a much larger extent in the international commercial launch market: there, it would have to face the new-comers whose competitive power and effectiveness was controlled by the U.S., and the latter's policies had other priorities than protecting the European launch company. In view thereof, the European Commission was asked to also conclude a separate restrictive agreement with the Russian authorities. The resulting arrangement, however, was never formalized because of internal disagreement concerning the

At the same time various domestic mergers and take-overs in the U.S. launch industry have produced two powerful launch companies, Boeing and Lockheed Martin, both successful aerospace conglomerates, engaged in other civilian and military space (manufacturing) activities as well. Already in 1996, President Clinton could confidently proclaim in his National Space Policy that the goal of the U.S. was "free and fair trade in commercial space launch services", in support of which the U.S. government would

"implement, at the expiration of current space launch agreements, a strategy for transitioning from negotiated trade in launch services towards a trade environment characterized by the free and open interaction of market economies."[9]

The prospects for the abolishment of the launch quota and other restrictive conditions by the year 2000/2001, when the agreements expire, have dimmed considerably in the aftermath of the China affair. The relations with China, having deteriorated as a result of these and other, more damaging nuclear espionage related conclusions of the above Cox Report, appear to be less conducive to a (launch) trade liberalization move vis-à-vis that country; this will also affect the chances of the agreements with Russia and Ukraine being liberalized within the foreseeable future. This brings us to another aspect of the agreements concerned, namely that of *national security.*

As indicated above, national export controls are not only used to restrict the sale or transfer of missile and launch technology but, these regulations generally also cover *satellites* and other so-called 'dual-use' goods and technologies, *i.e.* roughly all high-tech goods and technologies that can be used for both civilian and military purposes.

In the cold war era, *CoCom* was the multilateral arrangement through which the Western world restricted the export of dual-use items to the Soviet Union and other communist countries. After the demise of CoCom, its successor, the *Wassenaar Arrangement* of 1997, of which Russia is one of the founding members, has the same purpose (to prevent 'sensitive technologies' falling in the wrong hands) but different targets, namely terrorist-exporting/supporting and other 'rogue' states or entities.

National export control regulations generally followed the above multilateral arrangements and included satellites in the national lists of controlled dual-use goods and technologies. Also the European Union, in 1994, set up a Community regime for the control of exports of dual-use goods, which included communications satellites in the common list of controlled goods.[10]

In the U.S., commercial communications satellites were originally included in the Munitions List and treated, for export purposes, as arms and therefore controlled by the State Department. In 1996, pressure on the part of the satellite manufacturers resulted in a transfer of this export licensing responsibility from the State Department to the Department of Commerce. This did not dramatically change the scope of the controls, but rather the starting point and the focus: where State Department controls have as their sole objective to serve U.S. national security and foreign policy interests, Commerce has a strong trade and commerce focus, and considers it its task, while applying export controls, to (also) take into account the concerns and wishes of the industry.

The bilateral launch trade agreements do not prejudice these controls on U.S. satellite exports. This means that each U.S. satellite cleared for Chinese launching under the provisions of the launch trade agreement, still needs an export license before it can be shipped to China. The U.S. administrations of both Reagan, Bush and Clinton have routinely approved such licenses, whether the controlling agency came under the State Department or Commerce: from 1989

Commission's competence to conclude such agreements.

[9] See *National Space Policy*, Fact sheet, The White House, National Space and Technology Council (Sep 19, 1996), Commercial space guidelines, para. 5.

[10] See Council Regulation (EC) No 3381/94 (Dec 19, 1994) and Council Decision 94/942/CFSP (Dec 19, 1994), e.i.f. Jul 1, 1995, OJ L367 of Dec 31, 1994, and amendments.

to February 1998, a total of 13 case-by-case approvals for 20 satellite projects were granted.[11]

The China affair has in the meantime resulted in legislation, which w.e.f. March 1999, returned export licensing of commercial communications satellites to the State Department. Where Congress found that national security had been compromised by at least some of the launches of U.S. satellites on Long March and, generally, felt that trade interests and trade relations had received too much benevolent attention at the expense of national security, the respective Act, both in content and in spirit, clearly gives a higher priority to the U.S. national security interests than to trade.

This effectively removes China from the list of reliable and predictable launch service providers for launches involving U.S. satellites, *including non-U.S. satellites with State Department-controlled 'sensitive technology' components:* the latter creates a complication for satellite manufacturers from *e.g.* Europe and Japan which use such components. Though these countries own export controls may in practice allow the sale to, (and/or) the launch by China of satellites, U.S. controls on U.S.-manufactured satellite components may form an impediment to the export of the respective satellites to China. Apart from thus affecting the launch customers, this may create serious bilateral trade conflicts between the U.S. and the countries concerned.

This primacy of national security also means that the question of the expiration or extension of the respective bilateral launch trade agreement has largely become moot, as the underlying export legislation and the strict application thereof override the former' provisions. And, as suggested earlier, (the spirit of) this Congressional legislation cannot but also affect the U.S. administration's attitude towards Russia and the Ukraine, the other 'controlled' launch providers serving U.S. satellite exporters.

This *national security vs. trade interests* dilemma is difficult to solve: both interests may be equally legitimate and worthwhile serving. At the same time, the national security-inspired actions of one country may have a disproportionate effect on a major global industry and on the legitimate trade interests of other countries. This creates responsibilities which go beyond national borders. We will come back to that aspect later.

One other policy/practice, which could be considered an impediment to "free and fair trade in commercial space launch services" should be mentioned and briefly reviewed.

Government procurement of launch services

The practice of governments to reserve the right to exclude their procurement of goods and services from competitive international bidding is widely spread and generally accepted. The U.S., for example, has a so-called "Buy American Act" since 1933, which directs federal agencies to procure articles, materials and supplies from American sources. U.S. government air travel, as a rule, takes place with U.S. licensed airlines.

Many other countries have similar policies and practices. In the field of launching, neither the Chinese nor the Russian authorities so far allowed their government satellites - whether civilian or military - to be launched by foreign launch providers. The Convention establishing the European Space Agency (ESA) of 1980 requires that the Agency, when defining its missions, shall take into account the launchers developed within the framework of its programmes, or by a member state, or with a significant Agency contribution, and

"shall grant preference to their utilization for appropriate payloads if this does not present an unreasonable disadvantage compared with other launchers or space transport means available at the

[11] Each project may involve more than one satellite, and some of these satellites were bought by China and not launched for a third party, see *China: possible missile technology transfers from U.S. satellite export policy - background and chronology*, CRS Report for Congress, 98-485 F (Aug 13, 1998). These approvals took the form of Presidential waivers of Tiananmen-related Congressional bans on exports of, *inter alia*, satellites to China.

envisaged time, in respect of cost, reliability and mission suitability."

Additionally, the States participating in the Ariane project, in the same year made a commitment on the preferential use of the Ariane launch vehicle similar to the above treaty provision, both in respect of ESA activities and of national space activities, and promised to support such use in the framework of the international programmes in which they participated.

The U.S. Federal departments and agencies abide by a Presidental policy of 1990, confirmed at later occasions, that

"U.S. government satellites will be launched on U.S. manufactured launch vehicles unless specifically exempted by the President."

The Commercial Space Act of 1998, dealing, inter alia, with the same 'fly U.S.' subject, does not use the country of manufacture of the launcher as a criterion, but the nationality of the launch provider:

"Except as otherwise provided in this section, the Federal Government shall acquire space transportation services from United States commercial providers whenever such services are required in the course of its activities. To the maximum extent practicable, the Federal Government shall plan missions to accomodate the space transportation capabilities of United States commercial providers."[12]

Though the purpose of the above U.S. and European provisions is basically the same, there are interesting differences in practice and in practical effects.

- Traditionally, the U.S. *government* market has been considerably larger, in number of launches and value, than the European market of ESA and national member states government launches. (Only the Russian market of civilian and military launches came anywhere near the U.S. total). Data from the above FAA Report show the following figures for 1998:

	Commercial	Non-commercial	Total launches
U.S	17	19	36
Russia	5	19	24
Europe	9	2	11
China	4	2	6

- Neither ESA nor the individual ESA member states or the Ariane participants have scrupulously adhered to the 'Ariane preference' commitments. In practice, ESA made exceptions to the rule when faced with operational or financial difficulties. Additionally, some member states feel free to use the cost level of the Ariane, compared to its competitors', or the (semi-)privatized status of its telecom agency as an argument for choosing a competing foreign launch provider. And regional European space organizations like Eutelsat and Eumetsat felt some commitment but no obligation to use the Ariane.

By contrast, the U.S. government agencies so far have felt obliged, by law and policy, to use domestic launch vehicles and launch providers, and have acted accordingly. An additional factor supporting the U.S. firmness in this respect is the availability of alternative domestic launch providers: in addition to the Space Shuttle and the Air Force- operated Titan, two private companies, Boeing and Lockheed Martin, may help out; and for LEO launches and smaller payloads, a third private company, Orbital Sciences Corporation, provides the Pegasus and Taurus launchers.

The overall effect of the above regulations and practices, based on a combination of national security

[12] See Commercial Space Act of 1998, P.L.105-303 (HR 1702), Title II - Federal acquisition of space transportation services, Sec.201-206. A U.S. commercial provider is defined as "a commercial provider, organized under the laws of the United States or of a State, which is (A) more than 50 percent owned by United States nationals; or (B) a subsidiary of a foreign company..", with category (B) subject to a number of specific stringent criteria.

and competitive considerations, is that a sizeable part of the total global launch market is not open to international competition, to the disadvantage, of course, of the excluded launch providers, but in the end also of both the respective governments and the private customers.

Effects of the present regulatory environment on the global provision of launch services

In the foregoing, a few observations on the above subject have already been made. We will limit ourselves here to a brief review of some additional examples involving cooperation and competition between the various launch companies. Cooperation between launch providers of different nationality has so far been limited. A few examples of such arrangements:

Lockheed Martin and the Russian manufacturers of the Proton launcher, Khrunichev and Energia, jointly market the Proton through a U.S.-based firm *International Launch Services (ILS)*. This arrangement has had considerable advantages for both parties. Lockheed Martin added a reliable heavy-lift launcher to its Atlas and Titan launch vehicles, positioning itself strongly in the international market. The Russian launch firms not only got American international sales experience to work for them but also the interest of the latter in - and the ensuing domestic lobbying efforts for - having the restrictions of the U.S.-Russian launch trade agreement lifted or at least further liberalized.

Boeing in the mean time took over McDonnell Douglas (MDD) and thus became a launch provider with MDD's successful medium-lift Delta launch family. To also enter the heavy-lift launch vehicle market, Boeing concluded an agreement with a Russian, Ukrainian and Norwegian firm to launch the Ukrainian-built Zenit from a movable platform in the Pacific Ocean. This project, *Sea Launch*, has already received the support through a bulk launch order from Hughes, and is at the time of writing close to its first commercial launch.

Both arrangements involve an American company selling *foreign* launch vehicles, which is rather neutral from a U.S. missile/launcher *export* control point of view. However, both U.S. companies have a clear interest in guaranteeing, both vis-à-vis the insurers and the customers, the reliability of the launch vehicles offered. That potentially raises transfer ("export") of sensitive U.S. know-how concerns on the part of the U.S. government, and entails State Department controls on all discussions between the partners which could amount to such transfers. The 'China affair' has led to increased awareness and sharper controls, delaying the progress of the cooperation and the further liberalization of the applicable launch trade agreements.

Since a few years, *Israel* has been offering its - partially successful- *Shavit* launch vehicle to the U.S. for the launch of government payloads. At the same time, to overcome the handicaps of a small, largely landlocked territory to launch from, it requested permission to perform these launches from U.S. launch facilities. (The U.S. government, true to its non-proliferation and export control policies, had for years delayed, but not been able to prevent, the development of this new launch vehicle). Recently, however, the U.S. Coleman Research Corporation has been able to build a Shavit-based launch vehicle with sufficient U.S. content to qualify, under the above fly U.S. policy, as a U.S. launch vehicle which can be used for the launch of government payloads. Coleman has in the mean time been selected, together with Orbital Sciences Corporation, to perform launches for NASA.[13]

Brazil's development of an indigenous small satellite launch vehicle (VLS-1) started in the early 1980's, for the purpose of having independent access to space, a consideration that also underlay Europe's decision to build the Ariane. The construction of the VLS-1 was impeded, through the years, by MTCR-based national controls complied with by both U.S. and

[13]The LK-0 launcher is being developed in the U.S. jointly by Coleman Research and Israel Aircraft Industries; it has not flown yet, but the Shavit has been launched four times with one failure. The NASA program concerned involves 16 future small payload launches valued at USD 400 million, see Space News (Nov 2, 1998) at 1 ("Pegasus, Shavit win big, but NASA shuns Athena").

European component manufacturers. In 1995, Brazil enacted domestic missile/launcher export control legislation and joined MTCR. The expected increase in launcher development assistance on the part of the U.S. or Europe did not materialize, and Brazil had to turn to Russia for the completion of its launch vehicle. The first flight in November 1997 failed, but Brazil is determined to turn the project into a success, also in the commercial/economic sense of the word. In that connection, its own *Alcantara* Equatorial launch base is a valuable asset which could form part of a wider space cooperation with another launch technology possessing country with complementary needs, such as Israel.

A particularly interesting case is India, a country with both a military missile program and an ambitious launcher development industry. India was already in 1980 the seventh country to orbit a payload on an indigenous launch vehicle. It markets a Polar Satellite Launch Vehicle (PSLV) for commercial LEO launches, and has been developing a heavier-lift launch vehicle for GEO launches. Originally, India concluded a contract with Russia to obtain the necessary rocket technology, but MTCR-based protests on the part of the U.S. resulted in the Russian assistance being reduced to the delivery of engines without the technology to build them. This only increased India's determination to develop its own engine independently of uncertain foreign assistance. India's nuclear tests in May 1998 led to export sanctions imposed by the U.S., involving both 'arms' and dual-use goods and technologies. This did not (yet) affect the cooperation between Arianespace and its Indian counterpart Antrix Corporation, which provides for the mutual marketing of surplus capacity for small satellites on each other's launch vehicles. However, the U.S. controls would stand in the way of any Indian launches of U.S. satellites, whether contracted by Arianespace or by Antrix. India is neither a party of the Wassenaar Arrangement nor a MTCR member: the latter will be an additional factor hampering launcher development cooperation with MTCR members.

The - possible - involvement of international organizations and institutions

Space activities have in common with other international/transborder activities of states or private companies that they are regulated by various national and international institutions and agencies. A good example is satellite communications, the technical aspects of which are primarily governed by rules and regulations of the International Telecommunication Union (ITU), whereas international trade and market access issues are increasingly addressed by the World Trade Organization (WTO). Global navigation satellites, so far, which are used for aviation purposes will necessarily have a form of International Civil Aviation Organization (ICAO) involvement. And other uses may bring additional (international) organizations into play.

An interesting question is which international organization or agency, *if any*, would be qualified to deal with the launch services industry. The emphasis on 'if any' stems from the conviction that international regulation should only then be considered, if the parties concerned cannot solve their problems of transnational proportions on their own or if the international issues and interests concerned should not or cannot be left to those parties, including the individual States concerned.

Launching or space transportation is a space activity which serves both military and civilian purposes. The activity itself may be of a clearly military character, *e.g.* when the payload is a weapon of mass destruction. The launch vehicle may also carry a military reconnaisance ('spy') satellite, which is less offensive, but still a use of a military/national security character. A communications satellite built and used for exclusively sensitive military communications would fall within the same category.

Governments will require total national control over the launch and the payload, and international competition which could lead to the satellite being launched by foreign launch companies will not be considered an acceptable option. Unless, perhaps, the foreign launching State is member of the same military

alliance for the (part-) benefit of which the satellite is launched, *e.g.* NATO. It is clear that, where the launches concern payloads with unequivocally military or other national security uses, the regulation or de-regulation thereof is something that can only be dealt with within the membership of the military alliance concerned. And no other international organization or institution will be seen as qualified to deal with the matter.

But, the launch of government payloads of a *civilian* character is in principle different, as a possible national security concern can only be based *either* on the premise that the government satellite-foreign launcher interface as such may improve the reliability of that foreign launcher and that such increased reliability is, or may produce, a national security risk *or* on the assumption that any government satellite of a civilian character contains sensitive technology that should not fall in the hands of some foreign launch providers. One may question whether those national security concerns in the end are sufficiently serious to justify keeping *all* international competition away from this part of the government launch market.

On the opposite side of the launch payload spectrum (going from national security-sensitive payloads to national security-*neutral* ones) are the launches of private scientific or commercial satellites with no possible military use whatsoever: satellites for astronomy, space tourism, space burials etc., a small market indeed, but one which may be open to international competition without national security concerns, or satellite export controls based thereon, standing in the way of any launch provider, whether domestic or foreign, being selected by the satellite owner/user concerned. It becomes a *large* market, with more nations, industries and commercial interests involved if we add private commercial communications, meteorological and (other) remote sensing satellites.

If there are no demonstrable national security aspects involved in the launch of the latter payloads, the restriction of international competition, in the form of launch trade agreements or other discriminatory practices, becomes a *trade* restriction, and the international organization qualified to discuss such restrictions would be the *World Trade Organization* (WTO). It is interesting to note in this connection that the European Commission, during the Uruguay round of trade in services negotiations, proposed to the U.S. to make launch market access commitments under the GATS in order to liberalize the international trade in launch services. This did not materialize. The present situation is that the U.S. government, in view of the existence of the bilateral launch trade agreements, had to formally exempt launch services from the application of the MFN principle (which forbids discrimination between foreign providers), to allow for the continuation of the restrictions in force.[14]

The GATS principles do not apply to *government procurement*. In fact, a separate plurilateral Agreement on Government Procurement of 1994 (GPA) aims at introducing the liberal trade principles of GATS into this traditionally jealously guarded reserved area. Government procured launch services were however, excluded from the application of the GPA by all relevant States, including the U.S.

As we have seen in the previous paragraphs, all members of the Wassenaar Arrangement control the export of commercial communications satellites as dual-use goods. The U.S., the most important manufacturer of satellites and launch vehicles, considers the launching of commercial communications satellites sufficiently national security-relevant to apply export controls with varying strictness to a number of countries with commercial launch industries. The new State Department controls, in place since March 1999 and based on the qualification of these satellites as 'arms', do not bode well for the chances of launch services being liberalized through adaptation of the Wassenaar criteria, let alone through inclusion in GATS or GPA. At the same time, more *treaty-based* certainty about the free and permanent availability of both domestic and foreign launch services is of crucial importance to global telecommunications, and any unilateral interference with the free use of present launch providers may threaten the continued operational and commercial viability of that important customer. Similarly, an environment in which the entry of new, innovative, players into the launch market, assisted by

[14] See Final List of Article II (MFN) Exemptions (U.S.) (Apr 15, 1994) <http://www.wto.org/wto/services..>

international launch cooperation, is strongly discouraged, irrespective of the peaceful character of the project, is one that, in the interest of the same customers, deserves to be challenged within the MTCR group of countries, but not only there.

The question does becomes one of finding the right forum for discussing this apparent incompatibility of national security and international trade, in the light of its short and long term effects on the growth and sophistication of the international launch industry and on the well-being of the global customers who depend on the former's services.

Undoubtedly the WTO GATS discussions, which resume in November 1999 in Seattle, provide a forum for discussing the trade-related aspects of the issue (which discussion may, of course, get uncomfortably close to a door saying "national security: no trespassing"!).

Could UNCOPUOS play a role?

Not, it is submitted, as a (de-) regulator of launch services, nor as a judge of what is a real national security concern and what is not. Two other aspects of UNCOPUOS' work justify the Committee's possible involvement in the discussion:

First, the Committee, *inter alia* through its Scientific and Technical SubCommittee, has an unparallelled experience in promoting international cooperation in the peaceful uses of outer space, and is therefore well-positioned to contribute to a review of the advisability and feasibility of international projects involving launch cooperation.

Second, the Committee, *inter alia* through its Legal SubCommittee, is not only draftsman and guardian of a series of space treaties and other instruments dealing with the legal aspects of space activities, it is also about to engage in an analysis of whether, and if so, to what extent, this body of space law and policy is still adequate in regulating the space activities of States and other entities governed by the respective rules, particularly in the light of the explosive growth of private commercial space activities.

In that connection, it would make practical sense to refrain from an approach, which has enthusiastic space lawyers (like the author of this report) looking for gaps in the various treaties, and, instead, start a dialogue involving in particular the industries and organizations engaged in private, commercial space activities, with the purpose of reviewing and analyzing the way in which the present regulatory regime affects their present and future operations.

In that dialogue, it would be entirely appropriate to also include for review other regulatory instruments, such as the ones treated above, which influence the development of the trade in launch services.

It should be emphasized that this exercise is not meant to create new standards or new instruments, but rather to discuss - without losing sight of what the treaties and other applicable instruments tried to accomplish - from a practical angle, the requirements of modern-style exploration and use of outer space, both today's and tomorrow's.

Concluding remarks

In the foregoing, many aspects of launching as a space activity have *not* been discussed, notwithstanding their importance for the customers, the regulators and other parties concerned. Time, space and the perceived patience of the readers were limiting factors.

Nevertheless, there is one issue that deserves to be briefly mentioned at this stage, namely that of the *safety* of launching/space transportation, on the ground (spaceports), in airspace and in outer space.

With the increase of launch activities, caused by the increased use of the low-earth orbit for LEO satellite communications conglomerates, the joint use of air space by aircraft and launch vehicles may become a matter of safety-related concerns, particularly with the advent of re-usable launch vehicles (RLV's), now under construction in the U.S. and the increasing use of air-launched vehicles such as the Pegasus. This may be an issue where the experience of both national licensing agencies (FAA) and regional institutions (JAA), Eurocontrol, as well as IGO's, dealing with safety,

security and other operational issues such as ECAC (Europe) and ICAO (worldwide) can play a role. The FAA is already working on the concept of a National Airspace System (NAS), aimed at having a seamless and fully integrated control of space and aviation operations in national airspace by the year 2005, the Space and Air Traffic Management System (SATMS):

"In the near 2005 timeframe, the number of U.S. space transportation operations will have increased sharply, reusable launch vehicle operations will have become commonplace, and the demand for access to the nation's airspace by aviation users (civil, military, general) will have significantly increased. With these changes on the horizon, the need for smart, rapid evolution towards realization of the SATMS "vision", in the 21st century, becomes paramount."[15]

There are various good reasons for *not* getting involved in a discussion on the matter of the safety of airspace, let alone on international regulatory attention to the issue:

- The U.S. is the only country so far with an airspace that may become cluttered by the joint use of RLV's and aircraft, both because of the existing Space Shuttle and the advanced state of RLV development in combination with the location of the airports and spaceports used;
- The expendable launch vehicles are not designed to return to earth at all or the remains will burn up in the atmosphere and/or make a calculated crash landing on the empty high seas;
- The Space Shuttle and the future RLV's are designed and operated so as to land in their own national territory and thus only traverse national airspace: ICAO safety rules and regulations came about because aircraft of many different nationalities enter or fly through foreign airspace or land at foreign airports;
- Involvement of an international regulatory body such as ICAO, including its decision making processes, could be viewed by the few launching States possibly affected as a measure of overkill not warranted by the issue.

Still, there would appear to be an argument for the latter organization to be at least kept informed about the above national regulatory initiatives:

- Aircraft of foreign nationality do use (part of) the air space which RLV's will also operate through and the worldwide safety of aviation, involving global standardization and promulgation of safety standards and procedures, can be considered part of ICAO's institutional responsibilities;
- RLV's may in future go where the customer is and take of and/or land in foreign countries; this would also require a standardization of rules and procedures.

The above brief account should not be interpreted as a call for ICAO's active involvement in the matter, but as an invitation to further study the ramifications/consequences of this new issue for the aviation industry.

It may also be seen as an example of another space activity, next to the use of global navigation satellites by aviation, which requires the attention of both air lawyers and space lawyers.

Commentary Paper

Catherine Baudin
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In his document, H. Peter van Fenema analyses the changes taking place in the launch services sector, identifies the causes and obstacles and proposes some possible remedies.

The starting point is the observation of the rapid increase of the commercial part of the market associated to the emergence of constellations placed in

[15] *See Space and Air Traffic Management System (SATMS)*, FAA AST strategic plans, <http://ast.faa.gov/strat_plan/satms.htm>

low earth orbit. This commercial part of the market encourages us to look at launch services not any more at the national or regional level but also at the global level.

On the other hand the global launch services are not driven by the free market but rather by a series of rules often associated to national security and national interest. As a matter of fact, the weight of governments is still heavy in this sector of activities both because governments are still investing largely in development of launch vehicles and because they are a major customer for launch services.

The situation worldwide is therefore complex and the author has attempted to analyze a complicated, sometime contradictory and constantly evolving landscape. The paper is well documented and tries to be exhaustive even though some aspects are missing, such as the role of insurance and the role of the restructuration of industry leading to "vertical" giants able to sell at the same time launch services, satellites and services associated to satellites. These aspects can be additional obstacles. Japan is also surprisingly absent in the paper, while it is already a significant player and partner in the field of launchers.

Based on these considerations I would like to make the following general comments:

1. It is not easy to draw a line between launchers and other space related activities since:

   - launchers on the one hand constitute a world apart in space activity, not only because of the high level of technical expertise needed to design and to operate these vehicles but also even more because of the special link existing between the launcher technology and the missile technology which makes them a very sensitive and highly confidential subject,

   - and on the other hand launchers also form an integral part of space activities where most debates regarding national security versus free market are the same for launchers, satellites and associated services. For instance, as it was already underlined by the author in his paper, the recent US export control measures concern not only launchers but also satellites.

2. The line between governmental and commercial launch activities, as referred to by the author in his paper, is not easy to define since:

   - the commercial success of a launcher alleviates the burden of governments in maintaining an industrial and operational capability able to guarantee a continuous and reliable access to space (this is for instance the case for Ariane);

   - reciprocally a governmental market which is a captive market, at least in the United States, certainly supports the commercial success of a launcher;

   - more generally most of the space technology applications are of dual (civil/military) use, like telecommunications, earth observation and navigation.

It is therefore very difficult to distinguish the driving forces of the governmental and those of the non-governmental/commercial activities, especially since, despite the expansion of the commercial market, the governmental market still remains of the same order of magnitude as the one for the commercial market. That is why the role of governments in the field of launchers is still very important and will probably remain so in the foreseeable future.

3. This is why the "national security aspects" and the "export control restrictions" applied for example by the US administration are both the same aspect of an overall US policy, namely the US leadership in space activities, obviously including launch services.

But protectionism has its limitations and can be detrimental to industrial interests and competitiveness and therefore, the US policy encouraged the US industry to become a launch operator of Russian or Ukrainian launchers. This is the only slight difference between the governmental and the commercial market in the US: the governmental market is reserved for the

US launchers and the commercial market is oriented towards the US operators.

Therefore I would like to express my reservation regarding the comparison made by the author between the US policy regarding the launch of US government satellites exclusively on US manufactured launch vehicles which has been made compulsory through various legislative acts, and the European policy regarding the preferential use of the Ariane launch vehicle as stated in Article VIII of the ESA Convention and in the Ariane Production Declaration, which is not compulsory and which leaves the door open to other choices. As a matter of fact between the period 1981-2008, 75 European governmental missions have been or will be launched by Ariane and 20 European governmental missions have been or will be launched by another launcher than Ariane which represents a percentage of almost 30 % of the total 95 European governmental missions launched or to be launched between 1981 and 2008. As stated by the author, "by contrast, the US government agencies have so far felt obliged, by law and policy to use domestic launch vehicles and launch providers and have acted accordingly".

The restrictive US policy in the field of launchers is based on national security reasons regarding China with the "China Affair" and is based on US leadership considerations with respect to Europe.

4. So after having made these remarks, I would ask what is the future of global launch services industry and the possible involvement of international organizations and institutions?

In the immediate future and considering the importance of the government involvement in the global launch services, I would think that only concerted actions between the governments and industrial operators might be the way to alleviate the heavy consequences of this domination by governments on the free market. A good example of this type of action is the very recent (June 1999) lobbying by Arianespace and the ESA Member States in the United States with in particular the release to the US press of a "white paper" issued by Arianespace, entitled "European Satellite Services and the US Export controls", which reacts to the recent changes in the US Export Control regime resulting from the so called "China Affair" and which might in its view affect the normal interaction between launch providers and satellite builders.

Meanwhile I share the view of the author regarding the proposal to start a dialogue within the frame of UN COPUOUS involving in particular the industries and organizations engaged in private, commercial space activities, with the purpose of reviewing and analyzing the way in which the present regulatory regime affects their present and future operations. This type of forum would certainly contribute to improve the mutual understanding of the new requirements of the global launch services and their potential consequences for all countries looking for taking benefit of the application of space technologies.

However it is only when the commercial market will have become significantly larger than the governmental market, that global launch services have a chance to reasonably evolve towards a free market. This important expansion of the commercial market is certainly linked to a dramatic reduction of launch costs, and therefore probably to the existence of an operational reusable launch vehicle. The development of such a vehicle relies itself on significant technological progress and therefore on heavy investments coming from governments themselves.

This might not happen in the near future but when this will occur then the questions of international cooperation and of safety in space referred to by the author in his conclusion, will certainly become crucial and meanwhile the possible debate within an international forum would certainly have proven useful.

Commentary Paper

John B. Gantt
Attorney in Private Practice of Space-related Law[16]

First, I want to congratulate Prof. Peter van Fenema on an excellent and thorough discussion paper for this session of the workshop. His paper affords a broad overview of the subject, identifies a number of issues that merit further study, and makes several recommendations, some of which I find myself in substantial agreement.

Introduction

My comments are from the current perspective of the commercial launch market and the commercial launch operators whose launch activities intersect in some manner the jurisdiction of the United States of America. For example, this intersection may occur either because the operators are U.S. citizens or are conducting their launches from the territory of the United States, or the payload or major components thereof must be exported to a foreign launch site from the United States.

The United States has developed a considerable body of laws and regulations implementing, as municipal law, its obligations under the 1967 Treaty on the Peaceful Uses of Outer Space ("the Outer Space Treaty") and the 1972 Liability Convention. In the case of commercial launches, these consist primarily of the Commercial Space Launch Act of 1984, as amended, ("the CSLA")[17] and the regulations issued pursuant to the CSLA by the Department of Transportation, Federal Aviation Administration's Office of the Associate Administrator for Space Transportation.[18] In addition, the U.S. State Department maintains a registry for purposes of compliance with the U.S. obligations under the Registration Convention. However, it should be noted that this national registry is not sufficient for the purposes of filing liens and security interests (i.e., notification to the world of creditors' rights) pertaining to commercial spacecraft or their components. This is a major deficiency in present U.S. municipal law as well as private international law, given the international nature of orbiting spacecraft. Thus, to the extent the good offices of COPUOS can be lent to the efforts presently underway (e.g., by UNIDROIT) to develop harmonious practices in this regard among nations, it should certainly be welcomed.

In addition, the United States has recently enacted major legislation (and has further proposed changes under active consideration by the Congress) concerning the matter of export licenses in the case of U.S. spacecraft, components, and technology. These have substantially altered the situation of obtaining export licenses with respect to commercial communications satellites, and threatens to cause delays with respect to the contracting for and launch of such satellites.

Also, some recent business developments suggest there may be a need to re-examine global launch forecasts, particularly as they apply to launches of future (e.g., second generation) low earth orbit ("LEO") communications satellites. (Subsequent to giving my Workshop presentation, IRIDIUM has been placed in bankruptcy by some of its bondholders as well as Iridium, itself, and has sought the protection of the bankruptcy laws for the purposes of financial re-organization. Additionally, ICO has also recently experienced difficulties of a financial nature.)[19]

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[17] 49 U.S.C. § 11001 *et seq.*

[18] 14 Code of Federal Regulations ("CFR") Chapter III.

[19] See, e.g., *Iridium: Born On A Beach But Lost In Space*, Financial Times, August 20, 1999, at 16; *Iridium Files for Bankruptcy Protection After Its Bondholders Submit Petition*, The Wall Street Journal, August 16, 1999, at A4; *Iridium Defaults; ICO Struggles*, Aviation Week & Space Technology, August 16, 1999, at 27.

The Market

Traditionally

In the United States, the launch market had until 1996 been driven by the requirements of the U.S. Government for launch services. Government funding had traditionally financed launcher R&D and production and the establishment and operation of the two major launch ranges in the United States. Commercial spacecraft, beginning with INTELSAT's Early Bird in 1965, were launched on a "cost reimbursable" basis by NASA utilizing, at first, expendable launch vehicles manufactured for NASA and the Air Force under government contracts and later the Space Shuttle.[20] It was not until the mid-1980s, and especially after the Challenger Accident in January 1986, that a commercial launch market first developed in the United States. In Europe, Arianespace began commercial launches in 1984 after several years of test and demonstration flights by the European Space Agency. President Reagan's decision in August 1986 to remove from the Space Shuttle's manifest essentially all of the planned commercial spacecraft launches meant that these off-loaded spacecraft would have to seek launches on commercial terms from the U.S. launcher manufacturers and Arianespace. Even then, the U.S. companies seemed hesitant to proceed until amendments to the CSLA in 1988 were in force affording them a comprehensive risk sharing mechanism, including the possibility of government "indemnity" for third-party liability in the case of a catastrophic accident. Also, the U.S. commercial launches continued to heavily leverage the government launch requirements through cost-sharing mechanisms such as "direct cost" reimbursement for use of government launch facilities and range support. This form of additive cost reimbursement essentially became a "but for" reimbursement requirement under which the commercial launch provider is required to reimburse the Government only for those identifiable costs which, in the absence of any commercial launch activity, the Government would not have incurred. Furthermore, as policy decisions were made to allow U.S.-origin commercial payloads to be launched on Chinese (1989), Russian (1993) and Ukrainian (1996) expendable launch vehicles, the U.S. required those governments to enter into launch trade agreements with stated quotas and pricing restraints so as to avoid market disruption to the detriment of commercial launch providers in western market economies.

Currently

Since 1996, the situation has reversed itself as concerns the relative numbers of U.S. Government launches versus commercial launches. Due in large measure to the end of the Cold War, the number of Government launches per year are increasingly less than the number of commercial launches licensed by the FAA from the United States. (Note: Launches arranged by International Launch Services, the Lockheed Martin - Russian joint venture, are not licensed by the FAA since Lockheed Martin is neither the operator of the launch or the launch facility. On the other hand, launches conducted by the four-party Sea Launch venture are licensed by the United States, pursuant, *inter alia,* to a requirement in the U.S.-Ukraine launch services trade agreement.)

Furthermore, the U.S. Government as part of its overall shift to procurement of commercial launch services, seeks to leverage this increasing commercial launch demand in order to obtain lower cost launches for its government satellites. This is particularly evident in the present Evolved Expendable Launch Vehicle procurement program by the U.S. Air Force, which contracted in October 1998 separately with Boeing (DELTA 4) and Lockheed Martin (ATLAS 5) to develop and operate competing EELV launch systems with LEO, GTO and GEO capabilities to launch U.S. Government payloads and to compete for commercial launches in the international market. In this

[20] Interestingly, hindsight suggests that the United States missed an early opportunity to develop a commercial, expendable launcher industry in the early 1970s when the Federal Communications Commission commenced licensing various U.S. companies to construct, launch and operate U.S. domestic satellite systems. Instead, the Government adopted the policy of reliance on the Space Shuttle as the primary U.S. launch capability and commenced the gradual phaseout of its expendable launch capability. Europe took advantage of this U.S. reliance on a single launch system and successfully developed and commercialized the ARIANE launcher.

connection the Government awarded $500 million to each company for the development of its EELV system. In addition, the Air Force entered in to EELV launch contracts with Boeing ($1.378 billion for 19 launches) and Lockheed Martin ($649 million for 9 launches) as well as previously having funded pre-development efforts by these companies and several other unsuccessful competitors. The goal of the Government's EELV policy is to reduce launch costs initially by 25 percent and eventually by 50 percent and thereby enhance these U.S. companies' ability to successfully compete in meeting the increasing international demand for commercially-furnished launch services. Also, the policy makers anticipate that the success of these EELV systems will minimize U.S. dependence on foreign launch systems. Moreover, their scheduled entry into service in 2001 coincides with the expiration of the launch services trade agreements with China, Russia and the Ukraine, including the currently anticipated removal of the launch quota and pricing constraints.

At the same time the U.S. Government has begun to upgrade its major range and launch facilities infrastructure under a planned program which when completed by the middle of the next decade is currently estimated to cost the Government $1.2 billion. The two EELV contractors are also making significant investments of their own in various launch facilities upgrades.

Market Demand

The projections as to demand for launch services, especially to LEO, have become less certain as a result of recent market and financial developments. The obstacles that have befallen IRIDIUM this year have "spilled over" in the form of concerns by the investment community as to the financial viability of LEO/MEO communications satellite systems generally. Foremost among these are the failure of IRIDIUM to come anywhere close to meeting its publicly-stated customer and revenue projections, and the rapid pace with which terrestrially-based cellular and wide-band voice and data systems have come to market, including the increased capability for business travelers to "roam" internationally. This has raised questions within the investment community as to whether there is even sufficient demand for one of these systems to be financially viable. The "jury" is still out, but undoubtedly one of the important "pieces of evidence" will be the introduction and reception given this Fall and Winter to GLOBALSTAR by its targeted customer market for voice and low-speed data. Another evidentiary fact will be the outcome of the financial restructuring negotiations between IRIDIUM and its investors and ICO and its investors. Presumably, the lessons learned will be studied most carefully by TELEDESIC and others in formulating their future plans and strategies.

U.S. Legislation and Regulations

Prior to the advent in the United States of the provision of launch services by commercial entities, the only laws implementing the Article VI, Outer Space Treaty obligation of the United States for "authorization and continuing supervision" of the activities of its non-governmental nationals in outer space were those pursuant to which the Government licensed and regulated the launch and operation of U.S. commercial communications satellites.[21]

Commercial Space Launch Act of 1984, as Amended

The enactment of the CSLA expanded U.S. law to cover the "authorization and continuing supervision" of commercial launch activities in the territory of the United States and, extraterritorially, by U.S. citizens. The CSLA, in addition to its licensing and oversight provisions, sets forth a comprehensive risk management regime in the case of third-party liability. This regime, necessitated by virtue of the absolute liability responsibility of the United States under the Liability Convention with respect to damage occurring other than in outer space, is made up of three components: commercial insurance, an extensive system of cross-

[21] E.g., Communications Act of 1934, as amended, 47 U.S.C. Chapters 1-5; Communications Satellite Act of 1962, as amended, 47 U.S.C. Chapter 6.

waivers, and in the case of liability in excess of required insurance cover, the potential for the Government to pay such excess amount up to a maximum of $1.5 billion. In addition, the CSLA was amended in 1998 to include licensing jurisdiction with respect to re-entry vehicles.

Launch of U.S. Government Payloads

Prior to 1990, U.S. law reflected a definite preference for the launch of these payloads on U.S-built and operated launch vehicles. In September 1990, President Bush signed an executive order mandating that such payloads would only be launched on U.S.-built and operated launch vehicles, unless the President decided otherwise. This executive mandate was codified as statutory law in the Commercial Space Act of 1998 .[22] This Act provides that with certain limited exceptions (e.g., Shuttle-unique payloads), the Government shall acquire space transportation services from "United States commercial providers", and to the maximum extent practicable shall plan its missions to accommodate the capabilities of such providers. The definition of the quoted phrase, although quite complex, nevertheless clearly excludes foreign providers which are primarily controlled by foreign governments, but makes a limited exception in the case of U.S.-foreign joint ventures that meet a number of specified criteria.

Export Controls

Launch vehicles and their technologies are and have always been classified as munitions and carried on the U.S. Munitions List. Their export is controlled by the State Department Office of Defense Trade Controls pursuant to the Arms Export Control Act[23] and its implementing International Traffic-In-Arms Regulations ("ITARs")[24] and the U.S. obligations as a party to the Missile Technology Control Regime ("MTCR"). The export of technical data (a broadly defined term under the ITARs) as well as the furnishing of technical assistance relating to launch vehicles is also controlled exclusively by the State Department.

Likewise, until 1992, the export of communications satellites was controlled and licensed by the State Department under the ITARs. Decisions as to whether to license the export of Munitions List items, technology, technical assistance and technical data pertaining thereto, are made on the basis of national security and foreign policy interests of the United States, and not on the basis of whether the export will promote U.S. business and trade. Therefore, at the urging of U.S. spacecraft manufacturers who saw the increasing potential for foreign sales of commercial communications satellites, the Bush Administration made a partial transfer of licensing jurisdiction to the Commerce Department in 1992 in the case of such commercial satellites, except for those satellites in which any one of nine specific technologies was incorporated. In the latter case, jurisdiction with respect to the entire satellite remained with the State Department. The Commerce Department's licensing jurisdiction is pursuant to the Export Administration Act of 1979 (as amended and extended by executive order). Commerce includes as part of its licensing process consideration as to the economic effect on U.S. trade of granting (or denying) a license. However, the retention of jurisdiction by the State Department in the case of any of the nine exceptions made this transfer to Commerce largely meaningless, since most advanced satellites employed one or more of the nine technologies. Also, the transfer of technical data and the giving of technical assistance remained under the jurisdiction of the state Department. Therefore, in 1996 the President, at the behest of the satellite manufacturers, transferred licensing jurisdiction with respect to the export of the complete commercial communications satellite to the Commerce Department, including that technical data necessary to mate the satellite with its intended launch vehicle (i.e., "form, fit and function" technical data). All other technical data including design and manufacturing data was retained under the control of the State Department. In addition, changes were made in the administrative procedures leading up to a decision on a license application so that any disappointed department or agency could appeal the decision to the President. Export jurisdiction with

[22] 42 U.S.C.A. §§ 14701, 14731 (1999 Pamphlet).

[23] 22 U.S.C. § 2751 *et seq.*

[24] 22 CFR Parts 120-130.

respect to all other commercial satellites, e.g., remote-sensing satellites, remained entirely with the State Department.

However, as a result of the allegations made during 1997 and 1998 of improper transfers of technology by Hughes and Loral to the Chinese in connection with the attempted launches of certain of their respective satellites in China, and the subsequent investigation and report by a special committee of the House of Representatives (the Cox Committee Report), legislation was enacted in the Fall of 1998 transferring export license jurisdiction with respect to commercial communications satellites back to the State Department, effective March 15, 1999. In addition, the legislation mandated increased controls with respect to such exports, but specifically exempted from these increased controls exports to member countries of NATO and their nationals and to non-NATO "major allies" of the United States (e.g., Japan, Australia, Israel) and their nationals. The State Department was directed to produce amendments to the ITARs implementing this legislation. However, in doing so, the Department created a national security exception to the NATO and non-NATO major allies specific statutory exception. This further exception, in turn, caused considerable controversy among the NATO allies as to its meaning and purpose and has yet to be satisfactorily resolved. In addition, considerable controversy resulted from the inclusion of a specific paragraph imposing State Department licensing authority over exports of technical data and associated services to foreign insurers and their brokers. This should have come as no surprise given the fact that the export of such data and services (i.e., technical assistance) with respect to any satellite has always remained under the jurisdiction of the State Department (with the limited "form, fit and function" exception).[25]

[25] While as a general matter only a limited amount of spacecraft technical data (e.g., spacecraft mass, center of gravity) needs to be transferred to the launch vehicle operator, the insurers being asked to insure the risks of satellite failure need considerably more information and data as to the satellite in order to properly assess the risks in deciding whether to write the insurance and, if so, under what terms and conditions including premium amount.

Several bills currently awaiting final action in this Congress contains provisions addressing this matter including, specifically, the issue of the State Department's exception to the statutory NATO exception. These proposed provisions, however, tend to support the State Department's position. All of this has lead to considerable uncertainty as to U.S. export policy regarding commercial communications satellites, including exports for foreign launches of U.S.-built satellites or components. In essence, the "national security" exception introduced by the State Department's implementing regulation recognizes expressly, that which is implicit in the role of government, and, in the case of the United States, the role of the President; namely the duty to protect the national security of the state and its people. The difficulty arises however when trying to determine what considerations are encompassed by the phrase "national security" and whether these include considerations of trade and protection of the U.S. economy.[26]

Conclusions and Recommendations

Possible involvement of international intergovernmental organizations ("IGOs") in space activities

I would note only that the major IGOs, aside from the United Nations, involved in space activities, e.g., the ITU, ICAO and INTELSAT, were in existence before the entry into force of the 1967 Outer Space Treaty.

[26] For example, as part of the notification and certification which the State Department is required by the AECA to give to Congress before it grants a license for the export of Munitions List "defense articles or defense services" (i.e., technology, technical data, or technical assistance and services therefor) having a value of $50 million or more, is that the Department is prepared to license the export of the subject matter "having taken into account political, military, economic, human rights, and arms control considerations." See, e.g., Notification addressed to the Speaker of the House of Representatives concerning "the export of one Telstar commercial communications satellites to French Guiana for launch into outer space", 64 Federal Register 44571 (August 16, 1999). (Emphasis added).

They have specific mandates entrusted to them which are essential to the conduct of efficient and economical space activities. INTELSAT and to a certain extent the ITU and ICAO also must deal with launch services (and the return of space objects). Beyond that, the very character of launch vehicles and the absolute necessity, given present global circumstances, to control the proliferation of launch vehicle technology and data, places the control of launch services within the national security umbrella of those states possessing such technology and data. As regards the use of these vehicles in furtherance of the goals expressed in Article I of the Outer Space Treaty, the United States through NASA, whose charter includes the mandate to further international space cooperation, has entered into numerous cooperative arrangements with other countries, including non-launching countries, by which the latter share not only in the scientific data derived from the payloads but also in many cases the responsibility for producing various payload modules and instrumentation. Other countries possessing launch capabilities have done likewise. While there may always be room for improvement in such cooperative undertakings, the fact remains that under current geopolitical circumstances, it is unlikely that nations will cede control of their launch technology such as to an IGO established to provide launch services.

Launch services and the WTO

While none of the three countries with which the United States required launch services trade agreements is a member of WTO, the primary reason, I believe, that the U.S. insisted on the exception in the GATS and in the Government Procurement Agreement was to preserve the market for launch of U.S. government payloads for the benefit of U.S. commercial launch providers to the exclusion of foreign providers. As noted, *supra*, President Bush's September 1990 executive order preceded by several years the conclusion of the Uruguay Round. I have always viewed this "protection" coupled with the requirement of trade agreements in the case of China, Russia and the Ukraine, as the U.S. Government's "ace" in response to what it has consistently maintained is subsidization by foreign governments of their national launch providers. Further, I would note that the GATT-94, which incorporates the provisions of the GATT 1947, includes the latter's specific exception in the case of the "essential security interests" of a contracting party.

Recommendations

1. As concerns the provision of launch services, we need to accept the fact that under the present global circumstances, the licensing of launch technology will remain tightly controlled. However, this does not mean that full advantage cannot be continue to be made of "partnering relationships" between launching and non-launching countries. COPUOS should continue to work to encourage the furtherance of such arrangements.

2. As for the issue of implementation in municipal law of a state's international treaty obligations with respect to outer space, COPUOS should establish and maintain a compilation of the various national laws in this respect. This would provide a ready reference to states party to Outer Space Treaty which wish to develop or expand their national laws in fulfillment of their Article VI obligations as parties.

3. COPUOS should use its good offices in ways that can help to bring about appropriate and harmonious international and national laws with respect to the registration of security interests for the protection of creditors' rights in orbiting space objects and their component, e.g., transponders.

Commentary Paper

Jose Monserrat Filho[27]

First of all, let me thank the coordination of this Workshop for the kind invitation to comment on

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[27] Vice-President of the Brazilian Society of Aerospace Law (SBDA) and member of the Board of the International Institute of Space Law (IISL). Visiting professor of Space Law at the Rio de Janeiro University (UNI-RIO).

Professor Peter van Fenema presentation on "Expanding Global Launch Services". It is indeed a very comprehensive, competent, interesting and provocative paper as it should be appropriate and convenient to be at this important International Institute of Space Law event.

Professor Peter van Fenema has showed us a reality with two faces:

1) On one hand, over the past five years we are having a rapid growth of the competition among international launch providers for commercial customers worldwide;

2) On the other hand, the competition between launch providers of different nationalities has so far been limited, and even worse, a sizeable part of the global launch market is not open to international competition.

It means there is a very good tendency along with a tendency that should be corrected for the sake of a healthy global launch services expansion.

The challenging question here seems to be how to use political and legal means to review the impediments that stand in the way of a more cooperative efforts in global launch services. We all certainly have no doubt that the cooperation is an essential requirement if we really want to encourage the appearance of more alternatives in global launch services.

New alternatives in this field are quite necessary because:

(a) We have a great demand – "unprecedented number of customers in science, communications and other industries clamoring to get their payloads into space", as wrote John Pike, a space programs expert, quoted by Professor Peter van Fenema;

(b) "The limited number of countries with a launch industry creates a vulnerability of the industry 'in toto' for disruption of services to their customers", as also stressed by Professor Peter van Fenema.

He properly suggests that the technical problems related to successive launch failures (including in the USA) may be solved by means of international cooperation. This cooperation has been hampered by a number of closed national concepts like military-strategic background, national prestige, national security and some foreign policy decisions. These concepts very often bring us back to the time of the cold war, which presumably should not exist anymore.

According to Professor Peter van Fenema the space industry, and particularly the launch industry, is subject to, if not the victim of, this sort of national not constructive factors.

Let me make here a special mention to the Brazilian Alcantara Launch Center. Alcantara is currently being prepared to host satellite launching services on a commercial basis, in association with interested international partners. Its privileged geographical location and a set of measures adopted by the Brazilian Government put Alcantara Launch Center in a competitive position in the market. However, Brazil faces some difficulties in this way.

The USA Government has sent a "non paper" to the Italian Government not recommending the use of launching services from Alcantara by the Italian enterprise FiatAvio, which is planning to launch the Ukraine Launcher Ciclon from Alcantara.

We don't know exactly the reasons of this not so diplomatic attitude by the Government of a nation with which Brazil has signed just in November 1997 an agreement to participate in the International Space Station.

Anyway, it is undeniable that this kind of pressure is unacceptable and represents at least a infringement of the principle of free access to outer space by all nations, irrespective of their development degree.

Professor Peter van Fenema also presents a suitable assessment of the undesirable effect of the Missile Technology Control Regime (MTCR), which makes it extremely difficult for prospective newcomers to enter the launch "business". I agree with him: The unfriendly environment to more countries with launch abilities and innovative ideas in this field stifles progress and

oligopolizes the launch industry, both as a technology and as a trade in services.

All these obstacles, as emphasized by Professor Peter van Fenema, "affect the free choice of launch service providers of different capabilities and nationalities; in other words: international competition".

Therefore, we can say that international competition as well as international cooperation in the launch industry still remains a big obstacle course, which of course holds back a more vigorous expansion of this fundamental sector of space activities.

That is certainly why Professor Peter van Fenema is carefully in inviting us to deeply think about the dilemma of national security versus trade interests, and the way to solve it in favor of "free and fair trade in commercial space launch services". He rightly points out that "the national security-inspired actions of one country may have a disproportionate effect on a major global industry and on the legitimate trade interests of other countries", and that "this creates responsibilities which go beyond national borders".

We can see here the source of an abnormal and unadmissible 'de facto' situation when one country's national law intends to be in force in and to other countries without any agreement on this matter. It seems that in the current global launch affairs it is not difficult to detect the uncomfortable presence of some of extraterritorial national jurisdiction imposed, which has to be faced as a very negative factor in general and particularly to the development of space activities by all states.

I agree with Professor Peter van Fenema that more certainty about the free and permanent availability of both domestic and foreign launch services must be based on an international treaty in order to assure an environment of stability and predictability, as well as to prevent unilateral and arbitrary national decisions.

I also second the proposal of Professor Peter van Fenema to engage the COPUOS Legal Subcommittee "in an analysis of whether the body of space law and policy is still adequate in regulating the space activities of states and other entities, particularly in the light of the explosive growth of private commercial space activities". I would just suggest one basic condition: This discussion should be focused not only on private interests, but also and simultaneously on the international public interests, the interests of all countries, as they are recognized in 1967 Space Treaty.

We need to take into due account this requirement because, as properly stated in the UNISPACE III Plenary session by the Head of the Brazilian Delegation, Ambassador Sergio de Queiroz Duarte, "the increasing involvement of the private sector in international cooperation agreements should not result in an increase of the gap between developed and developing countries, but rather in the strengthening of true international cooperation in the use of space as the common domain of humankind."

All these ideas raise questions that we would have to discuss and try to find fair answers: Which kind of global launch services development we all need nowadays and in the future? Does this expansion will continue to move under the market forces only, or could the community of nations and organizations, including private ones, act in the sense of conducting this expansion to a more reasonable and rational direction also? How to deal with the tendency of oligopolization of the launch industry?

Such a comprehensive discussion may lead us to seriously think about the task of setting specific principles on the launch space services, a sort of a code of conduct. After all, they are the very start of all space activities.

Commentary Paper

Armel Kerrest
Professor of International Law at the
University of Western Brittany (France)

I was very impressed by the high quality of the presentation of Pr. van Fenema. I share most of his

views on that matter. I would like to make two remarks and two proposals concerning this important issue.

1) The space treaties and especially the first ones are a great achievement. I really don't know how we could draft such texts nowadays. As far as launching activities are concerned, the treaties deal with responsibility and liability in a victim-oriented manner which is second to none. Some improvement is possible especially to take into account the commercial and private activities, but it should not conduct to a change of the principles.

The relations between international and domestic law are often misunderstood. Space treaties should not be regarded as able to rule everything in outer space especially as far as private entities are concerned. Private entities are not subject to international law which applies to them through domestic legal order. International space law including the treaties creates to States obligations that they must fulfil. The treaties should be regarded as the basic rules of States obligations and relations. This does not prevent them to organise and rule, on a domestic juridical level, private activities they are internationally responsible and liable for.

It is often argued that some definitions used in the treaties are to be specified. May I remind you that article 38 of the statute of the International Court of Justice accepts the "teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law." Thus I would support the creation by the COPUOS of groups of experts which should be of great help on these matters.

2) My second question is more directly linked with the paper of Pr. Van Fenema. If the commercial space market is rather closed for the time being, I am not sure this situation is going to be maintained. The current market is nowadays launcher-oriented, but, with the possible success of new launchers and of the commercial use of old ones, the market may become user oriented. The recent success of Sea Launch shows the way. Some other projects are being pursued; new launch facilities are created or to be created.

To my opinion this trend will modify not only the launching market, but also the legal framework for controlling launching activities. As we know, the launching State, because of its liability, has to control launching. Until now, launching activities needed large facilities and were under the effective control of competent and able States. The current evolution should conduct to see some private entities driven by a stronger competition try to escape the heavy burden of regulations by space powers. As we see in other fields, in a difficult and very competitive market, one of the major possibilities to lower the cost is to try to escape regulations that are costly in time and money. It is already the case in the sea activity; no real actor can act in a competitive market without using flag of convenience, i.e. rules of convenience.

My proposals are the consequences of these remarks:

1 The necessity to maintain the treaties as the very basis of space law especially on the questions related to responsibility and liability.

2 The necessity to improve international space regulations to make sure that States will fulfil their obligation to control their national activities in outer space. These international rules should be compulsory and integrated into domestic legal order by every State and thus cannot be avoided by choosing a registration or a nationality. No flag of convenience should be accepted in outer space. I would not like to see those legal black holes be created in outer space as they are at sea.

We know what black holes are, they destroy everything approaching them, even the light.

Summary Report

This session examined the expanding base of launch system providers worldwide and considered the legal and policy implications of the phenomenal growth in

this market sector. The international launch sector shows a high grade of privatisation and commercialisation. The problem is the missing liberalisation of this sector. There is still a relatively small number of players but this will change.

- The private enterprises shall be given an higher importance in the legislative process.
- Therefore, a framework for permanent dialogue could be established.
- For the future global launch industry, the IGOs could possibly play a very beneficial role
- US governmental inducements to (re) start commercial launch industry.
- Investigation in the role of IGOs in this concern.
- Elaboration of Coordination of ITU, GATT, WTO with UNCOPUOS for the harmonisation of work to be done in the future.
- Need for substainable development in order to protect environment
- Accountability also at the private level
- Study on the dilemma between national securiy and commercial interest (this was shown precisely on the example of USA). Investigation in the problem of national security including economic security.
- Technology transfer can be reached by a cooperation with MTCR.
- More effective and systematic regulation of international property rights.
- National export controls should be minimized.
- Establishment of a working group for the revision of national laws.
- The discussion must not be focussed only on private enterprise's interests but must orientate on public interests as well.
- Reference: Book of Mr. S.E. Doyle on Dual Use of Space Applications

EXPANDING GLOBAL COMMUNICATIONS SERVICES

SESSION 3

Chair: Professor V.S. Mani (India)
Coordinator/Rapporteur: Dr. Ram Jakhu (Canada)

SESSION THREE

Expanding Global Communications Services

Discussion Paper

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Preliminary note

What follows is intended as a 'discussion paper'; that is, its purpose is to identify, to make some comment on and to open up for consideration some questions of international telecommunications in the space age. I am not thereby to be thought of as necessarily wholly committed to all the points made, nor to all the solutions and measures suggested. And I also would apologise to those whose ideas or points of view may have been overlooked, as well as to those who may well have put forward similar ideas in the past, but whose work is not here expressly acknowledged.

Introduction

World telecommunications were revolutionised by the opening of space. As was foreseen by Arthur C. Clarke in that famous article of 1945 in which he put forward the concept of providing telecommunications links from the geostationary orbit,[1] space systems provide relatively inexpensive high quality services, are easy of access from very widely spread locations, and are without many of the problems of wired services or terrestrial radio. The United Nations was early conscious of the challenges and opportunities presented by this revolution, and has responded through General Assembly Resolutions as well as through its family of specialised agencies, notably the International Telecommunication Union (the ITU). There have also been two prior conferences held specifically to consider space matters, UNISPACE I of 1968 and UNISPACE II, 1983. Now, four decades on since Sputnik I, UNISPACE III takes our attention.

Telecommunications are extraordinarily significant in the modern world. The provision of telecommunications services is one of the largest business sectors in the world. The data carried by these services is fundamental to the conduct of many industries. Telecommunications therefore has important economic effects. The political effects are also undoubtable. Statesmen, governments, institutions and commentators are expected to react faster than ever before, occasionally, I fear, without having sufficient time to gather all relevant information and arrive at a balanced view following upon a period of thoughtful contemplation of problems. The information explosion has had vital consequences (both positive and negative) within societies,. Some cultures have spread and others weakened. Moral attitudes and religious beliefs, have been strengthened and diminished. Former bedrock

[1] A. C. Clarke, 'Extra-terrestrial Relays: Can Rocket Stations Give World-Wide Radio Coverage?' *Wireless World*, October 1945, 303-8.

principles have been questioned, and new dogmas established. In short, Marshall McLuhan's 'global village' is upon us. Nonetheless, and granted all the dangers involved, it is important that as much of the population of the world as possible should be able to gain from the benefits that have come since the opening of the space telecommunications systems. How this can be done efficiently and equitably is a question, and the answers to it change over time.

Our predecessors at UNISPACE I and II faced a rather different world. Since 1968 and even since 1983, attitudes and presuppositions have changed. Demand for telecommunication services has increased in many ways. The privatisation of services formerly thought of as the responsibility of government has become common in many of the developed states. Correlatively, competition has become a watch-word. It is curious, however, to note how in the technical field at least, modern solutions to modern problems often are directly traceable to the basic concepts worked out by our forefathers at the dawn of the modern telecommunication age.[2] It is odd also to see the parallels between Nineteenth Century arrangements and those of the present day, and to wonder whether that cycle of underlying philosophies will repeat.

But things have moved on since the early days of space, and, without further rehearsing history, we must now turn our eyes to the future, while learning from the past. Telecommunications have expanded in many ways. As noted, demand for traditional telecommunications services has increased. New services have become available, and popular. How to cope institutionally with these developments is a question, the answers to which have arguably been compromised by a failure to tackle it early enough. Many of the relevant institutions that served well in the past are under pressure. Some are on the brink of metamorphosis, while others have evolved. How to cope with the new level of demand as a matter of resource allocation is another and equally fundamental question, to which there are several potential concurrent answers. Telecommunication by cable has its own practical constraints, but is relatively easy to deal with in that the connection facility is confined and the arrangements a matter for negotiation between the countries and entities concerned. By contrast, radio is a real problem.

That said, many of the problems remain the same as those faced by our predecessors, albeit in altered or aggravated form. Further, various basic questions are common to the sessions to be held during this Legal Workshop, though the answers may well vary from case to case. How best should space be used? What is required for the efficient exploitation of space technologies? How can we ensure that exploitation is also equitable.[3] What international procedures exist to deal with such matters? How can they be improved? What controls may be required? How can they be enforced? These, and similar issues, underlie what follows. Our subject, telecommunications, requires its own set of responses to these questions, but we should begin by noting that these basic questions face us all.

Three other introductory points must be made. First, the matters discussed below are not exhaustive of the issues of space telecommunications. There is neither time nor space for that. This paper simply deals with matters that seem to me to deserve the attention of UNISPACE III. Second, assumptions are made about the knowledge of the participants in the Workshop both as to technical and as to legal matters. Third, while I have given sourcing for the documentary materials referred to, the citation of scholarly and other authoritative discussions is less thorough. More has been read over the years than is cited, and I apologise to any who feel their work has been neglected by my failure to cite. The problem is the nature of the paper, which is intended to trigger discussion.

[2] Cf. the International Telegraph Convention, Paris 1865, 130 CTS 198; the International Telegraph Convention Vienna, 1868, 1366 CTS 292; the International Telegraph Convention and Regulations, Rome, 1872, 143 Consol. TS 415, and the Preliminary Conference at Berlin on Wireless Telegraphy, Proces-verbaux and Protocole Final, (UK) (1903) Cd. 1832; 194 Consol. TS 46.; and, the Radio-telegraphic Convention, Final Protocol and Regulations, Berlin, 1906, 1906 UK Parl. Papers, HC 368; 203 Consol. TS 101.

[3] I assume here that the obligation of art. I of the Outer Space Treaty (cited below) as to the benefit and interest of all countries is accepted as legally binding.

We start with developments in international telecommunications providers. We go on to the International Telecommunication Union as such, and thence to questions of the radio spectrum and the geostationary orbit.

International telecommunications providers: privatisation and competition

Global telecommunications entities

The privatisation of telecommunications is having its effect. While formerly (and with the exception of the US), telecommunications was generally considered necessarily to be a state function, many states have privatised the provision of telecommunications services within their jurisdiction in whole or in part, or are taking steps towards. Further, these new telecommunications entities have been busy entering into cooperation agreements, and even on occasion forming increasingly large businesses through take-overs and mergers that have gone beyond state frontiers. This goes along with the notion of competition. As noted earlier, competition is now a dogma in international trade. Telecommunications have not been exempted. The World Trade Organisation recently adopted measures on the question of the provision of telecommunications services.[4] The European Union has also produced legislation under which competition is being introduced into telecommunications services across the member states. And, of course, as the European Union expands, as seems likely, these requirements will extend to a greater geographic area.

To the devil's brew of commercialisation and competition has been added technological developments. The convergence of technologies, and the ability to provide formerly distinct services through common systems, has an effect on law. The relatively simple regulatory structures of the past have become outmoded.

It is awkward to fit these developments into the framework of space telecommunications as that was first developed. It must be done, but it is clear that there are dangers involved in these unstoppable developments. I fear that the public interest of the world may be compromised, and therefore suggest that steps should be taken to ensure that the 'global public interest' is protected by appropriate machinery. The original conception when space services were contemplated by the United Nations was of telecommunications as a public service. That is not the same as a service to the public. While it is equitable that payment is made for use of both a public service, and a service to the public, a public service should be provided and maintained even if it is not itself profit-making. A 'service to the public' will usually be provided only if there is a reasonable prospect of profit. Profits will normally be maximised.

The potential of space telecommunications to benefit mankind was clearly identified by the General Assembly of the United Nations in 1961, when, in Resolution 1721 (XVI) of 20 December 1961, on 'International Cooperation in the Peaceful Uses of Outer Space' it expressed the hope that 'that communication by means of satellites should be available to the nations of the world as soon as practicable on a global and non-discriminatory basis'.[5] Curiously the desirability of such telecommunications service is not further specifically identified either for commendation or exhortation in later UN Resolutions or treaties. However, there can be no doubt that space telecommunications fall well within the terms of UN

[4] World Trade Organisation: Agreement on Telecommunications Services (Fourth Protocol to General Agreement on Trade in Services), Geneva, 15 February 1997, (1997) 36 ILM 354. See T.L. McLarty, 'Liberalized Telecommunications Trade in the WTO: Implications for Universal Service Policy' (1998) 51 *Fed. Comm. LJ* 1-58. As of correlative interest, cf. the splitting up of the Bell system in the US and subsequent developments arising out of technological convergence. On the Bell story see: P. Temin, *The Fall of the Bell System: A Study in Prices and Politics*, (Cambridge and new York: Cambridge UP, 1988).

[5] See the first preambular paragraph, 'Believing', of Part D of UNGA Res. 1721, 'International Co-operation in the Peaceful Uses of Outer Space', 10 December 1961.

Resolution 1962 of 1963, the 'Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space',[6] and the manifestation of these Principles in the Outer Space Treaty of 1967.[7] Of course, over the years the non-space-active states, and in particular the developing countries, have expressed reservations about the extent to which actual benefit from space activities has accrued to them, General Assembly Resolution 51/122 of 1997[8] being the clearest outcome of their concern, as well as evidence of the willingness of the space-competent states to consider the matter. But while one can have sympathy with the point, telecommunications can certainly be cited as one area in which all countries willing and anxious to benefit from space have been able to do so.

It would be otiose to pretend that after Resolution 1721 of 1961 matters were simple or easy. The technicalities were to take time, and there was much discussion and compromise to come on the legalities. How best to set up a 'single global system' for space telecommunications was a question to which different answers were possible. Within a year the United States had created the Communications Satellite Corporation with some hope that it would build and run a service which others would use on a commercial basis.[9] Others wanted an arrangement under which the enterprise, its profits and losses and the technical expertise resulting from the endeavour, would be shared, and that is what transpired. Interim Arrangements for the International Satellite Telecommunications Organisation (INTELSAT) were set up in the shadow, as it were, of the 'Principles' Resolution of 1963.[10] The Interim Arrangements were innovative, having more of the character of an arrangement among joint venturers than had hitherto been normal in international organisations. After nine years, in 1973 these interim arrangements were replaced, INTELSAT as we have known it for a quarter of a century came into being,[11] and it must be acknowledged that it fulfilled, and continues to fulfil, many of the high expectations of the 1961 UN Resolution. The concept of the linked intergovernmental agreement and the operating agreement between telecommunications entities (taken over from the Interim Arrangements) was novel. The relating of financial obligation and the sharing of profit, and fundamentally the weighting of representation in the Board of Governors, to usage, was a master-stroke. It afforded, and affords a workable solution to the constant problem found in so many international organisations (including the ITU) of the difficulties caused when the dogma 'one state one vote' is not matched by equality of financial commitment.

For a variety of reasons a separate organisation, INMARSAT, was created to provide maritime mobile services, through the agency of what was originally called the International Maritime Satellite Organisation.[12] For related reasons, including the

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[6] The Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, 13 December 1963, G.A. Res., 1962 (XVIII).

[7] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies, 1967, 610 UNTS 205; (1968) UKTS 10, Cmnd. 3519; 18 UST 2410, TIAS 6347; 6 ILM 386; 61 AJIL 644.

[8] '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' A/RES/51/122 4 February 1997.

[9] See the (US) Communications Satellite Act 1962, (Public Law 87-624; 76 Stat. 419, 47 USC 701-44), as subsequently amended. The Articles of Incorporation of the Corporation are printed (1963) 2 ILM 395.

[10] Agreement Establishing Interim Arrangements for a Global Commercial Communications Satellite System, and Relative Special Agreement, (UK) 1964 Cmnd. 2436; (1964) 3 ILM 805

[11] Agreement and Operating Agreement relating to the International Telecommunications Satellite Organisation (INTELSAT), Washington, 1971, (1973) UKTS No. 80, Cmnd. 5461; 23 UST 3813 and 4091, TIAS 7532; (1971) 10 ILM 1909.

[12] Convention and Operating Agreement on the International Maritime Satellite Organisation (INMARSAT) with Operating Agreement, London 1976; 1143 UNTS 105 and 213; (1976) UKTS No. 94, Cmnd. 7722; 31 UST 1 and 135, TIAS 9605; (1976) 15 ILM 1051-75. Although it retains the acronym of its older incarnation, INMARSAT is now formally titled the International Mobile Satellite Organisation, as the business transacted has expanded into other fields of mobile communications.

smaller size and more confined purposes of the organisation, a structure different from that of INTELSAT was selected. However, notably the relationship between financial commitment and power in important decisions was retained. Other international organisations were set up to provide particular services, or services to a particular constituency. Major among these are INTERSPUTNIK,[13] originally based within the then USSR sphere of interest, EUTELSAT,[14] which originated with Europe, ARABSAT,[15] which brought together the Arab world across a large section of the globe, and PALAPA, originally an Indonesian domestic system, but one which now provides services in the Asian region.

Such were the main providers of satellite telecommunication services. But now, increasingly, we see companies such as PanAmSat, Orion, Iridium, Alcatel, invested with legal personality by registration through the procedures of a particular state, whose purpose is the provision of national and international telecommunication services for commercial profit. These companies wish selectively to enter the telecommunications market. Indeed, some of them are already active in parts of the market, in some instances providing 'new services' not offered by their predecessors.

Some would argue that this development is necessary. Without conceding that, others would accept that the procedures of the international telecommunications organisations can be slow, the introduction of new services not as swift as companies can achieve, and that the status of the gateways to the facilities of the organisations can be used to impede competition by others.[16] Both INTELSAT and INMARSAT avoided some of that criticism by accepting direct access by non-Signatory entities, but only provided that the appropriate Signatory agreed. That has been insufficient to stifle criticism. Another strategy has been for first INMARSAT, and second INTELSAT to hive off certain elements of their businesses to separate companies. In the case of INMARSAT, ICO Global Communications Ltd, was created some years ago, and it is now a separate company, which, indeed could be a competitor of INMARSAT in due course. It's market niche is that of the personal mobile phone, which will link with a system of low level satellites which it is in the process of creating. In the case of INTELSAT, New Skies NV was separated off in 1998, and operates as a Dutch company providing multi-regional video and interactive multi-media services for both business and individual customers. Unlike the INMARSAT spin-off, which has still to establish its system, New Skies NV has been created in a functional state, as it were, five satellites and appropriate contracts being transferred as at the time of incorporation. In addition the ITU has accepted the transfer of appropriate frequency and orbital positions from the US to The Netherlands.

However, such steps are less than would meet the requirements of those who would seek the privatisation of the international organisations. Other arguments for privatisation of the core business of each of the two satellite organisations have been at work as well. Both organisations could profit from an ability to garner finance from the ordinary commercial sources such as

[13] Agreement on the Establishment of the "INTERSPUTNIK" International System and Organisation of Space Communications, Moscow, 1971, 862 UNTS 3; *Space Law: Selected Basic Documents*, (2d. ed.) Committee on Commerce, Science and Transportation, (US Government Printing Office, 1978) at 385-98. See also Y. M. Kolossov, 'International System and Organisation of Space Communication (INTERSPUTNIK)' in N. Jasentulyana and R.S. Lee (eds.), *Manual On Space Law*, (New York: Oceana, 1979-84), vol. 1, 401-14, with text of Agreement, vol. 2 at 159.

[14] Convention and Operating Agreement of the European Telecommunications Satellite Organisation (EUTELSAT), Paris, 1983, 1519 UNTS 149; (1990) UKTS 12, Cm. 956., amended (1990) UKTS 15, Cm. 956.

[15] For unofficial translations of The Agreement of the Arab Corporation for Space Communications, see *Space Law: Selected Basic Documents*, (2d. ed.) Committee on Commerce, Science and Transportation, (US Government Printing Office, 1978) at 449-68; N. Jasentuliyana and R. Lee (eds.), vol. 2 at 345-60; and, E. M. M. Abdallah, 'The Arab Satellite', (1977) 44 *Telecommunication Journal*, 422-6.

[16] Cf. the rather hysterical opposition to INTELSAT manifested in recent Congressional debate, as well as provision in draft bills which appears to instruct the US Executive Branch to breach its international obligations. See the terms of and debate and Hearings relevant to Bills S. 2365 on International Satellite Communications Reform, and H.R. 1872 on Communications Satellite Competition and Privatisation, both 105th Congress, 2d Session.

banks. This is particularly the case with INMARSAT which needs to upgrade its satellite system at a time that the economic difficulties of some of its major members has made them less likely to undertake the needed investment. Ordinary commercial borrowing is an option not available to an international organisation, but available to a private entity.

Another factor has been that, as the space telecommunications market has opened up to competition from private companies, the advantages of limited liability have seemed increasingly attractive. The privileges and immunities of an international organisation are not the same thing as limited liability. This interacts with the question of access to normal financial sources. Borrowing, whether or not with security, is not available to an international organisation in the same way it is available for an economic entity whose liabilities are defined and protected to a degree by limited liability.

However one looks at these matters, the die has been cast in the one case, INMARSAT, and is likely to be similarly cast in the other, INTELSAT. From 15 April 1999 INMARSAT has been a rather different thing. It has been extraordinary to see a camel metamorphose into a horse, and I just hope that that metaphor is correct. Others might say that an armadillo has mutated into a dromedary. INMARSAT now consists of a much slimmed down international organisation with supervisory functions in relation to INMARSAT Ltd, a company incorporated in the U.K., and to which the assets and liabilities as well as the operating functions for the former organisation have been transferred.[17] INTELSAT may well go down the same line, as may EUTELSAT and INTERSPUTNIK.

This is not the place thoroughly to analyse these developments, actual and potential. But one should express some fears. What of the principles of a global system with access for all on a basis of equality?

First, we must recognise that incorporation of an entity within a legal system makes that entity subject to the law of that system, and to governmental pressures backed up, if necessary, by appropriate legal changes. Will a global telecommunications system run by an incorporated private company be subjected to the direction of the state of incorporation according to what that state's government considers to be in its interests? To sharpen the point, would INTELSAT privatised and incorporated, for the sake of argument in the US, be allowed without interference to continue service to Iraq or the Former Yugoslavia because its system is supposed to be global and accessible without discrimination?[18]

Second, if the major global international telecommunications organisations are to be privatised, and therefore run on a commercial basis, what can be done to ensure that profitability alone is not the measure of whether a particular service or link it maintained, particularly if it is not itself profit-making? What of the concept of an 'international public service'?

It is good to note that within the INMARSAT mutation, steps have been taken to protect the public service obligations in relation to the safety of life at sea (the GMDSS (Global Maritime Distress and Safety System)). The Public Service Agreement between the new company and the new Organisation secures that element.

It has also been good to understand that in the INTELSAT discussions, public service is also an element which is likely to be protected. From the beginning the INTELSAT Agreements allowed the organisation to provide domestic telecommunications services, in some instances on the same basis as public international services if that were feasible after obligations to the international services were met. That has eventuated. Over thirty countries and fifteen or more territories are dependent on the INTELSAT system for their domestic telecommunications services,

[17] D. Sagar, 'The Privatisation of INMARSAT', 1998 41 *Proc. IISL*, 205-23.

[18] 1. The INTELSAT 'spin-off', New Skies NV, has been incorporated in The Netherlands, not the US. 2. I note that EUTELSAT withdrew service for a Yugoslavian TV news broadcast through its facilities at the beginning of June 1999. This, however, is not quite the same as the provision of telecommunications services.

In addition many developing countries are also dependent on INTELSAT for their international traffic. In terms of Art. V(d) of the INTELSAT Agreement, the charging rate for each type of utilisation of the INTELSAT space segment is the same for all users of that service. What this means is that routes and connections which do not themselves generate sufficient income to pay for their provision are charged at less than cost. It is to be hoped that a mutated INTELSAT will continue to provide these services, and that financial considerations will not result in an undue increase in charges to such countries and territories. Such services really are a public service, well within the tenor of the attitudes of UNGA Res. 1721.

But how may one secure the INMARSAT and the (potential) INTELSAT position on such matters? In an era of competition where financial cost-effectiveness seems paramount, one can not wholly rely on assurances. As noted, there is the INMARSAT Public Service Agreement enforceable through the UK courts. Perhaps something similar could be done for INTELSAT, though I must say I would be reluctant to see INTELSAT's public service obligation secured through the vagaries of US law as it now exists.

One solution might be to entrust the supervision of such matters to an international body. I will come to the question of an International Authority for other purposes, but that of enforcement of public service obligations could sit well with the other duties that should be given to such a body.

In any event it is desirable that UNISPACE III should express concerns on these matters, and the expectation that the basic concept of 'international public service telecommunications facilities' should in the general world interest be continued, if necessary by subsidising uneconomic connections, routes and services, by the more profitable. Telecommunications entities should not be able to cream off only profitable services and routes, leaving others to shoulder the burden of the public interest where that service is loss-making.

New entrants

Some of the preceding discussion assumes the presence of new telecommunications entities as providers of space services. That assumption is, of course, more than an assumption. But there are certain matters connected with the entry of companies into the space telecommunications business which should cause concern. Since some of these concerns can be met through the ITU, they will be mentioned under that heading, below. Other general points arising from the entry of new providers into international telecommunications may be identified here.

States' supervisory abilities

It is the duty of states parties to the 1967 Outer Space Treaty to authorise and on a continuing basis to supervise the activities of state and non-governmental entities in space (art. VI, OST). It is also the right of all states to use Outer Space (Art. I.2, OST). Similarly, states have duties under arts. 45.2 and 3 of the ITU Constitution as to the avoidance of harmful radio interference. The question must be asked whether all states are equally able to exercise these supervisory roles. There is a risk that a state may be willing to authorise space activities which it is not able properly to superintend, and to allow the use of radio frequencies without being able properly to enforce the avoidance of harmful interference. Perhaps where such an ability is lacking, the ITU should be permitted not to accept notifications from such a state.

Flags of convenience : Homesteading

We can take the question of a state's ability to meet its duties as to licensing and supervision one step further. The concept of a 'genuine connection' has surfaced at times in various matters of nationality. Companies and businesses are quite often created and registered with regard to taxation and other advantages, without there being a close or fundamental connection between the business and the state of registration. Some states are in the business of being tax havens, and I note that at least one of the new entrants to the space telecommunications business has so arranged its affairs.

Apart from that, a clear analogy is possible between the developing law of space, and the law of the sea. The registration of shipping and flags of convenience states have been long-standing problems.

There is, of course, a correlative possibility that in reality a state may seek to register frequencies and/or orbital positions in order to gain revenue by leasing them to companies. (The Tongasat question could be viewed in this light.) In such a case a state would effectively be homesteading a claim which might or might not eventually produce gold. This would be an undesirable abuse of the ITU system. It is true that the new measures as to 'due diligence' described below in the discussion of 'Paper Satellites' will do much to reduce the problem. But that does assume a state will act in accordance with the spirit of the system. A state just might be persuaded to play the system, interpreting the words of the procedures to suit its own purposes and those of a persuasive company. My answer to this would be to encourage the ITU to use the powers that can be implied from its purposes, as indicated in the last section of this paper. But perhaps the ITU would prefer express authority so to do.

Therefore, to cope with the problems of this sub-heading, perhaps UNISPACE III should declare that it is incumbent on states not to incorporate or register companies, or license the activities of companies engaged in space telecommunications, unless there is a clear and substantial connection between the state and the business to be carried on. Further states should notify only space systems which are required for their own internal and international telecommunications services, traffic volume being an important consideration. The ITU, should be given the power to scrutinise notifications to it for the required connections between operator and the notifying state, and between the proposal and the telecommunications requirements of that state, and be instructed to refuse notifications which do not meet these test. Such could go along with other proposals for strengthening the role of the ITU which are made below.

Licensing

Finally in connection with new entrants there is the question of the licensing authority. At present it is for states to license an entity which wishes to engage in space activities, including telecommunications (Art. VI, OST). In so doing a state is free to establish whatever mechanisms it may choose. However, for the sake of this discussion let us assume that every state deals with the matter through a Communications Commission. No matter what device is used, such a Commission will have regard to the interests of the state in coming to a decision. In many countries by reason of their rules as to the incorporation of international law, the obligations the state has under the ITU and other appropriate *fora* will be taken into account. At least, one hopes so. Other countries act differently. But in any event, it is clear that the domestic interest of the state, often manifested through the benefit to the national entity which is the applicant for the licence, is paramount. The result is that the global telecommunications system develops piecemeal, as a cumulation of separate commercial and state interests. There is no body or process in which the interest of the world as a whole is the basis of licensing decisions in space telecommunications.

Consider the new entrant using one of the Low Earth Orbit technologies. The licences granted for such mean that the company gets access to orbits and to frequencies. Theoretically the licence is valid only within the jurisdiction of the authority which grants it. In some cases new rules as to the recognition of licences, for example within the European Union, means that a wider area is covered - but it is still a small area having regard to the fact that the LEO satellite(s) orbit the earth. In effect therefore the decision of one licensing authority pre-empts the matter on a global basis, but the decision has been made in the particular interest of the licensing state. This is wrong.

I would argue (and will argue again further on, though expressing certain reservations) that just as space telecommunications affects the whole world, not just the state of licence, decisions affecting the world should be made by a world authority. A global Communications Commission is the only way in which the aspirations of Article I of the Outer Space Treaty

will be properly met. The entry of these new entities into the space telecommunications market-place would have been the time to put such a system in place. But it is not too late.

Radio matters

The radio spectrum, which used to be considered an inexhaustible resource, is clearly so no longer. As article 44.2 of the ITU Constitution states, radio frequencies are a limited natural resource, the use of which should be rational, efficient and economic. The geostationary orbit is similarly characterised.

Without radio signals for command, control and telemetry, satellites, whether for telecommunications or otherwise, are useless. Such requirements have to be intercalated with the demands of terrestrial high frequency systems. In addition there is also demand from the radio astronomers and SETI searchers, that certain (otherwise useful) bands be kept free from use so that interference with extra-terrestrial sources is minimal. In short radio, already the province of the ITU when space activities began, is essential for virtually all space endeavours. It would therefore have been quite remarkable, not to say obtuse, had United Nations Resolution 1721 of 1961 not also put its finger on the importance of the ITU for developments in space. The ITU was quick to respond, a major initial conference on space requirements being held in 1963,[19] the first of many thereafter. Indeed, space matters have become major preoccupations of the ITU system.

The International Telecommunication Union

Background

The International Telecommunication Union, the ITU, is one of the success stories of international co-operation.[20] Although now in modern guise, the ITU is one of the two oldest international organisations still functioning. The other is the Universal Postal Union.[21] It is therefore noteworthy that these two elderly, but still sprightly organisations, exist to provide practical benefit for all mankind, effectively complying with one of the major principles that underlie Space Law.

The present ITU, with competence in both wired and wireless telecommunications, was formed in 1932 by a fusion of the International Telegraph Union and what was loosely known as the International Radio-telegraph Union.[22] Like other international organisations, the ITU was reconstructed following the Second World War, becoming a Specialised Agency of the United Nations at that time and adapting its constitution to the UN model by introducing a Secretary General, a Secretariat, and an Administrative Council as well as making permanent its most significant committees.[23] The ITU Convention was revised several

[19] Final Acts of the Extraordinary Administrative Radio Conference, Geneva, 7 October - 8 November, 1963 (Geneva: ITU, 1964). In fairness it should be noted that the ITU had begun planning this conference before UN Res. 1721.

[20] For the history of the ITU down to their respective dates, see: G.A. Codding Jr., *The International Telecommunication Union, An Experiment in International Cooperation* (Leiden: E. J. Brill, 1952; rep. New York: Arno Press, 1972). O. Mance, *International Telecommunications* (Oxford: Oxford UP, 1943) and J.D. Tomlinson, *The International Control of Radiocommunication* (Michigan: J.W. Edwards, 1954)(a dissertation of 1938), and F. Lyall, *Law and Space Telecommunications*, (Aldershot, Hants: Dartmouth, and Brookfield VT: Gower, 1989).

[21] G. A. Codding, *The Universal Postal Union: Coordinator of the International Mails* (New York: New York U. P., 1964); F. Lyall, 'Posts and Telecommunications' in O. Schachter and C. Joyner, *United Nations Legal Order*, (Cambridge: Grotius Publications, Cambridge UP, 1995) vol. 2, 789-824.

[22] Telecommunication Convention, General Radio Regulations, Additional Radio Regulations, Additional Protocol (European), Telegraph Regulations and Telephone Regulations, Madrid, 1932, 151 LNTS 4; M. O. Hudson, *International Legislation*, (Washington DC: Carnegie Endowment, 1932-4) vol. VI, 109. Technically a Radio Union was never established, but like others, I use the title to denote the signatories to the various Radio-telegraph Conventions.

[23] International Convention on Telecommunications, Atlantic City, 1947; 193 UNTS 258; (1950) UKTS 76, Cmnd. 8124; 63 Stat. 1399, TIAS 1901. Interestingly the ITU and its predecessors had stood apart from the League of Nations: G.A. Codding, Jr., 'The Relationship between the League and the United Nations with the Independent Agencies: A Comparative

times thereafter by successive plenipotentiary conferences, until it underwent fundamental reorganisation in 1992, when the present constitutional structure was adopted.[24] This, *inter alia*, involved the division of the ITU Convention into a Constitution (cited CS) and a Convention (cited CV), the former containing provisions less likely to require later amendment. However, the major innovation of 1992 was the creation of three Sectors, Development, Standardisation and Radiocommunication, with the competence indicated by their titles, each served by a Bureau headed by a Director elected by the Plenipotentiary Conference. Minor revisions to the ITU were made in 1994 at Kyoto,[25] and further amendments at Minneapolis in 1998.[26]

The ITU has done well, and should be congratulated for that. It has adopted a less cumbersome way of doing business in order to cope with modern conditions. The four year cycle of sectoral meetings within the four year cycle of plenipotentiaries is bedding in, though it seems that on occasion for some matters that may be too tight a timetable. Non-state entities (businesses) have been given easier access to ITU study groups and the like by the 1998 Minneapolis Plenipotentiary Conference. But, looking to the future of space telecommunications (and indeed to other areas of ITU responsibilities) there are some matters which should be given fresh consideration. Further, as we will come to in due course, there arguably is a case for the extension of ITU competence and responsibilities. We start with several matters of structure and functioning.

The ITU and Development

As noted above, the reorganisation of the ITU in 1992 produced the Development Sector. Although Development had been a matter of great interest to certain members of the ITU,[27] a question must be asked whether Development is a matter which should figure to the extent that it does within the ITU structure. The ITU functions as a technical organisation, facilitating the efficient and equitable use of telecommunications. Certainly the technical development of telecommunications is in the interests of the whole world.[28] However, there is a strong argument that there are other UN agencies which are better adapted to dealing with the rather separate matter of the actual development of telecommunications facilities in developing countries. To have grafted that responsibility into the ITU has not been wise. Certainly the budget for Development is closely controlled and it is separate from that for other ITU activities, but that has served merely to stunt what could accomplished were telecommunications development included in the portfolio of another international organisation whose purpose and skill generally is the fostering of development. The development of telecommunications would be better incorporated within other decisions and efforts towards 'development' seen in a broader context.

The Radio Regulations Board

One result of the restructuring of the ITU in 1992 was that the former five member full-time International Frequency Registration Board disappeared. Many of its functions are the responsibility of the Bureau of the new Radiocommunications Sector under its Director. Other functions are the responsibility of a part-time Radio Regulations Board (RRB), originally nine in

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Analysis' *Annales d'Etudes Internationales*, 1165-87.

[24] Constitution and Convention of the International Telecommunication Union: Final Acts of the Additional Plenipotentiary Conference, Geneva 1992 (Geneva: ITU, 1993).

[25] Final Acts of the Plenipotentiary Conference of the International Telecommunication Union, Kyoto, 1992 (Geneva: ITU, 1992).

[26] Final Acts of the Plenipotentiary Conference of the International Telecommunication Union, Minneapolis, 1998 (Geneva: ITU, 1999).

[27] The old International Frequency Registration Board was active in development matters, by running training courses etc. for the officials of many new states.

[28] Cf. 'The Missing Link' (the Report of the Maitland Commission, (Geneva: ITU, 1985), and 'The Report of the Secretary General's Advisory Group on the Changing Telecommunications Environment', (the Report of the Hansen Committee)(Geneva: ITU, 1989).

number, but raised to twelve by the Minneapolis Plenipotentiary Conference.[29] This appears to recognise that there is more work for the RRB than was thought. Given the importance that the countries of the world, particularly the newer countries, should trust the ITU system, I would still argue that a full-time Board would be better.[30] If the Board is to have more decisions to take like that relating to EUTELSAT and Astra of 1998, or that may stem from the present (1999) argument between Loral and EUTELSAT, it would be better if the Board were divorced from the world of business. A part-time Board member is likely to be employed in telecommunications, which raises fears as to impartiality. Further, since most Board decisions rest on technical factors, it would be best that Board members should be qualified technically (as used to be required for membership of the IFRB), and not just experienced within the realm of telecommunications management.

Voting weight and Finance

As is the case throughout the UN family of Specialised Agencies, the members of the ITU are states, and each is entitled to one vote in ITU deliberations. However, like the UPU, and unlike the other UN Agencies which are financed by contributions assessed by Gross National Product, subject to a maximum, the general expenditure of the ITU continues to be financed on a voluntary basis (ITU CS. art. 28). Each state Member chooses within six months after each Plenipotentiary conference the number of units of contribution which it will pay. The range is from 1/16 unit, available only to the least developed countries of the world as assessed in terms of UN classification, to 40 units. In fact 90% of the membership pays 10% of the general costs on the Union. There is therefore a disparity between voting weight and financial weight. This disparity may explain why over the last five or six incarnations of the ITU basic documents, development has been given a greater and greater role, until now it is classified as one of the major Purposes of the Union.

Such a disparity is wrong, not to say grotesque. Add it to what is written above about the imbalance among states of practical competence in telecommunications, and one can clearly see a potential threat to the proper and satisfactory functioning of the Union. The objective of the ITU was (and is) the creation and operation of practical solutions to international telecommunications matters which will best serve the interests of the world. The current financing arrangements for the ITU were adopted precisely because they reflected the interest and competence of Members in telecommunications. In that the usage of the international system by ITU members was an obvious element. With the huge growth in numbers of states that original basis has been lost sight of. Steps should be taken to restore it. One method would be to relate voting weight to financial contribution, and perhaps to telecommunications usage both within and from/to a Member.[31]

Officials

While it is naturally required that the elected officials of the Union, the Secretary-General, his Deputy, the Directors of the Sectoral Bureaux and members of the Radio Regulations Board should be of the highest efficiency, competence, integrity (CS art. 27.2), in electing these persons the Plenipotentiary Conference must also seek equitable geographic representation through the world. That may be fair enough. However, art. 9.1(b) of the Constitution also requires that these officials should all be of separate nationality, nominated by their home states (CS art. 9.1.(c)). Now that, as noted above, the RRB membership has been raised to 12 by the Minneapolis Conference, that makes a total of 17 distinct nationalities. That seems too many, given the other requirements of election. Although an academic would think it enough to demand the highest standards of competence in an elected official, there

[29] See ITU Plenipotentiary Conference, Minneapolis, 1998, Resolution Plen/2, 'Provisional Application of the Changes to the Composition of the Radio Regulations Board'.

[30] Cf. F. Lyall, 'The International Frequency Registration Board' 1993 35 *Proc. IISL* 394-99.

[31] I would not argue for a strict relationship between contribution and voting strength, as that would mean the least voting weight would be 1/640th of the highest. But some sort of scaling should be applied.

doubtless are other factors at work, so perhaps a suitable compromise would be for not more than two persons of one nationality to figure on the list of those elected.

The ITU Council

The ITU Council is elected by the Plenipotentiary Conference, and, within the scope of the functions delegated to it by that Conference, at its annual meetings acts on behalf of the plenipotentiary conference in the period between plenipotentiaries (CS art. 7 (b) and 10; CV art. 4). Members are elected 'with due regard to the need for equitable distribution of the seats on the council among all regions of the world' (CS art. 9.1(a)). Under the 1992 Convention there were 43 Council members. When the amendments made by the Minneapolis Plenipotentiary Conference are fully in force, that number will be determined by successive plenipotentiaries, but not to exceed 25% of the ITU membership (CV art. 4.1 and 2, as modified). Forty-three members was already very large, and arguably too many, making for a cumbersome body at a time when the ITU should be directing itself to efficiency and expedition in its internal workings. A 25% ceiling invites Council membership to increase further, at present to c.46. Without much hope, I would suggest that the number should be reduced, and a somewhat different concept be introduced. While some regard must be had to geographic spread, representatives should be appointed not necessarily to represent individual ITU members, but on occasion (often indeed) to represent the interests of groups of states. This could be done by reference to the 'weight' each might represent, on the model of the INTELSAT Board of Governors as that body presently is constituted. Entitlement to sit could be based on the cumulation of contributions of various members represented as well as activity in international telecommunications. Voting weight in Council should also be related to such factors.

Paper satellites

In the latter part of the 1990s the ITU Radiocommunications Bureau received a large number of notifications of intended satellite systems. Many of these notifications were submitted, it would seem, in order to gain a place on the usual 'first come, first served' queue.[32] Most were not likely to eventuate in working systems, and accordingly are known as 'paper satellites'. Submitting data on a 'paper satellite' to Geneva would seem to be a breach of the duty of the notifying state to exercise 'due diligence' in scrutinising the notifications it was requested to forward. In itself that failure ought to be deplored since the international system depends on states properly complying with their obligations. Be that as it may, the position became very serious, with the Sector in latter years having to deal with over 2000 notifications, which was a huge burden on the staff, and the finances of the Sector. Such burdens were, of course, aggravated as many of those involved were quite aware that the chances of a satellite system actually coming into being from such notifications were very small. The staff and facilities of Sector was therefore being diverted unnecessarily, and time, effort and money wasted. Further, of course, those states later in the queue were under an obligation to seek coordination of their proposed systems with the earlier - again a burden perceived as futile. The problem of paper satellites' was the subject of much consideration following the adoption of Resolution 18 of the Kyoto Plenipotentiary Conference directed towards the improvement of efficiency of the Union.

The upshot has been two-fold, to date. First the necessity that a state exercise 'administrative due diligence' in its scrutiny of a proposed notification before submitting it to the radiocommunication Sector has been strengthened. By its Resolution 49 the World Radiocommunication Conference of 1997 revised the information required to be provided in a notification to include detail of the date of the contracts with the space-craft manufacturer and with the launch provider in addition to other standard data. The requirement of firm contracts alleviates the problem to a degree, though the Director of the Sector is to report on the effectiveness of this strategy. Second, the ITU has introduced a cost-recovery fee for the processing of notifications of satellite systems. This innovation requires separate treatment, but before we come to that, I would suggest it would be wise were UNISPACE III to stress the importance that states fulfil properly and

[32] As to 'first come, first served', see below.

fully their international obligations. A list of putative offenders would be salutary.

Cost recovery

As indicated, one effect of the burgeoning numbers of 'paper satellites' was to overburden the Radiocommunication Sector. Apart from the strengthening of 'administrative due diligence' some suggested solutions focused more precisely on the cost of processing notifications and how that might be met in a way that would diminish the problem. First, notifications of systems unlikely to eventuate could be deterred by the introduction of a suitable level of fee, and second, it was argued to be only right that those who as it were caused the cost should bear its burden in whole or in part. The 1997 World Administrative Radio Conference was not willing itself to take such a step, but the Minneapolis Plenipotentiary Conference has introduced the concept of 'cost recovery' for some ITU products and services.[33] This goes beyond the matter of the paper satellite, though it clearly applies there, and the ITU Council has been empowered to introduce such a system for other products and services. The circumstances on which a cost recovery fee may be applied are however, closely circumscribed, the intention being to offset cost, not to generate income.[34]

As a matter of principle, UNISPACE III should welcome this financial realism, and perhaps advocate its adoption elsewhere in the UN system in appropriate instances. Those who cause cost should be prepared in part at least to contribute to it. That is a regular expectation among the governmental and administrative structures of the world. Why should international organisations not act similarly?

But the idea of a fee may have been introduced in an unduly restrictive manner. There is an argument for it extended application as indicated below (Resource Utilisation fee).

Implied powers

The ITU has on occasion been weak in its response to new problems. There has been a tendency to seek to parse the constituent documents and a submission to argument based on purely verbal constructions that are not intrinsically compelling. Insufficient regard has been had to the purpose of the Union as expressed in the constituent documents. In International Law there is a doctrine that while an international organisation has the powers conferred expressly on it in those documents, it also has impliedly powers required for it to carry out its function.[35] In the Tonga matter the IFRB did question the number of notifications made by that state, and eventually the number was considerably reduced. Of itself that questioning was a use of implied power, as the ability to refer a notification back to the state submitting it on other than technical grounds is not express in the ITU documents. However, in my view, the better solution would have been to decline to accept notifications which went beyond Tonga's own requirement for satellite services, the Tongan original notification being therefore an abuse of the notification system. Such declinature should have been made as being within the IFRB's implied powers. It was wrong, and weakening of ITU authority, to have in effect negotiated with Tonga. It is to be hoped that the new Radiocommunication Bureau and the Radio Regulations Board will be more robust should a similar instance arise later. If they are not, and despite the tightening of the 'due diligence' requirements for notification, the homesteader states discussed above (New Entrants, page 69) will be forming a queue.

Radio spectrum and orbital matters

Turning from institutional and structural questions of the ITU, there are matters of substance in the use of space that require discussion.

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[33] ITU Plenipotentiary Conference, Minneapolis, 1998, Resolution Plen/4, 'Cost Recovery for some ITU Products and Services'.

[34] The Council will report on the matter further in 1999. As a side-note, one wonders whether the price of publications are designed only to offset costs.

[35] Cf. *Reparations for Injuries Suffered in the Service of the United Nations*, 1949 ICJ Rep. 174.

Spectrum and orbits: First come, first served

I want to take questions of spectrum and orbits together, for reasons that will become apparent.

It was noted at the start of this Section on Radio Matters (page 71) that, as article 44.2 of the ITU Constitution states, radio frequencies are a limited natural resource, which should be used rationally, efficiently and economically. The geostationary orbit is similarly characterised, its limitations being aggravated by the fact that certain parts of its orbital arc are more useful than others because of the distribution of population round the globe. To these ends other ITU provisions require that states and those they license should avoid harmful interference (CS art. 43), and limit frequencies and spectrum use to a minimum, applying technical advances as soon as possible (CS art. 44.1 and 2). A main purpose of the Union itself is 'to coordinate efforts to eliminate harmful interference' and improve the use of spectrum and geostationary orbits (CS art. 1.2(b)). In this the ITU mechanisms as to the allocation of frequency bands, allotment of frequencies and registration processes are essential (CS art. 1.2 (a)).

The ITU mechanisms as to radio have been worked out over decades, and in principle their application to space questions was clear. However, certain questions may now be raised. Correlative questions may be raised as to the geostationary orbit.

Allocations

Although the ITU has done well in the matter of the allocation of frequencies to services, and, with the exception of the recent matter of 'paper satellites' discussed above, the registration system has also performed satisfactorily. Nonetheless, the slow development of allocations over the three and a half decades since the Extraordinary Administration Radio Conference of 1963, has been just that - slow. Technical advances have been swift. Debates in the 1995 and 1997 Administrative Radio Conferences as to frequencies, particularly for the LEO systems and for mobile phones with global roaming, clearly show the difficulty.

The problem is that the Table of Allocations of Radio Frequencies represents various geological layers, allocations being made for the best at a particular point in time, but being likely to remain past the point at which they represent the most efficient solution to problems. An example is the different provisions made for Broadcasting-Satellite Services in Regions 1 and 3 in 1977, and Region 2 in 1983, where the later Administrative Radio Conference was able to take account of technical progress in the intervening years. Of course, the ITU system is able to deal with only so many matters at one time. The ITU cycle has been considerably swiftened, but the point remains even with a four year cycle. Again there is some drag on the reconsideration of allocations stemming from manufacturers who have made decisions on the basis of known allocations to particular services. They need time to re-coup their investment.

Even acknowledging all that, however, I am inclined to wonder whether a general review of Allocations is needed in the light of modern requirements. Long-standing allocations should be reviewed to see whether more rational allocations would better fit present needs.

Allotment questions; First come first served v. engineering

The ITU system of notifications and the Master International Frequency Table provides a protection for an assignment of a frequency and, in appropriate instances, for the geostationary orbital position involved. A later assignment is to be coordinated with the earlier. In short-hand terms this is known as 'first come first served'. What happens, happens and therefore development is decided '*a posteriori*', on the basis of state action, and not discussed and decided '*a priori*', (i.e. in advance). In space matters, the process contributed to the development of the 'paper satellite' problem mentioned above. The problem with 'first come first served' in space is that the technically advanced states are likely to be 'first', leaving less useful frequencies and orbital slots to later-comers. Some would therefore argue that it would be more equitable to divide up frequencies and orbital positions before they come into use, allotting to states in terms of

their likely requirements rather than their speed of technical development.

Something similar does already operate terrestrially in that there are Broadcasting Plans for several portions of the globe. The European Broadcasting Plan, for example, allots frequencies and signal strengths within the European area, and is a useful way of arranging matters. But space is different.

In general in matters of space uses, the argument as to the 'first come, first served' falls on the side of first come first served. It is efficient that those who can make good use of a frequency band or a geostationary orbital position, should be allowed so to do. To 'engineer' either the spectrum, or the geostationary orbit, giving indefeasible rights to particular states is not expedient. That said, it has happened - once - but even that single instance did not entirely displace the 'first come' concept. This was the allocation of frequencies and slots to each state for Direct Broadcast systems by the 1985-88 WARC-ORB conference. However, until a state is ready to take up its allotment, another state may license the use of the frequencies and orbital position on a 'first come' basis. But while the 1988 decisions did guarantee the interests of the less-developed countries, after twelve years one may question its wisdom. The 1988 decisions were based on technologies that have since been much improved. As a result a state having a 'right' under the 1985-88 Plan may be blocking a more efficient use of spectrum in the new Century. Again, since 1988 we have seen an unexpected growth in the number of states. Have not the 'new' states been disadvantaged, on precisely the same grounds as the proponents of the 1985-88 system argued?

Public Service Allotments?

Putting the basic ideas of the last two sections together, there is also an argument that precisely because of the increased demand on space services, steps should be taken to secure the requirements of certain services which fall into a 'public service' category. It is in the general world interest that bodies such as the World Meteorological Organisation with its Meteosat system, and INMARSAT as operating the GMDSS system as well as maritime and air mobile services, should receive preferential treatment in their requirements. Account should also be taken of the global positioning services (GPS) however they may evolve. For such services particular orbital positions and frequencies are desirable to the point of being essential. Similarly, such entities as INTELSAT should also be given preference if they maintain public services (life-line services) for those reliant on satellite services but unable to afford full-cost prices. Already the ITU Constitution imposes duties to give priority to messages concerning the safety of life at sea, on land or in outer space, as well as to epidemiological messages by the likes of the World Health Organisation (CS art. 40). That principle should be extended into the question of the allocation of frequencies, and of orbital positions, and also as to the category of messages that qualify. Indeed, some preference in orbits and frequencies could even be a carrot to induce commercial companies to provide life-line and similar services.

In short, the pure form of 'first come, first served', already departed from in 1985-88 for more dubious reasons, should be further restricted. In the general world interest, the requirements of certain services should be recognised, fostered and protected within the ITU system.

Resource Utilisation Fee

As noted above, the Minneapolis Plenipotentiary Conference authorised the introduction of cost recovery for certain ITU products and services. That move stemmed from the question of a 'filing fee' for the processing of a notification as to a proposed space system. A UK/Luxemburg paper submitted for the 1997 WARC spoke in terms of a deposit of 2% of the cost of each satellite in the system times a charge for the amount of spectrum space sought computed in units of 1000 MHz, the deposit to be returned when the system became operational.[36] The paper also suggested that were the fee not to be returnable, it would be set somewhat differently, relating it clearly to processing cost. Exempted from the calculation would be the first

[36] Due Diligence Considerations', UK/Luxemburg June 1996, submitted as part of the work of RAG96.

1000 MHz of spectrum sought for either only for a national service, or in the case of systems to be set up for the use of less-developed countries.

Minneapolis has applied strict criteria for the introduction of 'cost recovery' and its quantum. However, more should be made of the concept.

With the development of privatisation, competition and commercialisation in telecommunications generally, as well as in the space segment, consideration should be given as to the introduction of a 'resource utilisation fee'. In that radio is a 'limited natural resource' (CS art. 44.2), why should its use not be paid for? The idea is not new.[37] And it has been acted on. We have seen in a number of countries a willingness on the part of the state to generate income for itself through the sale or lease of spectrum space, or the introduction of 'bidding systems' for the allocation of broadcasting licences.[38] Those who are to gain commercially by the use of a general natural resource should be willing to pay for it.

The precedent of the Area under Part XI the 1982 Convention on the Law of the Sea is not irrelevant, though its mention will doubtless resonate with those who bitterly opposed the introduction of its concepts.

Of course this raises various questions, and doubtless opposition who would see it as an unlawful tax on enterprise. Does not the second paragraph Art. I of the Outer Space Treaty speak of the use of space being 'free'? But does the term 'free' mean 'available to all', or does it preclude a financial aspect over and above the cost of getting there? I would suggest a 'fee' is not excluded by the word 'free'.

Other questions should be discussed. What would be the basis of assessment? I am attracted by a calculation based on the number of satellites in a system, their individual cost, the extent of the spectrum band used, and a flat rate per 1000 MHz.. Should such a 'utilisation fee' be one-off, or a continuing annual payment? Who should administer it? - the ITU seems the obvious candidate.

And, lastly: what should be done with the income? Of course those subject to the fee would argue it should be returned as subsidy for maintaining uneconomic services, but that would merely invite abuse. My own preference would be to make the sums available to the UN system, perhaps fostering development, refugees or the work of such as World Health. But this takes us into very different waters.

An international regulator?

As I have thought of the content of this paper, and started in on its writing, I have become more and more persuaded of several matters that arise from the increased demand for telecommunications services, and from the irruption of commercial business practices brought in through the privatisation of telecommunications and modern dogma as to competition.

The ITU is clearly overburdened. Although it has done well in mutating into its new forms, its agenda, particularly in radio, is too great. The agenda for the next World Radio Conference in 2000 is likely to be enormous, and arguably such matters are getting beyond the ability of many delegates to comprehend.

I question whether the present international arrangements satisfactorily secure the general world public interest in the provision of global telecommunications services open to all without discrimination.

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[37] H.J. Levin, *The Invisible Resource: Use and Regulation of the Radio Spectrum*, (Baltimore MD: Johns Hopkins Press, 1971).

[38] J.C. Thompson, 'Space for Rent: The International Telecommunication Union, Space Law and Orbit/Spectrum Leasing' (1996) 62 *J. Air Law and Comm.*, 279-311. In the US and Australia, spectrum bands have been auctioned by the relevant governmental authorities. Cf. G.L. Rosston and J.S. Steinberg, 'Using Market-based Spectrum Policy to promote the Public Interest', 1997 FCC LEXIS 384; I. Coe, 'Legal Issues surrounding Spectrum Auctions' a paper at the 1998 Melbourne Colloquium of the IISL, 1998 41 *Proc. IISL.* 194-204. In the UK the last round of commercial television broadcasting licences was allocated on the basis of bids by companies, and mobile phone spectrum bands may also be auctioned. See also generally F. Lyall, 'The International Telecommunication Union: A Global FCC?' (1994) 37 *Proc. IISL*, 42-7.

First, the approach of commercial businesses is directed to the maximisation of profit and the reduction and often excision of non-commercial activities. This is not well adapted to the UN stated, and widely accepted, notions of telecommunications as a public service.[39]

Second, although competition is a watchword much touted, there is a tendency towards the establishment by companies of dominant positions in markets. As a matter of fact, in many states competition has to be secured and monopoly and dominance diminished by suitable governmental supervision. The US has the FCC, the UK has the Office of Telecommunications (OFTEL) and the Monopolies Commission. The European Union monitors and preserves competition as one of its aims. These bodies serve a useful function. However, such supervision is lacking at the international level.

Third, *ex natura* the decision of a state as to a space system has a global effect, but in grants of licences to telecommunications entities, each state seeks to secure the interests of its own nationals, without necessarily taking into consideration the welfare of the world as a whole.

Fourth, and allied to the immediately previous point, there is insufficient separation between the technical supervision and facilitation of international telecommunications and the politics and economics involved. The size and content of delegations (and their hangers-on) to ITU conferences, and the lobbying for commercial advantage that seems to be involved, proves the point.

Fifth, where an element in a delegation is devoted really only to a part of the agenda of a conference, the overall result of the conference can be distorted and unsatisfactory.

Many of these difficulties could be alleviated, if not entirely met, by the creation of an international regulator and supervisor, which would licence civilian space telecommunications activities. Although an individual state would remain responsible in law for the licensed activities, a direct approach should be available to the providers of global international services of the INTELSAT or INMARSAT model, even after their mutation. The regulator should be given power or discretion not to accept proposals which are without substantive connection with the proposing state. It should also be able to reject proposals from states whose competence in space or radio matters is questionable. In licensing the regulator should deal with technical requirements and act in the best interests of the world as a whole, taking into due account the well-being of both the developed and the less developed states. Proposed rulings should be published, and opportunity be given to interested parties, and to those with an interest in such matters (the two are not the same) to intervene in opposition or with amendments. The efficient use of the radio spectrum and of orbital positions would thereby be facilitated. The regulatory body would act both on a cost recovery basis for processing applications, and also could derive income from a suitable resource utilisation fee. Given its standing in telecommunications matters, the ITU, suitably adapted could provide this new regulator. (I am aware that some within the ITU would seek not to have such a role.) Its base would come from the Radiocommunications Bureau and the Radio Regulations Board. A good, though improveable, model would be the US Federal Communications Commission.

I recognise that this is a lot to ask for. But it would seem the best way to come closer to the provision of global telecommunications by satellite open to all without discrimination and on a basis of equality.

The Content of Telecommunications

Last, and with more than a little diffidence, I would tag the rights of the individual to hold and express opinion, widely framed in many lists of Human Rights, freedom of expression, freedom of communication, and similar matters. Within the ITU Constitution it is incumbent on Member states to recognise 'the right of the public to correspond by means of the international service of public correspondence' (CS art. 33). The secrecy of international correspondence is also provided for,

[39] Cf. the aspirations expressed in UNGA Res. 1721, referred to above.

though in terms which permit that secrecy to be broken in appropriate cases (CS art. 37.1. and 2). Telecommunications have a content, and questions can arise as to the lawfulness of that content. The development of the INTERNET seems greatly to have increased the abilities of many to send and receive messages. That is good, and within the scope of the rights listed above. But how do these rights interrelate with concerns as to crime, terrorism and the like. What of intellectual property, or the locus of transactions for the purpose of contract, delict (tort) or taxation? These are not specifically a matter of space telecommunications, and go to content rather than technology. For those reasons I do not pursue them. But it is useful to remember we are dealing with only one side, the technical side, of questions of international (and national) telecommunications. Various organisations and conferences are at work on these other questions, as are some legislatures. This aspect of expanded global telecommunications should not be neglected.

Commentary Paper

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Mr. Chairman, Ladies and Gentlemen,

To be the first "commentator" on Professor Lyall's Discussion Paper on "International Telecommunications" is for me as the former ITU Legal Adviser (from 1979 to 1997) not only an honour, but also and particularly a real pleasure. As I should be short and leave sufficient time to my two "co-commentators", let me directly go *"medias in res"*!

1. First of all, my thanks and congratulations go to Professor Lyall who has done an admirable "job" by presenting us a fascinating paper full of material, evaluations, judgements, suggestions and new ideas, which just call for and provoke comments - both concurring and supporting, but also diverging or simply dissenting ones - as well as they invite to raise questions. This will certainly help materializing the author's stated intention, i.e. "to trigger discussion". Although my comments will, of course, concentrate on the second half of his paper mainly dealing with the ITU, I shall quickly address a few points put forward or highlighted by Frank Lyall in the first two parts of his paper, as I found them particularly interesting.

2. As far as his **"Introduction"** is concerned, I fully share, on the one hand, his fear that today's easiness to communicate risks to become detrimental to balanced, thought-through and seriously considered decision-making at all levels. Both by e-mail and mobile phone, we all push each other for constantly quicker, but certainly not necessarily better "action", the substance of which risks to suffer! On the other hand, I also share the *"petitum"* expressed by him, but not always strictly followed through in the later part of his paper, "that as much of the population of the world as possible should be able to gain from the benefits that have come since the opening of the space telecommunications systems". Some of his categorical and certainly justified evaluations, judgments and pronouncements would benefit from being accompanied by a few concrete, illustrating examples. As he correctly finds it "curious" that "solutions to modern problems often are directly traceable to basic concepts worked out" long time ago in the past, we should ask ourselves: Is this not a sign of lack of imagination on our part, *inter alia,* due to the hectic and cantering booming of telecom developments "leaving us" - only seemingly and perhaps even as an excuse! "no time" to quietly sit down and work out new concepts perhaps more adequate to respond even better to the telecom problems of our time and the next century, not to speak of millennium?

3. In his second Chapter dealing with the matter of **"privatisation and competition"**, he addresses at length the **"global telecommunications entities"** and states that "large business through take-overs and mergers" go "along with the notion of competition ... now a dogma in international trade". Two questions come to my mind: Is there not a certain contradiction between the "dogma" of competition and the trend of the constantly increasing number of always bigger and larger mergers or take-overs, which might sharply reduce "competition" finally to a bitter battle between only a few telecom giants? And: Do such mergers and take-overs themselves not hide and cover up the real problems which those "getting married" cannot solve individually any more and, therefore, choose "to take refuge" in such mergers or take-overs, which usually at the beginning are welcome by the money winning share-holders, but the long-term success and even survival of which is by far not ensured? In this optic, I like Frank Lyall's picture of "the devil's brew of commercialisation and competition", share his "fear that the public interest of the world may be compromised" and fully agree that "steps should be taken to ensure that the 'global public interest' " - which he later also calls the "general world public interest" and also simply the "general world interest" - "is protected by appropriate machinery". His fine distinction between "a public service" and "a service to the public" is also very pertinent, whereas he is, in my view, much too optimistic in pretending that "telecommunications can certainly be cited as one area in which all countries willing and anxious to benefit from space have been able to do so".

4. Lyall's analysis of the changed or changing structure and functioning of INMARSAT and INTELSAT and the conclusions drawn therefrom are most interesting, but also show that they cannot simply serve as "models" for "those who would seek the privatisation of the international organisations", such as the ITU. While I support his idea that UNISPACE III itself should appropriately urge the international community that "the basic concept of international public service telecommunications facilities should in the general world interest be continued, if necessary by subsidising uneconomic connections, routes and services, by the more profitable"(see end of 2.1), I consider it most unlikely that the ITU Secretariats or even the Radio Regulations Board (RRB) would ever be authorized by the ITU Member States "not to accept notifications from such a state", which "is not able properly to superintend" space activities or "to enforce the avoidance of harmful interference" (the end of the section 2 on **"States' supervisory abilities"**, page 69), as this would imply a quality-control over any State's supervisory mechanisms, which would be considered as unacceptable and incompatible with the principle of State sovereignty. On the other hand, his suggestions on page 69 dealing with **"Flags of convenience: Homesteading"** appear to me to be quite realistic and thus desirable. I see great merit in Lyall's analysis of, and proposals for, the matter of **"Licensing"** (see page 70), cumulating in the creation of a "global Communications Commission" for licensing "decisions affecting the world" being made "by a world authority", in order to ensure that "the interest of the world as a whole" be protected against the variety of diverging commercial and national interests, although the realization of such a clearly "supra-national" solution will certainly meet strong objections, needs time and thus is, as of today, only "music for the future"! (But see also paragraph 17 below).

5. I now turn to the Chapter of the Discussion Paper that, for reasons beyond my comprehension, is entitled **"Radio Matters"** and deals in its first sub-chapter with **"The ITU in general"**, which, in my understanding should have been the main title for that Chapter, the structuring of which could certainly be improved. As to the ITU's **"Background"** (see page 71), it cannot be held that, after World War II, the Union adapted "its constitution to the UN model". Far from: Contrary to the UN, it maintained its - what is called - "federal structure" with a General Secretariat (GS) and three Consultative Committees, each headed by one elected official, i.e. the Secretary-General or a Director respectively and retained, following the tradition since 1865, the "International Telecommunication Convention" only as its basic instrument, which not earlier than in 1992 was

upgraded to a "Constitution" (CS) like since long in the other UN Specialized Agencies, supplemented by a "Convention" (CV). With regard to **"The ITU and Development"** (see page 72), it must not be forgotten that the ITU had already since the late 1960's in its GS a "Technical Cooperation Department" providing technical assistance in the telecom field to developing countries and participating closely in the execution of UNDP programs and projects. This Department and its activities became already upgraded to the "Telecommunications Development Bureau (BDT)" in 1989 at Nice and thus put on the same level as the traditional "permanent organs", i.e. the GS, IFRB, CCIR and CCITT: an action which had indeed to be taken politically vis-à-vis the developing countries! It was, therefore, only logical that the 1992 reorganization of the ITU resulted in the three Sectors, known as ITU-R (radio), ITU-T (standardization) and ITU-D (development) with their respective bureaus and elected directors. It must equally not be overlooked that technical aid, assistance and co-operation in the telecom field can best be provided by the ITU itself and not through other general, development agencies. This is - by the way - in the best interest of both the developing countries and the industrialized ones, for which thus interesting markets are open. In this respect, I entirely disagree with Frank Lyall's conclusions and hold that it has "been wise" to include the whole development of technical assistance and co-operation in telecom matters in the realm of the ITU and not elsewhere.

6. With regard to the **"Radio Regulations Board"** (RRB) (see page 72), practical experience in the ITU-R since Kyoto 1994 has amply demonstrated, as all ITU insiders will confirm, that "a full-time Board would" not "be better", and that a part-time Board is not only quite sufficient (and much less costly!), but should also be maintained and not be abolished, as certain radio circles still had intended and expected before and in 1994; by the way, the recent increase in 1998 from nine to twelve members is exclusively due to considerations of "equitable geographical distribution amongst the regions of the world" (CS No. 62). While somehow sharing Lyall's "fears as to impartiality", I must admit that since 1994 not one single incident has become known, which would justify this fear. Furthermore, the qualification requirements for, and other provisions concerning, the RRB members, which "shall serve ...as custodians of an international public trust", have remained in substance the same as they had been for the members of the old IFRB (cf. the provision in CS Article 14 and CV Article 10).

7. In the Section on **"Voting rights and Finance"** it is - somewhat misleading and certainly completely unintentionally - stated that "90% of the membership pays 10% of the general costs of the Union". According to the detailed figures just obtained from the ITU's Finance Department, for the purposes of the present comments, the real figures for the ITU membership and their bearing the costs of the ITU Budget are as follows: 10% bear 75%; 15% bear 80%,and 25% bear 90%, so that it may only be held that - in the worst case of calculation! - "75% of the membership" - and certainly not "90%"! - "pay 10%" of the Union's budget! Without denying "a disparity between voting weight and financial weight", which, at any rate exists in all organizations of the UN System, I can simply not follow Lyall in his conclusion that "such a disparity is wrong, not to say grotesque", as I consider it dangerous to add in this context "the imbalance among states of practical competence in telecommunications". Seriously invoking the latter argument could indeed become "a potential threat to the proper and satisfactory functioning of the Union". No steps "to restore" any such disparity or imbalance should be taken, e.g. by - as Lyall envisages - relating "voting weight to financial contribution, and perhaps to telecommunications usage both within and from/to a Member". The maintenance of the principle of "freedom of choice of the contributory unit" has been reconfirmed again at Minneapolis in 1998, and with good reasons. The Union will have well and "sprightly" survived with that traditional formula, on 17 May 2000, for 135 years and has remained "one of the success stories of international co-operation", to use Lyall's own terms. It is, in my considered opinion, quite preferable to stick in this respect to the Union's

traditional approach than to introduce a system like in the UN or many of its Specialized Agencies, by which the Organization becomes dependent, for 25% of its budget, on one single Member State, whose financial contribution within the ITU does not even reach 8% of the budget. If such a State decides not to pay anymore the equivalent of such 25% or to leave the Organization, the difficulties and crisis would be much greater, as some sister-organizations had to experience, than continuing to live with such disparity or imbalance as in the ITU, which had never to suffer under a similar situation!

8. The ITU has only five elected **"Officials"** (see page 73), to which "CS art. 27.2" = CS No. 154 applies, as it is also stipulated in CS Nr. 62 as amended at Kyoto, the 12 members of the RRB are considered as "experts on mission" in the meaning of the 1946 UN Convention on the Privileges and Immunities of the UN and can in no way be considered as ITU "Officials", and for them apply the special requirements referred to in paragraph 6 above. That all those 17 persons elected by the ITU Plenipotentiary Conference, the Union's supreme organ, "shall be nationals of different Member States" (ibid) considers Lyall as "too many". This figure of not quite 10% of the total of the 188 ITU Member States is, in my view, justified because it ensures best possible "equitable geographical distribution amongst the regions of the world" (ibid), while Lyall's "compromise" of "not more than two persons of one nationality" would risk to jeopardize that latter requirement, as it could easily bring down the 17 elected persons to only nine nationalities. This would amount to just 5% of the total membership and really not be "equitable"!

9. **"The ITU Council"** (see page 74) had already since Kyoto 1994 a membership of 46 States, i.e. a number which did not exceed the "25% ceiling", which had been fixed by that Plenipotentiary Conference (PC) and which the 1998 Minneapolis PC did not change. I am afraid that Frank Lyall's suggestion for reduction of that number, the introduction of a different concept, i.e. Councillors not representing anymore "individual ITU members", but "on occasion (often indeed)" representing "the interests of groups of states", and a change of "voting weight in Council", by following "the model of the INTELSAT Board of Governors", will indeed remain "without much hope", as he himself assumes. I have lived through and advised the ITU Council during 19 years in constantly increasing composition, i.e. from 36 to 41 to 43 and finally to 46 (its present size) and can assure everyone that the increasing size did not make it a "cumbersome body", although I basically am always in favor, like Frank Lyall, for smaller size bodies. However, one must keep in mind and admit that for an organization of such a large membership of 188 Member States, like the ITU, 25% thereof forming its indeed "governing Council" for a period of over four years - with the PC as the supreme organ not meeting annually, but only very fourth year, this size for the ITU Council is really quite reasonable, representative and workable. The latter is even more true for the present "concept" of its composition, which should, at any rate, be fully maintained. It would - worldwide - be more than difficult and indeed "cumbersome" to figure out any representation in the ITU Council according to "the interests of groups of states", as Lyall suggests. The interests diverge, and there are only a few regional formations or organizations, like the European Union (EU), in which almost all of the ITU Region B countries with converging interests and filling eight (8) seats at the present ITU Council out of a total of 46 seats. It would take any PC a long and hard time, eventually wasted, to form such groups of interests for the sole purpose of electing a Council according to Lyall's "different concept". Such course of action might even risk to bring more unrest and antagonism into the Union than it would produce any beneficial outcome; it is too academic and should not be further pursued. Also, any "weighted voting rights" should simply be forgotten, because their introduction now, at this stage of the overall political evolution, would be, in my mind, utopian and without any chance (in voting!) of success, because it would be considered as retrogressive or simply "reactionary" by the majority of the Member States!

10. Coming now, finally, to the "radio matter" (see paragraph 5 above) and thus first to the **"Paper**

Satellites" (see page 74), I can be rather short. Leaving aside here, as Lyall himself does, the "cost-recovery fee for the processing of notifications of satellite systems", I whole-heartedly support his suggestion that "it would be wise were UNISPACE III to stress the importance that states fulfil properly and fully their international obligations", whereas I disagree with him in that "a list of putative offenders would be salutary". Such a list (who should draw it up and publish it?) would in my view be counterproductive, politically unacceptable and even superfluous, since any "offenders" will be very quickly known by all interested circles, as the "Tonga-case" has amply demonstrated!

11. As far as **"Cost Recovery"** (see page 75) is concerned, my only comment is that I find it surprising that Lyall in his discussion paper and its footnote 33 refers only to Resolution 91 (previously numbered PLEN/4) of the 1998 Minneapolis PC, dealing generally with "Cost Recovery for Some ITU Products and Services" and not to the much more specific and in our context more important Resolution 88 (previously numbered COM5/21) adopted by the same PC on the "Implementation of Processing Charges for Satellite Network Filings and Administrative Procedures". As I have dealt with the latter and its relation to Resolution 91 at length in paragraphs 35 to 37 of my paper entitled "The Space Law Related Rôle, Activities and Contributions of the ITU in the Last Decade of the 20th Century" and presented to ECSL 3rd Colloquium at Perugia/Italy (5-7 May 1999), which will be before the UNISPACE III Conference, I shall not repeat what is stated there and make only reference thereto. But it is certainly of interest to this audience to learn that the ITU Council, at its most recent, annual session in June 1999 has, in conformity with the instructions given to it by the 1998 PC, taken concrete measures for the practical application of this officially, newly introduced concept of Cost Recovery, in particular for satellite network filings. It adopted its (seven pages!) Decision 482 an the "Implementation of Cost Recovery for Satellite Network Filings" with its Annex A containing the "Schedule of processing charges to be applied to network satellite network filings received by the Radiocommunication Bureau after 7 November 1998" and its Annex B containing the "Methodology" used and to be used. In the context of the present comments, it is obviously impossible to enter into details of this epoch-making decision; I shall do so elsewhere in appropriate depth. However, a brief over-all idea of this landmark is appropriate here. The ITU Council decided that the satellite (s.) network (n.) filings (fs.) as identified by Resolution 88 of the 1998 PC (see here above; a s.n. consists of one geostationary s., or one or more non-geostationary ss, and one or more cooperating stations, see Nos. S1.111 and S1.112 and Appendix S4 of the RR) shall be subject to the "charges" set out in Annex A to this decision. Therein, nine (9) different "categories" of s.n.fs. are, first briefly and then meticulously, described in detail, with reference to both the new "S" Articles and the old Articles of the RR. For each f. a "flat fee" is given in Swiss Francs, reachin g from 1'200.— to 17'500.— maximum, to give here a rough idea only. In the next column figures the number of pages in each category covered by that flat fee, reaching from 7 to 34 pages. The last column states in Swiss Francs the "additional charge per excess page for publications with more than the number of pages indicated in the preceding column", reaching from 100.— to 1'750.— Swiss Francs. Whereas there will be no cost recovery charges for any n. for which the API or the request for modification to a plan was received prior to 7/11/98, except for modifications to these ns communicated to the Radiocommunication Bureau after 7/11/98, or changes to the request for modification to the plan, which shall be subject to an additional charge per excess page "if their cumulative number of pages exceeds three times the number of pages indicated in Annex A at the time of the original publication". Payment of such charges, to be made on the basis of an invoice to the notifying administration or, at the request of that administration, to the s. n. operator in question, after publication of the related special section, within a period of six months after issue of the invoice or by 1 September 2000, whichever is the later. Administrations shall be invoiced according to the charges (which the Council may change) in force at the date of publication of their respective

ns. For more ample details of this sophisticated system, interested parties may get the full text of Decision 482 by ordering Document C99/94 dated 22 June 199 from the ITU Sales Section (Place des Nations, CH -1211 Geneva 20, Switzerland; telefax: +41 22 730 51 94; e-mail: sales itu. int; http://www.itu.int/publications). Frank Lyall's suggestion that "UNISPACE III should welcome this financial realism and perhaps advocate its adoption elsewhere in the UN system in appropriate instances" merits certainly to be pursued, but with emphasis on "appropriate instances", i.e. with caution and on a case by case basis, each case to be considered carefully as to whether or not it lends itself for the application of this concept, which can not become a principle to be applied generally.

12. Lyall's view of how the **"Implied-Powers"** concept (see page 75) could have been applied by the IFRB and subsequently the Radiocommnunication Bureau and the RRB is quite interesting, though very far reaching and even questionable. To decline the acceptance of Tonga's numerous notifications for reason of its "abuse of the notification system" by a treaty organ not specifically empowered to render such an "abuse"-judgement and to draw such consequence of non-acceptance is stretching the implied-powers concept very far. In the long run, the more cautious approach taken by the ITU bodies has, in my view, not been "wrong and weakening of ITU authority" (Lyall), but rather prudent and successful, as it has prepared well the terrain for the final adoption by the ITU's supreme organ, namely the 1998 PC, of the dual and complementary concepts of both the "administrative due diligence", by its Resolution 85 (previously numbered COM5/11; see in this respect my paper already referred to in paragraph 11 above, in particular paragraphs 24 to 27 and 34 therein), and the "cost recovery", by its Resolutions 91 and 88, both concepts being now generally applicable and going thus far beyond settling one single case of system-abuse by one Member State.

13. Turning now immediately to the matter of **"Allocations"** (see page 76), Lyall's call, in this respect and with reference to the "swift technical advances", for "a general review of Allocations ...in the light of modern requirements" and for "more rational allocations" which "would better fit present needs" is quite understandable and justified. The 1995 and 1997 ITU World Radio Conferences (WRCs) have tried hard in this direction and have also brought about appreciable results in this respect, but they have also demonstrated the problems and difficulties, as Lyall himself admits. A general review of the current "Table of Frequency Allocations" as contained in Article S5 of the last revision of the Radio Regulations (RR) and provisionally applicable only since 1 January 1999 would require from all concerned an enormous preparatory work requiring considerable time, manpower and money and could certainly not materialize "swiftly", even without any "drag stemming from manufacturers" desirous "to re-coup their investment" made "on the basis of known allocations to particular services" (Lyall). There also remains the other, additional consideration that what would tomorrow be newly and rationally allocated might be "swiftly" become out-dated a few month or years later - just because of the "swift technical advances"! Of course, this should not prevent from attacking a general and thorough review of the existing frequency allocations, and it can only be hoped that the forthcoming WRC in 2000 will set the starting signal for this gigantic exercise!

14. Lyall's philosophy with regard to **"first come first served v. engineering"** is most fascinating and has some truth in it. But "the 'first come' concept" alone is - in a both policy and political perspective - not acceptable anymore to the majority of the ITU Member States and has precisely led to the "planning-exercise", which resulted in the 1985/1988 Plan adopted by the 1988 WARC-ORB. After 10 years of its existence, it is quite obvious and undeniable that this Plan does not correspond to and satisfy anymore the needs of all concerned, although the "growth in the number of states" since 1988 was not so enormous. It was rather the change in the use and the nature of the services now offered to the general public as direct-to-home television which brought that plan out-of-date and created a need for a re-planning. Therefore, the WRC-97 adopted a new BSS Plan in

specified bands for Regions 1 and 3 as new Appendix S30 of the RR. Thus, the "engineering" will continue and there will be no return to the pure "first come first served" concept anymore, at least in my opinion!

15. Lyall's question as to **"Public Service Allotments?"**, on the contrary, is, in my view very relevant and timely and merits the greatest attention possible by UNISPACE III. I entirely agree with his *petitum* "to secure the requirements of certain services which fall into a 'public service' category", as this would indeed be "in the general world interest". The ITU provisions in CS No. 17 and 191 (concerning safety of life) and 200 (concerning distress calls and messages) fully support the idea of entering for such public services appropriate allotments in an agreed plan (cf. RR S1.17) to be worked out under the ITU auspices indeed in the best understood "general world interest". I strongly hope that UNISPACE III will pronounce itself in favor of such enhanced security measures and invite the ITU to act and implement them accordingly.

16. Lyall proposes that "more should be made of the concept of 'cost recovery'" (see paragraph 11 above) and that "consideration should be given to the introduction of a **'Resource Utilisation Fee'"** (see page 77), according to the device that "those who are to gain commercially by the use of a general natural resource should be willing to pay for it". This is undoubtedly a most interesting idea for which he also quotes certain precedents. His assertion that "the free use of space" in Article I, paragraph 2 of the Outer Space Treaty would only mean "available to all" and that the word "free" would not exclude charging a "fee" for such use freely available is rather clever, and I like it. However, as he himself, I foresee "doubtless opposition", though not necessarily for the reason of an "unlawful tax on enterprise". I see much more difficulties coming from the innumerable questions related to the introduction, the fixing and the collection of the fee (in particular by which 'supra-national' authority?), and finally to the use made out of such fee, all questions which Lyall himself sees as well. For such questions it may be very difficult to find generally acceptable answers and solutions, and, for this reason alone, the whole concept risks to remain an academic and hypothetical one and may never see the light of day in practical terms ! Unless....it might convincingly be coupled with the next idea of Lyall's, namely the creation of "an international regulator", who could be financed out of the income from the collection of such fees, as I hold the other uses which Lyall envisages for spending such income as too remote from the subject matter itself, i.e. "telecommunications", a remoteness which would not exist in the use just proposed by me!

17. Thus, I come to the penultimate section of Lyall's indeed stimulating discussion paper, i.e. **"An International Regulator"** (see page 78), whom I would immediately and more precisely prefer to be called **"an international telecom regulator"**, a term against which I cannot imagine that Lyall would raise any objection! Now more to the details of this concept itself, which is perhaps the most fascinating idea in this paper and corresponds to (or is inspired by?) the currently, quite modern concept of an "independent regulator", as advocated by the relevant EU Directives and created already at many national levels! One thing indeed must be ensured, i.e. that such an international telecom regulator, once institutionalized and installed, has to act quite independently. Precisely in the interest of "general world public interest in the provision of global telecommunications services open to all without discrimination" and to preserve and protect "telecommunications as a public service" (Lyall), such independence is imperative. Such regulator could ensure - at the international level - the benefits of real competition for the public at large and supervise, control and direct the telecom markets' evolution. Thus "the establishment by companies of dominant positions" in those markets could be avoided, in order not to fall from the old "monopolies" into a few "oligarchies" producing the same results as the former! Nationally prevailing interests in e.g. licensing could by such a regulator be counterbalanced and be made compatible with "the welfare of the world as a whole" (Lyall) both at the technical, economical

and political level. With the adequate decision-making competence and enforcement powers such an international telecom regulator could indeed be most beneficial in acting along the lines briefly and certainly not exhaustively outlined in the penultimate paragraph of this Chapter 4 of Lyall's paper. In spite of his statement at the beginning of this Chapter that "the ITU is clearly overburdened", Lyall is completely right in his conclusion that "the ITU suitably adapted could provide this new regulator" (emphasis added here) or telecom regulatory body. Who else would have the competence and authority in the telecom field to take over such a rôle, if not the ITU? If all concerned agree - as it seems - that telecom-wise we live in a "global village", then we also need a "global" or "international telecom regulator", as without such a regulator there will be no order in that "village". Such a recognition - after all this talk during the last decade, at least, about deregulation etc. - comes rather late: but 'better late than never'! The ITU would, beyond any doubt, be the appropriate focal point or "point of anchorage" for establishing such an international telecom regulator through which this world might indeed - to use once again Lyall's own words - "come closer to the provision of global telecommunications by satellite open to all without discrimination and on a basis of equality"! This workshop should have the courage to recommend to UNISPACE III to include in its conclusions and recommendations an investigation and study ventilating the possibilities for, and aiming at, the creation of such an international telecom regulator within the ITU.

18. It is quite correct that, in his last, very short Chapter, Lyall, at least, raises the burning issue of **"The Content of Telecommunications"**, as it is wise that he decided "not to pursue" - in the context of this discussion paper on "International Telecommunications - all the questions he raised therein and all the others which also remain open and are not mentioned therein, but are "content"-related and badly require answers and solutions, so that "this aspect of expanded global telecommunications should not be neglected" (Lyall). As important as they are, they go far beyond " the technical side" (Lyall), with which alone we are dealing here and for the treatment of which the ITU remains worldwide the best place, whereas the ITU is neither mandated nor equipped, nor should it, in my view, ever claim to become or be made competent, to deal with any matter related to "the content of telecommunications", following thus the good, old advice : "Cobbler, stick to your last!"

19. My foregoing comments, I hope, have amply testified the excellency of Frank Lyall's discussion paper, the contents of which has been - at least for me - as "sprightly" and rich of new ideas as stimulating and provocative, like a real "discussion paper" by its very nature and purpose should be!

20. With the further and final hope that Frank Lyall, in his good Scottish sense of humor, will understand and appreciate that I could not always agree with his philosophy, ideas and arguments, and looking forward to his replies to my comments, I close here, so that you, Mr. Chairman, may pass on the floor to the two other commentators on his discussion paper! I thank you and the audience for the patience with which you have listened to me!

Commentary Paper

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1. Professor Lyall raises the question of how communications revolutions can have consequences which are both efficient and equitable. (p. 64)

   I would answer that innovations can be introduced in both an efficient and equitable manner, although not necessarily. If we rely on utilitarian ethics and are concerned with the consequences of our actions

and not with our intentions, or deontological ethics, then, for instance, in the parlance of the ITU, we may find that "first come, first served" is efficient (pace "paper satellites") and equitable because the workings of the market may, through the invisible hand, promote services for disadvantaged persons and countries which were not previously available. On the other hand, a plan based on the idea that everyone and every state should be treated equally may sound good insofar as intentions are concerned, but the path to hell is paved with good intentions, as we have seen all too readily by looking at recent history. An a priori plan will not be able to cope with all the complexities of the real world and the unintended consequences of its own good works. In this sense, being efficient, if the market is efficient, is a way of being equitable, although certainly not every person or every state will be treated equally. Some may be worse off than others, but everyone may be better off.

2. Professor Lyall believes that competition is all well and fine but it needs to be regulated in the "global public interest" (p. 65). Certain services should be provided globally even if they are not profitable.

   Re #1 above, this would be equitable, but not efficient but it could be managed as a collateral aspect of market dynamics assuming that not too large a piece is taken out of the market pie. For instance, if public goods cost 5-10% of what the market produces, then I would agree that global public services should be provided. If one goes above that take, then we are in danger of killing the goose that lays the golden egg. If we have a plan to have a better golden egg, we may get no egg at all.

   Another problem concerns the structure of the market? Professor Lyall is worried that competition is "dogma," a kind of new ideology which ignores equity. What if the market is not competitive? It could be monopolistic or oligopolistic. There would then be market failures and negative externalities. These developments would then justify economic regulation, regulation to keep the market competitive. But how could this be done at the world level? It is hard enough to do within national economies. We do not need to go this far, however. We already have global public services such as providing for safety of life at sea through the Global Maritime Distress and Safety System (GMDSS). What we need is an inventory of these services and their costs and benefits.

3. Professor Lyall questions whether some states are really functioning countries. For instance, he notes that "some states are in the business of being tax havens" (p. 69) for businesses located elsewhere. What seems to be a sovereign state may be an outpost of a multinational corporation located elsewhere. The MNC may be "homesteading" in a host nation.

   UNISPACE III should discourage this practice, as Professor Lyall suggests. (p. 70)

4. Professor Lyall contends that "decisions affecting the world should be made by a world authority." (p. 70)

   I would agree insofar as public goods are concerned, but not private goods. For instance, pricing services affects the whole world but it is best left to the market, while allocating orbital slots and the frequency spectrum should be public functions provided by the ITU.

5. But, is the ITU organized efficiently and equitably? In the ITU, "90% of the membership pays 10% of the general costs..." (p. 73)

   What is indicated here is that while the market may produce market failures, public organizations created to correct these failures by providing collective goods may produce inequities of their own.

   Professor Lyall proposes a solution - "To relate voting weight to financial contribution and perhaps to telecommunication usage both within and from/to a Member." (p. 73) I would agree, thinking in particular of the success of the INTELSAT and INMARSAT models in this regard.

6. There are other ITU imperfections:

For instance, instead of a simple filing fee, it would be more financially realistic to have a cost recovery system. Even a third alternative merits evaluation. This would be a resources utilization fee (see no. 8 below).

7. The ITU should be strengthened by explicitly recognizing that it has implied powers to carry out its functions. (p. 75)

   I would second this point. Otherwise we shall see many anomalous and awkward situations develop based on legal technicalities, but not on efficiency and equity.

8. Professor Lyall suggests that freedom in space does not mean freedom from fees. (p. 78)

   Specifically, there should be a resources utilization fee for the radio spectrum and orbital slots. These fees could be used for public purposes of the UN system such as fostering development. I would agree. This is done in the U. S. While the frequency space used to be assigned without money changing hands, the U. S. now auctions off parts of the spectrum. If this were done at the level of an international organization, it would provide at the world level what the treaty for the organization says it should provide, for instance, development, as in electronic commerce for developing countries (EC-DC).

9. Probably the most significant suggestions in Professor Lyall's paper is that an international regulator be established (pp. 78-79). Francis Lyall sees the ITU as being overburdened. There are five reasons for going beyond the current system. Let me analyze and critique these points:

   a. Part of the UN and ITU mandate is to have telecommunications serve public purposes. This is not being adequately addressed in the current context of commercialization, privatization and profit-maximization.

      I would agree that the workings of the market do not necessarily provide for the public interest either within countries or between them. There can be market failures and negative externalities as mentioned above. For instance, greater communications can mean more opportunities for disseminating hate and fear, a point Professor Lyall brings up on p. 79 in a section "The Contents of Communications." On the other hand, more communications can create greater mutual interdependencies of a positive sort within and between nations, e.g., opportunities for distance learning and worldwide "virtual universities."

      However, to have an international regulator attempt to provide public services could result in nonmarket failures. This problem should be clearly addressed in any such proposal, especially given the law of unintended consequences. For instance, the international regulator could be captured by powerful interests operating behind the scenes. So called market-based regulation of the spectrum in the U. S. seeks to avoid this pitfall.

   b. "Although competition is a watchword much touted. There is a tendency toward the establishment by companies of dominant positions in markets."

      I would agree, and, as Professor Lyall notes, we do have antitrust mechanisms at the national and regional levels. From the perspective of logic, there should be regulations of the same type at the world level. But I do not believe that this is politically feasible. It would be labeled as the beginning of world government by proponents of nationalism. As Oliver Wendell Holmes once said, "The language of the law is not logic but experience."

   c. Professor Lyall contends that each state seeks to serve its own national ineterest in assigning licenses to telecommunications entities without taking into consideration the world interest.

      This is true although some national laws mandate serving world interests, e.g., the

NASA Act declares that it is "the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind." Further, by serving the national interest in a non-zero sum game situation, there can be a win-win scenario as well as a lose-lose possibility...Of course, there could also develop a zero-sum game situation in which one state loses and the other gains. In this case, the world interest does not get factored in.

Clearly, in this age of globalization which developments in satellite communications the Internet, GPS, et. al. have done so much to encourage, the world interest may not be developed by the dynamics of the market place. Therefore, auxiliary precautions are warranted in terms of a stronger presence to serve discrete public interests at the world level and manage the connections between them. For instance, one might note the necessity of coordinating natural disaster relief with public health and public telecommunications services.

d. ITU technical decisions have become politicized because of lobbying for commercial advantage. Therefore, the world interest requires more separation of technical expertise from political and economic forces.

I agree and following the FCC model of an "independent regulatory commission" would control to some extent for this malady. But, in the end, technological change does have to accommodate political and economic realities. Political and economic decisions and policies set the boundary conditions for what is technologically feasible at any particular point in history. One may note that direct broadcast satellite technology existed long before it was feasible to introduce it to the market. The same may prove to be the case with some of the newer LEO systems.

e. "Where an element in a delegation is devoted really to only part of the agenda of a conference, the overall result of the conference can be distorted and unsatisfactory."

Certainly, if the whole is the sum of its parts, and some of the parts are broken, the whole will not be very whole. And, we would wish in an ideal world, that the whole would be more than the sum of its parts in terms of providing positive externalities and public goods to the world. Therefore, a continuing and professionally staffed commission on the model of the FCC should take on the job of advising what the greater long-term interest is. But again this advice would be to political and economic actors which may not choose to accept it.

In summary, there are reasons for an international regulatory authority perhaps on the FCC model, but such a model, while preserving professional competence, also exists in a political and economic context. For instance, the five FCC commissioners in the United States are politically appointed and they are subject to lobbying pressures. So while the ITU is overburdened, as Professor Lyall notes, to move on to the next stage of political, economic and technical integration will require a political will and leadership that do not yet exist. My prediction would be that this process will occur incrementally and pragmatically. The role of the IISL and others in the academic space community is to push the envelope a bit further out, and it is that function which Francis Lyall has performed ably and well here today with his analysis and his challenges.

And, as indicated above, I agree with three of his specific proposals: 1) "To relate voting weight to financial contribution and perhaps to telecommunication usage both within and from/to a Member;" 2) To change the fees assessed by the ITU to more of a mix of cost recovery and resource utilization fees; and 3) To explicitly recognize the ITU's implied powers. On the other hand, while agreeing with some of the argument about the need for an international regulatory authority beyond the ITU, I think that many of the points are not politically feasible. Thus I prefer an incremental approach to increasing international regulation.

Commentary Paper

Ram Jakhu

Mr. Chairman, my comments on Prof. Francis Lyall's paper will be only few and very brief. Being the rapporteur of this session, I had the privilege of receiving and reading the comments of the other two commentators. Therefore, I would avoid repeating what they have already said. Secondly, my comments primarily relate to those issues over which I have a difference of opinion with Prof. Lyall's paper.

First of all, I want to reiterate what the two other commentators have stated that Prof. Lyall's paper is very interesting, exhaustive and more importantly very provocative. It has, in my opinion, fully served its purpose of being a discussion paper. I am, in general, in agreement with Prof. Lyall's suggestions and proposals for the improvement of the existing regulatory system for satellite communications.

Prof. Lyall has reminded us of UNGA Resolution 1721 of 1961 (which incorporates an important legal principle that: "communications by means of satellites should be available to the nations of the world as soon as practicable on a global and non-discriminatory basis") and has rightly used it as a yardstick to measure the developments in the field of satellite communications. I will propose that we should go a step further and recommend to UNISPACE III that this fundamental principle should be reiterated in the Conference's final report. In addition, we should propose that in future an appropriate and effective international regulatory regime should be created in order to implement, in practice, this principle. I further suggest that our proposal should also include that UNISPACE III declare that radio frequencies and the geostationary orbit as well as other orbits are international public property that must be used and exploited for the benefit of all nations in order to achieve the above mentioned principle of UNGA Resolution 1721.

Prof. Lyall argues that since some States lack the ability to exercise supervisory role over its national legal entities that engage in the exploitation of outer space, as required by the 1967 Outer Space Treaty, ITU should be permitted not to accept from such States notifications for registration of their satellites. In my opinion, it is difficult to accept this proposal because once the international community accepts a country as a State, the community recognizes that that country is able to fulfill its international obligations. The international community could not solve the problem of "flag of convenience" in maritime industry, I doubt that such problem would be avoided in the case of outer space exploitation.

The Tongasat issue: On this issue, I have perhaps the most serious difference of opinion with Prof. Lyall's paper. Contrary to Prof. Lyall's views, I fully support what Tonga has attempted and achieved for the following reasons:

(A) Tonga played according to the rules that were initiated, devised and strongly supported by those States that objected to Tonga's initiative. Under the ITU rules, each State has been and is allowed to secure radio frequencies and orbital positions to meet its needs. Who determines a State's needs? No one, but the concerned State. These needs might be for domestic or international services (or what we call today "global services"). Some States have secured radio frequencies and orbits for GMPCS for their national entities. Should we designate these States as "abusers" of the ITU system?

(B) The States that objected to Tonga's notification to ITU have secured radio frequencies and geostationary orbital positions for their private entities to provide international services. These entities have been and are being encouraged to secure foreign financial participation. Pursuant to the WTO initiatives for foreign investment and globalization of business operations, such entities could be/would be foreign owned and controlled to a large extent, and in some case even 100%. In my opinion, they are and would be doing exactly what Tonga did; i.e. using radio frequencies notified and registered by one State and used and exploited by the companies of the other(s).

In my opinion, the Tongasat case has been more psychological problem than a real one. The States that objected to Tonga's request for geostationary orbital positions, I think, were surprised to see how a small State could "out smart" them. Thus they have put unfair pressure on Tonga. Such pressure has never been imposed on any other State in any previous case. I believe that the most important achievement of Tongasat issue has been that it showed clearly the weakness of the first-come first-served rule that has been strongly guarded by the States that objected to Tonga.

Prof. Lyall proposes to relate "voting weight to financial contribution" to ITU. In my opinion, this proposal is impractical in law for the following reasons: (A) I do not think that the international community is yet ready to do away with the most fundamental principle of international law; i.e. equality of States. (B) We have seen, in some cases like INTELSAT and INMARSAT, that States appear to have accepted some exceptions/restrictions to their sovereign equality but that has happened only at the level of their operating agencies and more importantly when States or their companies are receiving something in return. I see no reason why a large majority of States will do away with the rule of one-state one-vote in ITU. (C) More importantly, in practice, 10% of the States that contribute to the 90% of ITU budget (if one accepts Prof. Lyall's figures) actually get 95 to 100% of the pie. What I am saying is that those who contribute a lion's share actually get lion's share of the pie too. The best proof of this is the results of World Radiocommunication Conferences (WRC) that allocate radio frequencies to various services. It is almost impossible to have any proposal accepted by a WRC if that is not fully supported by a small minority of States (i.e. the major contributors to the ITU's budget). Secondly, fairly a large majority of the States has been pressing for a change of the first-come first-served rule for decades. What they got was *a priori* plans only for two services (BSS and FSS) in two frequency bands (12 GHz and 6/4 plus 14/11 GHz) mainly because of the strong opposition by this small minority of States. Therefore, what Prof. Lyall is proposing is actually being practiced, but one should not yet expect its *de jure* acceptance by the international community.

I agree with the following two points raised by Prof. Lyall and would like to repeat them in order to highlight their importance. They deal with (A) the source utilization fee; and (B) the creation of an international regulatory body.

Since 1983, I have been proposing the imposition of a fee for resource utilization and I am glad to see that finally in 1998 the ITU Plenipotentiary Conference has agreed to impose such a fee. I believe that it will, to some extent, solve the problems of "paper satellites" and of inefficient resource allocation.

I also agree with Prof. Lyall's proposal for the creation of an international regulatory body – which in my opinion should be charged with, *inter alia*, the responsibility of achieving the goals set in UNGA Resolution 1721, as amended; though I am not sure whether the US Federal Communications Commission, as suggested by Prof. Lyall, is a good model for such a body, but this is a matter of details. The ITU confines itself to technical issues of resource allocation and technical standards. The WTO, on the other hand, is overwhelmed with all issues of international trade in goods and services but has almost nothing to do with global (as opposed to national) public good as far as telecommunications are concerned. Therefore, the WTO can not be expected to implement the principle of UNGA Resolution 1721.

However, on the one hand Prof. Lyall proposes the weighted vote procedure for ITU and on the other hand he suggests that ITU could be an international regulation body. In my opinion, these two proposals are

somewhat contradictory. Time does not permit me to go into details of my arguments. I therefore stop here.

But my final word is that Prof. Lyall's paper is an excellent document. I agree with all his suggestions with the exception, of course, of some points I raised in my comments.

Thank you for your attention.

Summary Report

This session examined the gigantic growth in worldwide communication services, considering the implications for use of radio frequency spectrum, international cooperation and organisation, relationship to economic expansion and the impact of global personal communication services.

- Space Telecommunication should be appreciated as a major transformer for one world.
- Privatisation of former public entities for commercial purposes.
- Investigation of the future role of sovereign States and operating agencies.
- Investigation in the development of privatisation and competition (some huge companies control the world market).
- Identification of the difference between public service and service for the public.
- Profit is the main but must not be the only motive of privatised telecom entities.
- Creation of an international regulatory body to ensure that space telecommunication remains a benefit of all mankind without any discrimination of access and use. Therefore UNISPACE III should integrate this issues in the Vienna Declaration.
- Study on the establishment of an effective supervisory regulation office for supervision of the use of natural resources, supervision of competition, making telecommunication open for the whole world.
- Elaboration of an action plan for developing countries (sustainable development) as communication is a basic human need.
- ITU coordinates and collects information on all launches.
- Establishment of a linkage between ITU and Outer Space Treaties.
- Investigation of the need for a full time radio board of ITU.
- Frequencies for GPS shall be protected (against first come, first served principle).
- Investigation into the necessity of development aid (technical cooperation and assistance) within ITU as ITU is a primarily technical institution.
- Study on the necessity of transform Radio Registration Board in a full-time body.
- Discussion whether the system that all 17 members of the Radio Registration Board have to come from different States, should be kept.
- Discussion whether the Council should still consist of 46 members or may be reduced.
- Study on the financial contributions of the Member States and the relation to the weight of their vote which differs from the usual UN division.
- Cost-recovery problems (e.g. WIPO): those who cause the costs, shall pay for that (see also the decision made by ITU Council last June).

- A resource management/administration fee should be paid annually by the users.
- Universal access fund might be used for the mentioned proposals.
- More allotments for space services should be erected.
- Invitation of people with scientific expertise as well as academics into the workshops.
- Public services as a global public good should be provided by the operators.

EXPANDING GLOBAL REMOTE SENSING SERVICES

SESSION 4

Chair: Dr. Ernst Fasan (Austria)
Coordinator/Rapporteur: Dr. Marietta Benko (Germany)

SESSION FOUR

Expanding Global Remote Sensing Services

Discussion Paper

Expanding Global Remote Sensing Services: Three Fundamental Considerations

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Introduction

As with all space activities, remote sensing was begun during the fear-filled days of the Cold War. It was driven, in large part, by motives of national prestige and power. The international legal community responded by addressing the questions of law and equity to which remote sensing gave rise. The response included the recognition that while remote sensing technology was determined by national needs and goals, the activity itself was, by nature, a global one and occurred simultaneously in the two different legal regimes of space and Earth. The resulting law included international as well as national interests; equity, as well as law; and the interests of sensed states, as well as sensing states. For a brief period of about 20 years these initial legal responses - while never considered fully adequate - did establish some fundamental principles by which nations agreed to be governed.

In the 1990's, the advent of commercial space-based systems - an unthinkable option during the Cold War - has revitalized the legal debate and highlighted some of the recognized inadequacies of the international remote sensing legal regime. The attention from industry, government and academia has been intense, raising dramatic questions. What legal protection is afforded to commercial remote sensing data? Will private systems function like spy satellites for hire? Will private systems be governed by international law?

The legal community is once again engaged in these, and other important questions. Details of legal frameworks,[1] data access,[2] intellectual property,[3] and more are all within the current legal dialogue. However, while the critical specifics of these and related issues will continue to engage the legal, scientific, and industrial communities for many years to come, there are still legal fundamentals in need of consideration and action. It is the purpose of this paper to raise three

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[1] Project 2001 Working Group on Remote Sensing, Legal Framework for Commercial Remote Sensing Activities - Proceedings of the Project 2001 Workshop on Legal Remote Sensing Issues, Toulouse, France, (1998).

[2] Committee on Issues in the Transborder Flow of Scientific Data, Bits of Power: Issues in Global Access to Scientific Data, National Research Council, National Academy Press, Washington, DC, (1997).

[3] European Space Agency, Workshop Proceedings Intellectual Property Rights and Space Activities, European Space Agency, Paris, (1995).

fundamental points regarding expanding global remote sensing services.[4] For it is how these fundamental conditions develop that will set the stage for scientific and industrial applications of current and planned services as well as international standardization and system ownership and management.

This paper is set out in five parts, the first of which is this introduction. The second section raises the question of the status of the *United Nations Principles Relating to Remote Sensing of the Earth from Space (Principles)*[5] in international law and takes the position that the *Principles* are relevant to the expansion of global remote sensing services and have acquired the force of law due to the practice of remote sensing nations. This section concludes that Committee on the Peaceful Uses of Outer Space (COPUOS) ought to transmit the terms of the *Principles* into a Treaty.

The paper's third section addresses the increasing restrictions on access to remotely sensed data and takes the position that the openness principle upon which much of remote sensing law is based is being weakened. The restrictions are being implemented for commercial and military reasons. Whether or not these will inhibit the expansion of global remote sensing services will, in the long-term, depend on two things: which services are being considered and a complex dynamic of politics, economics, and technology interacting with the law. This section concludes that these evolving situations are making, and will continue to make, important changes in the legal landscape of remote sensing services and will require on-going attention.

The long-term archiving of global data is raised, but not addressed in depth in section four. It serves more as an invitation to the space law community to mount a long-term, concerted effort to consider this most complex - and important - remote sensing activity. A concluding section follows.

It should also be noted that this paper sometimes, of necessity, crosses the line between law and policy. This is appropriate, in the author's opinion, for two reasons. First, law is codified policy and it is appropriate for lawyers to consider not only what the law is, but where it might, or ought to, develop. The second reason is that the remote sensing activities of the last three decades have been executed at national levels on the basis of policy as much as, perhaps more than, law, and, in many cases, the more flexible, dynamic nature of policy has moved ahead of the law.

A final introductory note: although this paper raises only three fundamental points, each one contains within it a wide array of topics. Therefore this paper is also broad and multifaceted and covers many aspects of the remote sensing legal landscape. This is intentional and it is respectfully presented with the hope that individual members of the space law community will find different, important issues that interest them.

The *United Nations Principles Relating to Remote Sensing of the Earth from Space* are relevant to the expansion of global remote sensing services and have acquired the force of law. COPUOS ought to consider transmitting their terms into a Treaty.

Relevance of the *Principles* to the expansion of global remote sensing services

Providing services, either by the public or private sector, requires law. The stability and predictability afforded by law and legal institutions are cornerstones of a successful commercial and public environment. This is particularly true in the case of new services that are, by nature, global. In the case of remote sensing, the

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[4] "Remote sensing services" is a broad term that can include a wide variety of space-based and Earth based activities. They range from government, private, and hybrid space segments, ground station developers and vendors, retailers of value-added data and information products, data and information brokers and distributors, hardware and software developers and vendors, and more. For purposes of this paper, all of these are included when the term "remote sensing services" is used unless otherwise indicated. In the author's view, this is appropriate since the paper is addressing fundamental points that impact the expansion of all global remote sensing services.

[5] G.A. Res. 41/65, 42 UN GAOR Annex (95th plenary meeting) at 2 UN Doc A/RES/41/65 (1987). [hereinafter, *Principles*].

move toward commercialization and the integration of government systems are being premised on a patchwork of international and domestic legal regimes that can create an uncertain legal environment.[6] This increases the risk already inherent in applying a new technology to a global service.

As the oldest form of specific, international remote sensing law, the *Principles* have particular importance in defining the international remote sensing legal regime. Adopted to guide the behavior of nations, the *Principles* also hold nations responsible for the remote sensing activities of their non-governmental entities and for activities conducted through international organizations to which they are parties.[7] The legislative history of the *Principles* contains extensive consideration of the role of private remote sensing activities[8] and they have, over the years, become increasingly used, in practice and legislation, to guide the behavior of private, public and hybrid public-private entities.[9] The successful expansion of global remote sensing services into the 21st Century requires that the status of these very important *Principles*, and the extent of their application, be clarified and established.

Clarity of the *Principles'* status is particularly crucial in the expanding context of a hybrid public-private, international commercial remote sensing environment. The aerospace industry worldwide has long been mired in controversies over different national philosophies regarding the necessity or desirability of public-private separation, direct and indirect subsidies, and trade practices. For remote sensing services, these issues can be expected to be even more acute due to a number of factors. First, major remote sensing nations like France, Canada, India and Japan already operate remote sensing systems based on mixed public-private institutions and principles.[10] And even in the United States, where separation of public and private institutions has been the policy, government-owned space corporations are being considered as cost-saving measures.[11] Second, in leading remote sensing nations commercial technology applications are clearly emerging from a government-funded, military heritage.[12] Third, post-Cold War national budgets are creating pressure to forge public-private partnerships even in nations historically more committed to the separation of these sectors.[13] Indeed, some observers opine that private companies that have already committed hundreds of millions of dollars in development will only be able to survive with

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[6] Harr, Michael & Kohli, Rajiv, Commercial Utilization of Space an International Comparison of Framework Conditions, at 69-71 (1990); Spector, Leonard S., *Not-So-Open Skies*, 1990 6 Space Policy 17 (1990).

[7] *Principles, supra*, note 5, Principle XIV.

[8] The individual debates and discussions in COPUOS and the Legal Sub-Committee regarding the commercialization of the *Landsat* system, SPOT and the role of privately funded systems are simply too numerous to cite. For a discussion of some of specific questions regarding the role of private sector in remote sensing, see, Christol, Carl, Q. Space Law: Past, Present, and Future, 83-88, (1991).

[9] Land Remote Sensing Commercialization Act, 15 U.S.C. §§ 4201 - 4292 (1984) [hereinafter, Commercialization Act], Now repealed and replaced with Land Remote Sensing Policy Act, 15 U.S.C. §§ 5601 - 5642 (1992) [hereinafter, Policy Act].; *RADARSAT Data Policy*, Document Number: RSCA-PR0004, Sec. 10.1 b., (Canadian Space Agency), July 13, 1994, at 11.; *ESA Envisat Data Policy*, ESA/PB-EO (97) rev. 3, Paris, (European Space Agency), 19 Feb. 98.

[10] Bourely, Michel, "National Space Legislation in Europe," AIAA, (1988). Mssr. Bourely notes a range of space services and activities that are a complex mixture of national organizations, non-governmental agencies, and privately capitalized companies. This is a useful perspective for this paper.

[11] Space News, NASA Considers Forming Government Corporation, April 5, 1999, at 1, col. 1.

[12] Some systems with either a military technology heritage or which have been discussed as being able to provide a military heritage for commercial systems include *Lewis, Clark, Helios, Eros, Orbview 4, RADAR1*.

[13] Commercial Space Act of 1998, Public Law 105-303 (1998); Programs include Earth Observations Commercial Applications Program and the data buy program at NASA Stennis Space Center.

governments as reliable customers.[14] Further, existing public systems face uncertain futures. Even though there is a statutory preference for a private *Landsat* follow-on option, its future also holds the potential for hybrid public-private operations.[15] Fourth, the particular remote sensing activities that the *Principles* are intended to address - "improving natural resources management, land use and the protection of the environment"[16] - are increasingly being identified among the potential markets for private and government space-based systems[17] and value-added retailers [18]and have become the economic rationale for aggressive, commercial-like cost recovery policies for some public systems. Indeed, the commercialization of the European Meteorological Operational (METOP) system and the recent adoption in the World Meteorological Organization (WMO) of a precedent-shattering tiered-data access practice[19] to protect the commercial value of some weather data, dramatically demonstrates how commercial and environmental issues are merging.

Finally, the *Principles*, as part of the international body of space law, also contain all of the public good characteristics that are a fundamental part of that law: mutual cooperation of nations, equity, equality, and the use of outer space for the benefit and in the interests of all countries.[20] The *Principles* must be defined to preserve and clarify these public good norms as well as to help define the rights, interests and obligations of public, private, and hybrid entities.

The current legal status of the *U.N. Principles*: accepted international law

The dynamics of international relations commonly cause nations to selectively apply international law as they attempt to define their own national interests within the international community.[21] It is also common for legal and policy observers to disagree about the relative strength of new or evolving legal norms.[22] The *Principles* are no exception. It is sometimes argued that the *Principles* are not legally binding on individual nations due to their status as declared, yet uncodified, legal norms.[23] However practice has overtaken this view. In general, declarations of principles by the General Assembly "if universally adopted and adhered to in practice, may be valuable evidence of international custom, which in turn is a most important source of law."[24] In particular, the *Principles'* "substance...has its foundation in space agreements agreed to in COPUOS,

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[14] Defense Information and Electronics Report, *DoD Needs To Back Commercial Imagery Efforts*, May 7, 1999, at 1.

[15] Policy Act, *supra* note 9, at 15 U.S.C. § 5641 a. 4 (1992).

[16] *Principles, supra*, note 5, Principle 1(a).

[17] "Today, the talk is of a 'niche' for commercial photography satellites for mapping, supplying weather information, preserving the environment and monitoring forests against fires. In fact, two huge companies, in the United States and Europe, are showing great interest in the small satellites that IAI has developed." Ha'aretz, *Outer Space -- Clean Up Your Act*, July 28, 1998, at B3, provided by Information Division, Israel Foreign Ministry - Jerusalem, [hereinafter, Ha'aretz].

[18] "In response to emerging environmental and land use issues, our team provides critical information in diverse areas such as natural resource tracking, city planning, market research, environmental assessment, and detection of threats to ecosystems." Pacific Meridian Resources, http://www.pacificmeridian.com/.

[19] WMO Res. 40, World Meteorological Congress (CG XII, 12th Meeting), *WMO Policy and Practice for the Exchange of Meteorological and Related Data and Products Including Guidelines on Relationships in Commercial Meteorological Activities*, (1995). This resolution addresses the exchange of data between national weather services, and the provision of data to third parties, including both the private sector and for scientific research. [Hereinafter, Resolution 40.]

[20] *Principles, supra*, note 5, Principle II.

[21] Christol, Carl Q., The Modern International Law of Outer Space, at 729, (1982)., [hereinafter, Christol - Modern].

[22] U.S. Congress, OTA, Remotely Sensed Data: Technology, Management, and Markets, OTA-ISS-604 (Washington, DC: U.S. Government Printing Office), (1994) [hereinafter, OTA].

[23] Pace, S., Sponberg, B., and Macauley, M., Data Policy Issues and Barriers to Using Commercial Resources for Mission to Planet Earth, at 34, RAND, (1999).

[24] Jenks, C.W., Space Law, at 85 (1965).

supported by the General Assembly, and are binding on a very large number of States."[25] Nations continue to cite the *Principles* as authority in domestic, bilateral and multilateral legal documents and in international fora.[26] Legal commentators from various nations, including key negotiators of the *Principles*,[27] hold the view that they are legally binding as a matter of customary law. The space law community continues to call for coordinated remote sensing legislation,[28] and, in particular, to place the "issue of [the *Principles'*] conversion into [a] legally binding instrument" on the agenda of the Legal Subcommittee of COPUOS.[29]

The stable, orderly extension of global remote sensing services into the 21st Century requires formally recognizing that the *Principles* are legally accepted. COPUOS ought to be encouraged to fulfill the intent of the *Principles'* drafters[30] by transmitting their terms into a treaty. The legal process that established the *Principles*, including their consistent use in setting standards for bilateral and multilateral agreements, and their unchallenged existence for a quarter-century demonstrate that their authority rests on legitimate legal process and time.

Legal process

The *Principles* were established according to the recognized legal process of first drafting general principles and then seeking formal adoption.[31] They were unanimously adopted as a resolution by the General Assembly[32] "in conformity with the United Nations Charter, furthering its purposes and principles."[33] Resolutions containing a declaration of principles are "important tools in the process of evolving international law."[34] They "express a legal conviction" of the international community concerning remote sensing law and are a particularly "suitable form for developing [the] international law of outer space for new, more sophisticated space activities including remote sensing."[35]

Regarding the *Principles* themselves, they have specific characteristics that strengthen their status. They begin with five definitions[36] which set them apart from other declarations of principles and is "clear evidence" of the intention to establish general regulatory

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[25] Christol, Carl, Q. Space Law: Past, Present and Future, at 94 (1991), [hereinafter, Christol Past and Present]

[26] Commercialization Act, 15 U.S.C. §§ 4201 - 4292 (1984), Now repealed and replaced with Policy Act, 15 U.S.C. 9 5601-5642 (1992).; *RADAR SAT Data Policy*, Document Number: RSCA-PR0004, Sec. 10.1 b., (Canadian Space Agency), July 13, 1994, at 11.; *ESA Envisat Data Policy*, ESA/PB-EO (97) rev. 3, Paris, (European Space Agency), 19 Feb. 98.; *Principles of the Provision of ERS Data to Users*, ESA/PB-EO (90) 57, rev. 6, Paris, 9 May 1994, (European Space Agency, Earth Observation Programme Board), Sec. 2 General Principles, 2.1 Legal Principles, para. 2, at 2.; International Space University, Toward an Integrated International Data Policy Framework for Earth Observations Workshop Report, ISU/REP/97/1, 1996, at 8.

[27] American Society for Photogrammetry and Remote Sensing and the American Bar Association, Earth Observation Systems: Legal Considerations for the '90's, 132 - 133, (1990), [hereinafter, ABA].; Kawamoto, Chiyoshi, *NASDA's Activities in the Field of Remote Sensing*, International Bar Association, 10th Biennial Conference of the Section on Business Law, Hong Kong, at 5 (1991), [hereinafter, Kawamoto].

[28] Short Account, *Beijing IISL Colloquium on the Law of Outer Space*, 24 J. of Space Law at 151 (1996).

[29] U.N. Doc. A/AC.105/674, (1997).

[30] Report, *25th Session of the Legal Sub-Committee of the UN Committee on the Peaceful Uses of Outer Space*, J. Space Law 48-49, (1986) [hereinafter, Report].

[31] Kopal, V., *The Role of United Nations Declarations of Principles in the Progressive Development of Space Law*, 16 J. of Space Law 5, at 6. (1988).

[32] Jasentuliyana, N., Remote Sensing and the Role of the United Nations, at 151.

[33] Kopal, *supra*, note 31.

[34] Kopal, *supra*, note 31.

[35] Kopal, *supra*, note 31.

[36] *Principles*, *supra*, note 5, Principle 1 (a), (b), (c), (d) and (e).

norms.[37] They also represent an intentional affirmation of, and return to, international agreement by consensus for space technology after a previous departure from that process regarding direct broadcasting satellites. As such, the *Principles* represent an intention to compromise rather than an intention to disagree. That compromise was intended by the drafters of the *Principles* to serve as a first step in the law making process which would eventually conclude in a formal treaty.[38]

On the domestic plane, the legislation of major remote sensing nations has authority for the development of international remote sensing law similar to the way that practices of strong maritime nations influenced the development of international maritime law.[39] Specific standards contained in the *Principles* were incorporated by the United States in its domestic legislation twice.[40] This was done to maintain the public good aspects of remote sensing, promote the broadest possible data use, and to place the United States in a favorable position in relation to nations that argued prior consent was necessary for remote sensing.[41] This last point is particularly meaningful in the development of the *Principles* as accepted law. The influence of U.N. declarations of principles is "strong particularly...when the solutions included in such principles end...controversies."[42]

A member of the Japanese delegation which adopted the *Principles* explains that in Japan, "there is no domestic law or regulation which directly regulates remote sensing."[43] Therefore, the *Principles* are "treated as a substantial source of law for remote sensing" and "NASDA's remote sensing activities are surely being performed pursuant to these principles."[44]

The *Principles* are also incorporated into the bilateral RADAR SAT agreement between the United States and another leading remote sensing nation, Canada, and they set the standard for the parties' cooperation.[45] The *Principles* are specifically referred to as guiding legal principles in the European Space Agency (ESA) document governing data form the ERS-1 and ERS-2 satellites.[46] The data policy for another European satellite, Envisat, was approved by the ESA Programme Board for Earth Observations and specifically contains a "Legal Framework" that mandates "Envisat data shall be available in an open and non-discriminatory way, and distribution of the data shall be consistent with the United Nations

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[37] Kopal, *supra*, note 31.

[38] Report, *supra*, note 30, at 48.

[39] DeSaussure, H., *Remote Sensing Satellite Regulation by National and International Law*, 15 Rutgers Computer and Technology Law Journal 352, at 375, (1989).

[40] Commercialization Act, 15 U.S.C. § 4201 (1984), Now repealed and replaced with Policy Act, 15 U.S.C. § 5621 (1992).

[41] "Specifically, the Committee is reluctant to take any action which: 1) could interfere with U.S. Treaty obligations; 2) might revive debate in the United Nations about the legitimacy of remote-sensing without prior consent by the sensed nation; and 3) sets a precedent which might lead other nations to impose increased restrictions on access to their data from their government-operated remote-sensing systems." H.R. Rep. 102-539, 102d Cong., 2d Sess., at 53, (1992).

[42] Kopal, *supra*, note 31.

[43] Kawamoto, Chiyoshi, *NASDA's Activities in the Field of Remote Sensing*, International Bar Association, 10th Biennial Conference of the Section on Business Law, Hong Kong, at 5 (1991).

[44] *Id.*

[45] "Data distribution shall be consistent with the United Nations Resolution 41/65 of December 3, 1986 on the Principles Relating to Remote Sensing of the Earth from Space." *RADAR SAT Data Policy*, Document Number: RCA-PR0004, Sec. 10.1 b., (Canadian Space Agency), July 13, 1994, at 11.

[46] *Principles of the Provision of ERS Data to Users*, ESA/PB-EO (90) 57, rev. 6, Paris, 9 May 1994, (European Space Agency, Earth Observation Programme Board), Sec. 2 General Principles, 2.1 Legal Principles, para. 2, at 2.

Resolution[...]on Principles relating to Remote Sensing of the Earth from Space."[47]

After in-depth, extended deliberations in COPUOS it may be found that some of the provisions contained in the *Principles* have failed to achieve as high a degree of acceptance as others. Nonetheless, it is clear that the international community continues to expect the *Principles* to provide regulation[48] and that the *Principles*, as a whole, have already served to guide important remote sensing nations in many of their practices.

Length of existence

The *Principles* are legally binding on nations because they have been negotiated, adopted, referenced and practiced for 25 years.[49] TIROS, the first civilian remote sensing satellite was launched in 1960[50] and the first remote sensing legal proposal dates back to 1970.[51] Remote sensing practice and law have continued since then. It is widely recognized that long periods of time are unnecessary to establish custom; that politics[52] and law[53] can forge instantaneous international custom. In light of this, the on-going, multidecadal record of continuous use of the *Principles* is a particularly compelling factor in their acceptance as law.

Starting in 1974,[54] nations engaged in the formulation of the *Principles* for a period of 12 years, which ended with their adoption in 1986. Some of the specific provisions contained in the *Principles*, like the right to overfly a state, date back even further to 1957, which is "the very beginning of space activity."[55] Others were intentionally designed and developed by the practice of leading remote sensing nations. In the case of nondiscriminatory access, the United States and other remote sensing nations engaged in customary practice, including entering agreements and establishing procedures for data dissemination another practice contained in the *Principles* to support the position that data acquisition from space is a legally permitted "use" under the *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies* (Outer Space Treaty).[56]

Customary law is established by refraining from action, as well as by taking action. Prior to the adoption of the *Principles*, remote sensing nations declined to make data available to a sensed State on a preferred basis or to seek permission from a sensed State to disseminate data to a third party. It is important to note that these practices were not prohibited by the

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[47] *ESA Envisat Data Policy*, ESA/PB-EO (97) rev. 3, Paris, (European Space Agency), 19 Feb. 98 at 8-9 (1998).

[48] International Space University, *Toward an Integrated International Data Policy Framework for Earth Observations Workshop Report*, ISU/REP/97/1, at 8, (1996).

[49] American Society for Photogrammetry and Remote Sensing and the American Bar Association, Earth Observation Systems: Legal Considerations for the '90s, at 127 (1990).

[50] OTA, *supra*, note 22 at 4.

[51] *Argentina: Draft International Agreement on Activities Carried Out Through Remote Sensing Satellites Surveys of Earth Resources*, U.N. Doc. A/AC.105/C.2/L.73 (1070) in *Report of the Legal Sub-Committee on the Work of Its Ninth Session (8 June - 3 July 1970) to the Committee on the Peaceful Uses of Outer Space*, U.N. Doc. A/AC.105/85 Annex II, at 2-14 (1970).

[52] McDougall, Walter A., The Heavens and the Earth - A Political History of the Space Age, at 118 - 124, 187, (1985).

[53] Report, *Environmental Aspects of* Activities *in Outer Space - State of the Law and Measures of Protection - International Colloquium*, 16 J. Of Space Law 93, (1988).

[54] G.A. Res. 3234, (XXIX) (1974).

[55] ABA, *supra*, note 27, at 127.

[56] Office of the White House Press Secretary, *Weekly Compilation of Presidential Documents*, Presidential Directive, vol. 14, at 1135, Presidential Directive, June 26, 1978 [hereinafter, Office of the White House Press Secretary]; 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. 6347, 610 U.N.T.S. 205 (effective Oct. 10,1967), [hereinafter, Outer Space Treaty]

Principles, thereby strengthening their customary law foundation.[57]

The *Principles* specifically incorporate by reference authorities which date even further back into the 20th Century, including the U.N. Charter, the Outer Space Treaty and relevant instruments of the International Telecommunication Union. This means that some rules contained in them and that are relevant to remote sensing, like spectra preservation, can be invoked and applied through the *Principles*.[58] Finally, some of the specific provisions incorporated in the *Principles*, like avoiding harm[59] and protecting humanity,[60] have their roots in the ancient practices of equity, establishing the temporal lineage of some aspects of the *Principles* as beginning well-before the advent of remote sensing technology.

The inclusion of customary and treaty law in the *Principles* serve as authority for their maturation into law.[61] These same facts have been used to support arguments that the *Principles* add nothing to international remote sensing law as a whole.[62] However, in the context of time, 1999 brings the international community to a full quarter-century of practice and acceptance of the *Principles*' without any "formal defection from their terms"[63] and with each year that this remains the case, the authority of the *Principles* grows stronger.[64]

Increasing restrictions on access to remotely sensed data are relevant to the expansion of global remote sensing services. These restrictions are weakening the principle of openness upon which much remote sensing law is based and is inhibiting global services. The degree to which decreased openness will inhibit the expansion of global remote sensing services will, in the long-term, depend on two things: which services are being considered and a complex dynamic of politics, economics, and technology interacting with the law.

Relevance of the principle of openness to the expansion of global remote sensing services.

Societies, like people, when faced with their own mortality are thrown back to the basics. They ask, "What do we value? For what do we stand?" Philosophy and pragmatism become one. For half of the 20th Century, for most of the world, World War II catalyzed this experience and it continued throughout the ensuing Cold War. Beneath the strategic preparations, beneath the demonstrations of technological prowess, beneath the political positions, beneath it all, was a conflict of ideas. It was a deeply philosophical conflict based on the question, which is the better form of society: open or closed? The United States, the western European nations, and others believed in, and fought for, the ideal of an open society. Other nations, led by the former Soviet Union, believed in, and fought for, closed, more controlled societies.

The fora in which space law developed became prominent arenas in this contest of ideas. Negotiations for treaties, declarations, resolutions and other legal instruments were rife with the ideological struggles surrounding the core issue of open versus closed

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[57] Christol Past and Present, *supra* note 25, at 91-92.

[58] ABA, *supra* note 27, at 129 - 130.

[59] Principles, supra, note 5, Principle IV, Principle X.

[60] *Principles, supra*, note 5, Principle XI.

[61] He Qizhi, *Legal Aspects of Monitoring and Protecting Earth Environment by Space Technology*, 20 J. of Space Law 111 at 114, (1992).

[62] DeSaussure, *supra* note 39.

[63] ABA, *supra* note 27 at 127.; Christol Past and Present, *supra* note 25, at 94.

[64] Christol Past and Present, *supra* note 25, at 94.

societies. The advent of each new space technology created a new field of debate for the question: radio frequency allocation, direct broadcasting satellites, telecommunications, meteorology, identification and registration of spacecraft- each became individual campaigns in the long-term battle for open societies. And when the engagements were done, the legal foundation that was laid embodied many provisions to ensure that openness would prevail in space,[65] the newest locale for human endeavor.

And with no use of space was the battle of open versus closed societies more energetically engaged than with remote sensing -for the unrestricted flow of data and information was involved- a core requirement of an open society. Nondiscriminatory access was championed by the United States and other western nations as a hallmark of the openness in which these societies believed.[66] This policy became international law, and this international law also became the law of some individual nations.

When the Cold War ended, the philosophical battle of open versus closed societies receded into the background of global political life. The demise of the Soviet Union signaled that the battle was won, open societies would prevail, and, with the all-encompassing need to prevent both philosophical and physical annihilation eliminated, it became possible for individuals, nations, and the international community to turn their attention to other, more life-affirming, affairs. Creative and innovative forces newly-released from Cold War competition were channelled into commerce, trade, and technology conversion. And space law, like so many other arenas of Cold War activity, quickly began to raise new questions generated by the new affairs.

And so in the frenetic post-Cold War reorganization of institutions and societies it is well to ask, how does the fundamental principle of openness fare in this new era? What is its standing in space law? Although less visible, less at the forefront of philosophical inquiries than previously, it is still a critical question. If it goes unasked, the world risks losing what has already been won. The world's remote sensing nations -who are also the world's leading democracies- must be as diligent in the preservation of openness in the post Cold War era as they were during the Cold War. Ultimately, this means being unwilling to allow for new reasons what they were unwilling to allow for political reasons: encouraging closed societies by limiting data access. It is a position of this paper that increasing restrictions on remotely sensed data for commercial and military reasons are weakening the principle of openness upon which much remote sensing law is based and is inhibiting some global services. The degree to which decreased openness will inhibit the expansion of global remote sensing services will, in the long-term, depend on two things: which services are being considered and a complex dynamic of politics, economics, and technology interacting with the law.

Increased commercial restriction on remotely sensed data

WMO Resolution 40 and encryption of European weather satellites

The free and unrestricted exchange of meteorological data has been the practice among nations for more than a century.[67] However, in recent years there have been

[65] Outer Space Treaty *supra* note 56. It provides for "free access," and "freedom of scientific investigation." Art I; Parties with information about "any phenomena" harmful to astronauts" must provide it. Art. V; Space objects must be registered and identifying data must be furnished upon request. Art. VIII; Consultations are required and may be requested regarding harmful interference. Art. IX; Parties must consider requests to observe the flight of space objects. Art. X; Parties must provide information about the "nature, conduct, locations and results" of space activities. Art. XI; Stations, installations, equipment and space vehicles on the Moon and other celestial bodies must be "open...on the basis of reciprocity." Art. XII.

[66] Office of the White House Press Secretary, *supra* note 56.

[67] The first International Meteorological Conference was held in Belgium in 1853. Twenty years later, in 1873, the International Meteorological organization (IMO) was established. In 1947, reflecting the post-war attention to global matters, the IMO became a United Nations specialized agency and began acting as the World Meteorological Organization (WMO) in 1951.

important changes in the international laws and agreements that govern meteorological data and the interpretation of "free and unrestricted exchange."

The twin forces of rising national debts and increasing economic value of all kinds of data produced pressure from national governing authorities in many countries to make national meteorological services (NMSs) self-sustaining. This resulted in a number of national services selling government data. In some cases these sales provide at least five to ten per cent of their operating budgets.[68] The question of whether a national service ought to do this involves different fundamental concepts regarding the proper relationship between the public and private sectors. The United States, for example, favors a separation between the two, leaving entrepreneurial market activities such as value-added services and information distribution activities to the private sector. Other nations hold a different view which allows national agencies to engage in profit-making ventures in an effort to recover costs.

In European practice, weather data users are charged for data and this is considered by the weather services to be a fair cost-sharing mechanism. In the United States, data users are provided data at the cost of reproduction. In this view, data are considered a public good and, because data must be produced for the government's own use anyway, providing them to other users incurs no substantial costs. The United States National Weather Service has come to rely on commercial value-added retailers and others to distribute weather information, making them an integral part of the overall weather services system. In the European view, private sector retailers compete with the NMSs. If private sector providers are able to obtain data they inhibit the services ability to recover costs for operating their national data-collecting infrastructure. It is the cost of the continued operation of these systems that, in the European view, justifies its position.

The European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) treaty contains a version of the European view. EUMETSAT's "primary" objective is to "establish, maintain and exploit European systems of operational meteorological satellites, taking into account as far as possible WMO recommendations. EUMETSAT has "worldwide exclusive ownership of all data" generated by it's satellites or instruments. It makes some data sets "available" to the national weather services of WMO members and "distribution policy" is decided in accordance with rules for determining which EUMETSAT programs are mandatory or optional for its members.[69]

Conflict between the different approaches surfaced at the global level when, at the WMO Eleventh Congress in 1991, a number of European governments requested that commercialization issues be studied to develop future policies. A draft resolution was considered by the Twelfth Congress which initially divided weather data into two tiers. The proposal addressed both satellite and non-satellite data. Tier one contained data that would continue to be open and freely accessible. Tier two contained data subject to restrictions based on their likely commercial applications. Tier one data types included *in situ* marine data and climate data needed on a regional and global scale and warnings and advisories to protect life and property. The second tier data contained restricted data to be identified at a later time. The restrictions would have prohibited third parties from re-exporting data gathered by another nation. Exceptions were proposed to allow all data to be accessed at the cost of reproduction for non-commercial educational and scientific purposes.

The United States responded that the principle of free and unrestricted access must be formally affirmed.[70] This position ultimately rested on United

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[68] World Meteorological Organization, Exchanging Meteorological Data Guidelines on Relationships in Commercial Meteorological Activities: WMO Policy and Practice, WMO, Geneva, at 8, (1996).

[69] EUMETSAT Convention, Art. 2.1, Art. 5.2 (b), Art. 5.3 (b), and Art. 8.

[70] Bulletin of the American Meteorological Society, *WMO Adopts a Resolution Governing the International Exchange of Meteorological and Related Data and Products*,, Vol. 76, No. 8, at 1478 - 79, (1995) [hereinafter, Bulletin].

States domestic law and policy.[71] The rest of the United States position held that a sanctioned two-tier practice could not be adopted, although the right of a nation to place restrictions on its own data as a matter of sovereign prerogative could be recognized. The position also held that enforcement of data restrictions would be the responsibility of the nation imposing the restrictions; and, guidelines should be adopted for the relations among national weather services and between the private sector and national weather services. The function of the guidelines would be to facilitate agreeable arrangements involving commercial activities.[72]

A draft resolution, including four annexes, was adopted. It included as a fundamental principle...broadening and enhancing the free and unrestricted international exchange of meteorological and related data and data products. Free and unrestricted was defined as non-discriminatory and without charge. Without charge was defined in the context of the resolution as no more than the cost of reproduction and delivery, without charge for the data and products themselves. Three data exchange practices were also drafted. First, the minimum data and products that members shall provide include severe weather warnings and advisories and specific types of data from specific systems as well as synoptic observational data. Second, data that should be provided are those necessary to sustain global, regional and national WMO programs and data to assist other Members in providing weather services in their own countries. It was understood, however, that members may place conditions on the re-export of this data for commercial purposes for reasons such as national laws or cost of reproduction. Finally, all data and products should be provided to the research and education communities for non-commercial purposes. Research and education communities include researchers, teachers, and students in academic and research institutions and in other government and non-government research institutions.[73] Unlike the original proposal which required Members to perform their utmost to ensure that re-export restrictions were respected by their [national weather services] and by all organizations given access to [restricted data] within their territories or abroad following a legitimate re-export[74] the draft resolution urged Members to [m]ake their best efforts to ensure that re-export conditions are made known to initial and subsequent recipients.[75]

A final set of policies and practices were adopted. Although the resolution and the final version are substantially the same, there is an important change between them. The adopted version omits the term "tier one" and replaces it with "essential data" to describe data sets that must be provided. Similarly, the term "tier two" is replaced with the term "additional data" that should be provided. These changes reflect a compromise between the United States position that rejected the adoption of a formal tier system and the European position that some kinds of data must be allowed to be restricted.

Resolution 40,[76] as the final version has come to be known, explicitly adopts the policy of free and unrestricted international data exchange, rejects the two-tier system, recognizes the need to support WMO

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[71] The Policy Act, *supra* note 9, at 15 U.S.C. §§ 5671 and 5672, prohibits the commercialization of the national weather satellites. Office of Information and Regulatory Affairs, Office of Management and Budget Circular A-130, Federal Register, Vol. 59, No. 141, 7/25/94. A complex piece of policy guidance, A-130 is generally accepted that it instructs executive agencies to avoid inappropriate constraint of access by the public to government information. This includes setting cost recovery policies at a threshold low enough to facilitate access. Much of the policy's substance was codified in the 1995 Paper Reduction Act raising the long-term status of the policy to a law, 35 U.S.C. §§ 3501 - 3520.

[72] Bulletin, *supra* note 70, at 1478 - 79.

[73] Draft Res. 11.4/1 (Cg-XII) - WMO Policy and Practice for the Exchange of Meteorological and Related Data and Products Including Guidelines on Relationships in Commercial Meteorological Activities [hereinafter, Draft Resolution].

[74] Report to Plenary on Item 17, EC-XLVI/PINK 65 (14.VI.1994), (WMO Executive Council, 46th Session), *Future Arrangements for the Exchange of Meteorological Data and Products*, (1994).

[75] Draft Resolution, *supra* note 73.

[76] Resolution 40, *supra* note 19.

activities, identifies specific minimum data sets that must be provided, limits restrictions to re-export rather than uses, articulates guidelines for interaction between the meteorological services and commercial practices; and contains a broad definition of research and education communities.[77] Nonetheless, as formulated, the overall effect of Resolution 40 has hampered the free flow of meteorological data for weather services worldwide for the largest operational application of remote sensing.[78] It is also apparently imperfect in its application due to the global nature of weather.

Formally stating a tenet that had previously been an unquestioned, accepted and widely-held practice while decreasing the scope of the practice's application, indicates that the stated principle has, in fact, been weakened. To be sure, it is to be counted as a success for the principle of openness that the formal statement was made and adopted. But if it is to evolve into something more than "shoring up" a weakened principle, then practical access to all data categories will have to be demonstrated. And although the two-tier system was rejected officially, the effect of identifying a minimum set of basic data and products that must be provided is the identification of another set that need not be provided. This is *inclusio unius est exclusio alterius* - the inclusion of one is the exclusion of another. The result is a *de facto* tier system.

The adopted practice which allows placing restrictive conditions on the re-export of some data and enforcement guidelines that condone data denial are, themselves, logically inconsistent with the concept of the free and unrestricted data exchange.[79] Additionally, and most importantly for remote sensing, data and products from operational meteorological satellites have been placed within the essential category. However, despite this designation, they will only be provided as agreed by satellite operators and "data and products necessary for operations regarding severe weather warnings and tropical cyclone warnings" "should" be included, but are not required.[80] While this provision attempts to balance the national desire to retain sovereign control over data exchange policies that affect expensive national assets with the inherent importance of meteorological satellite data, it holds the long-term prospect of erratic data access.

Resolution 40 also demonstrates that before the laws of nature, human-made law is imperfect at best. A compelling case of the logic of geography over the logic of politics is the inclusion in the essential data category of "as many data as possible that will assist in defining the state of the atmosphere at least on a scale of the order of 200 km in the horizontal and six to 12 hours in time.[81] Meteorological data at these spatial and temporal scales are an absolute necessity for computer model initialization and verification. Were a nation to selectively withhold data at these scales, it would create a data void, rendering other nations computer models useless. Satellite derived atmospheric parameters may be able to compensate for these critical data in the future, but until then all nations are naturally dependant on one another to provide *in situ* synoptic scale observations. Another manifestation of the logic of geography may be the United States decision to continue unrestricted access to its own data. Since the policy's scope is continental - an important unit in meteorological metrics - as well as national, it may be that geography more than political power will ultimately determine the long-term effect of these changes on the global weather community.

Finally, during the same time period that Resolution 40 was being forged, the question of restricted data moved into the realm of operations in 1994 when EUMETSAT began to encrypt the data from its

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[77] Bulletin, *supra* note 70, at 1478-99.

[78] Letter from Commercial Weather Services Association to the Commission of the European Communities, Directorate General IV - Competition. (September 28, 1995) Signed by 45 companies from the United States, Canada, England, and Argentina. This dates to the time Resolution 40 was passed. Conducting a formal study now to document the development of this early trend would be timely and useful.

[79] Id.

[80] WMO Resolution 40, Annex 1 (Cg-Xii), *Data And Products To Be Exchanged Without Charge And With No Conditions On Use*, number 8.

[81] *Id.*

satellites, which previously had been unencrypted. EUMETSAT plans to continue this practice into the foreseeable future.[82] Encryption, by design, is intended to inhibit access to all except those with the proper "key." Whatever the motive, even well-justified, efforts to characterize this as anything other than a move away from the principle of openness is contrary to fact and logic. As to its effect on the expansion of global remote sensing services, at most this practice will enhance the ability of a few services while decreasing the ability of many others.

The revised WMO practice is far from the last word, positions and issues will continue to be defined. It will also have to be reconciled with other data exchange policies like the CEOS principles in support of operational environmental use for the public benefit.[83] Often members of one group are also members of another, making the reconciliation an on-going process. Whatever the outcome, there are two things that are certain. First, weather data restriction is an on-going issue. Second, no single satellite operating nation no matter how politically or economically powerful can control the international rules concerning weather data acquisition and distribution. From this point on, determining the law will be an evolving multilateral process.

Industry and "availability"

When the United States Congress passed the 1992 Land Remote Sensing Policy Act (Policy Act)[84] it authorized the United States Secretary of Commerce to issue licenses for private systems pursuant to the new law.[85] As part of the licensing process, the Department of Commerce issued a Notice of Proposed Rulemaking which solicited public comment regarding the regulations it was formulating.[86] The remote sensing community subsequently engaged in a debate regarding the proposed rules.

Chief among the questions raised was how the nondiscriminatory access policy would be applied to private system operators. The Policy Act contains a sensed-state provision which requires that licensees "make available to the government of any country, including the United States, unenhanced data collected by the system concerning the territory under the jurisdiction of such government as soon as such data are available and on reasonable terms and conditions."[87] One position advanced in the debate was, if data is unavailable to the licensee due to system design or business practice then the data is unavailable for purposes of the sensed-state provision.[88]

The question of what constitutes "availability" under nondiscriminatory access had been raised numerous times under both international and United States domestic law. Each time, the answer was that making data available is an integral element of nondiscriminatory access, without which, the principle would be violated and rendered meaningless.[89]

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[82] Agreement Between the United States National Oceanic and Atmospheric Administration and the European Organisation for the Exploitation of Meteorological Satellites on an Initial Joint Polar-Orbiting Operational Satellite System, signed by the NOAA Administrator and EUMETSAT Director, 19 November 1998, Washington, D.C. [hereinafter, IJPS Agreement].

[83] Committee on Earth Observation Satellites, Coordination for the Next Decade 1995 CEOS Yearbook, at 7, (1995).

[84] Policy Act, *supra* note 9, at 15 U.S.C. §§ 5601 - 5642 (1992).

[85] Policy Act, *supra* note 9, at ' ' 5621 - 5625.

[86] 62 Federal Register 59317 (November 3, 1997).

[87] Policy Act, *supra* note 9, at ' 5622 (b) (2).

[88] Divis, Dee Ann, *Wrangling Over Remote Sensing; Government Considers Regulation Of Commercial Remote Sensing Satellite Systems*, GeoInfo Systems, at 16, (January 1998).

[89] Gabrynowicz, J.I., *Defining Data Availability for Commercial Remote Sensing Systems Under United States Federal Law*, 23 Annals of Air and Space Law 93, at 94, (1998), [hereinafter, Gabrynowicz].

When Israel persuaded the United States Government[90] to restrict remote sensing companies from acquiring and disseminating remotely sensed data of Israel, industry argued correctly, that nondiscriminatory access was being selectively applied. It argued further again, correctly that the United States' concession to Israel was a precedent that eroded the future application of the principle for industry.[91] To argue that technical system characteristics and/or business practices makes legally required data "unavailable" for purposes of nondiscriminatory access was to turn the tables. The industry put itself in the same position as the Government in the Israeli case: applying selective application of nondiscriminatory access. Industry advocated the very result it had attempted to prevent. Should industry selectively apply nondiscriminatory access, any future appeal to the principle on its own behalf will ring false and be justifiably ignored. This is of particular importance because the statute that prohibits imaging of Israel also holds the potential of additional imaging restrictions of "any other country or geographic area designated by the President."[92] Establishing nondiscriminatory access availability as a standard industrial practice will, on the other hand, restore the strength of nondiscriminatory access as a precedent and can help end the one-by-one exclusion of nations with the single anomalous situation that now exists with Israel.

A licensee is not obligated to make data available to the sensed state at uniform prices.[93] Nor is making data available to be equated with giving data away for free. The licensee is permitted to seek "reasonable terms and conditions"[94] which implies market rates. Regarding the expansion of global remote sensing services, applying the sensed state provision to industry, increases them. The provision prohibits a company from entering into an exclusive contract that requires withholding data from a sensed state. It therefore can

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[90] Rep. No. 104-278, 104th Cong., 2d Session, S.1745, National Defense Authorization Act for Fiscal Year 1997.
Section 1044: PROHIBITION ON COLLECTION AND RELEASE OF DETAILED SATELLITE IMAGERY RELATING TO ISRAEL AND OTHER COUNTRIES AND AREAS.
(a) COLLECTION AND DISSEMINATION- No department or agency of the Federal Government may license the collection or dissemination by any non-Federal entity of satellite imagery with respect to Israel, or to any other country or geographic area designated by the President for this purpose, unless such imagery is no more detailed or precise than satellite imagery of the country or geographic area concerned that is routinely available from commercial sources.
(b) DECLASSIFICATION AND RELEASE- No department or agency of the Federal Government may declassify or otherwise release satellite imagery with respect to Israel, or to any other country or geographic area designated by the President for this purpose, unless such imagery is no more detailed or precise than satellite imagery of the country or geographic area concerned that is routinely available from commercial sources.

[91] NOAA Public Meeting, Licensing of Private Remote Sensing Space Systems, Washington, D.C. (June 14, 1996).

[92] S.1745, 104th Cong., 2d Session, Authorizing Appropriations For Fiscal Year 1997 For Military Activities Of The Department Of Defense, For Military Construction, And For Defense Activities Of The Department Of Energy, To Prescribe Personnel Strengths For Such Fiscal Year For The Armed Forces, And For Other Purposes,
Section 1044 PROHIBITION ON COLLECTION AND RELEASE OF DETAILED SATELLITE IMAGERY RELATING TO ISRAEL AND OTHER COUNTRIES AND AREAS.
(a) COLLECTION AND DISSEMINATION- No department or agency of the Federal Government may license the collection or dissemination by any non-Federal entity of satellite imagery with respect to Israel, or to any other country or geographic area designated by the President for this purpose, unless such imagery is no more detailed or precise than satellite imagery of the country or geographic area concerned that is routinely available from commercial sources.
(b) DECLASSIFICATION AND RELEASE- No department or agency of the Federal Government may declassify or otherwise release satellite imagery with respect to Israel, or to any other country or geographic area designated by the President for this purpose, unless such imagery is no more detailed or precise than satellite imagery of the country or geographic area concerned that is routinely available from commercial sources.

[93] The Landsat Program Management Plan and H.R. 3614, The National Land Remote Sensing Policy Act of 1991, Hearing Before the Subcommittee on Environment of the Committee on Science, Space, and Technology, U.S. House of Representatives, 102d Cong., 2d Sess., 208. (1992) at 54.

[94] Policy Act, *supra* note 9, at § 5622 (b) (2).

sell the data at least twice, once to the customer and again to the sensed state.

Although the this particular question of applying the sensed state provision to industry arose under United States law other nations are also addressing the question. Early indications are that they are willing, as a matter of domestic law, to ignore the international law.[95] While domestic law is different from nation to nation, the international legal basis of the principle applies to other remote sensing nations that participated in the consensus process that adopted the *Principles*. New international and domestic remote sensing laws must evolve to meet the rights, interests and obligations of private entities. And some principles of remote sensing law, like the principle of openness, are so basic that they apply to both public and private activities. The obligation to make data available to sensed states through effective, practical measures is chief among these vital principles.

Increased military restrictions on remotely sensed data

Combining civil and military capabilities through system mergers: Convergence, the Initial Joint Polar System and the Joint Polar System

A post-Cold War, budget-driven policy regarding remote sensing of the weather is combining long-term[96] civil and military capabilities through system mergers at the national and international levels. At the national level,[97] the United States is merging its civil Polar-Orbiting Operational Environmental Satellite (POES) program operated by the National Oceanographic and Atmospheric Administration (NOAA) within the Commerce Department and its military Defense Meteorological Satellite Program (DMSP) operated by the Defense Department (DoD) into a merged United States national system, the National Polar Orbiting Environmental Satellite System (NPOESS). This is referred to as "convergence."[98] At the same time, the United States POES system is being merged with the European METOP 1 and 2 satellites into the Initial Joint Polar System (IJPS) with the further merging of the NPOESS with the METOP 3, creating the Joint Polar System, (JPS).[99] The guiding principles of United States convergence are the recognized importance of operational environmental data; assured data access; the ability to "selectively deny" critical environmental data to an adversary during crisis or war; and ensured data use by the United States and its allies. Implementation is occurring within the Executive

[95] Israeli Defense Ministry Director-General Ilan Biran is reported to have required, as part of a study for considering a commercial photoreconnaissance satellite, a "black-list of countries to whom the commercial satellite's photographs would not be sold." Ha'aretz, *supra* note 17, at B3.

[96] As points of reference, for purposes of this paper, the Initial Joint Polar System time frame is 2009 - 2013 and the Joint Polar System time frame is 2020 - 2025.

[97] Although this section addresses activities in the United States and between the collective nations of Europe and the United States, merging civil and military functions into a single system is also being considered by other individual nations like Italy and may also be the trend for other nations. Space News, *Italy Backs Navigation, Small Launch Efforts*, April 5, 1999. at 3, col. 1.

[98] White House Fact Sheet, Convergence of U.S. Polar-Orbiting Operational Environmental Satellite Systems, May 10, 1994, at 2. The NPOESS is managed by the Integrated Program Office (IPO). Its personnel are from the Department of Defense, NOAA, and NASA. The System Program Director is from NOAA and the Deputy Director is from DoD. As a tri-agency program there are three senior positions: associate director for acquisition; associate director for technology transition; and, associate director for operations. The Air Force has the lead for acquisitions, NASA is the lead for technology, and NOAA is the lead for operations. A tri-agency Executive Committee consists of the Undersecretary of Commerce for Oceans and Atmosphere, the Undersecretary of DoD for Acquisition and Technology, and the Deputy Administrator at NASA. It is the Committee's responsibility to "coordinate program plans, budgets, and policies and [to] ensure agency funding commitments are equitable and sustained."

[99] IJPS Agreement, *supra* note 82.

Branch.[100] The guiding principles of the merged United States and European systems are being developed through negotiations and agreements.[101]

Since 1972, the United States has made eight unsuccessful attempts to converge its military and civil weather satellite systems. Although progress in spacecraft design, data processing, and launch vehicle commonality was made, law, foreign policy, national security issues, and sharp political and cultural divisions in the civil and military sectors prevented complete convergence. The current, and ninth, attempt began in 1993.[102]

The history of multiple failed convergence attempts has fostered skeptics of the current plan. They also point to the failure of the United States Air Force and NASA to work together on the *Landsat* system as further evidence of their doubt.[103] Proponents of the current convergence plan identify key differences from prior attempts that they believe ensure the success of the effort. On the political side, common pressure for a converged system exists in both the United States Legislative[104] and Executive Branches,[105] increasing the likelihood of success. On the technological side, simultaneously planned upgrades for the NOAA and DMSP systems have presented an opportunity to increase the commonality of the spacecraft bus and subsystems of future satellites. The post-Cold War era has also eliminated many of the issues which have precluded complete convergence, including the need to have a redundant, separately controlled military system.[106] Finally, proponents point out that all the agencies involved have a common 'vested interest' in a converged system which is obtaining data for operational needs.[107]

NASA, NOAA, and DoD identified, accepted and have agreed to converged system requirements. This provides strong evidence that the current attempt at United States convergence will, in fact, be successful.[108] This agreement was never reached in the preceding eight attempts. In fact, seven of the eight attempts at convergence failed because of difference over requirements.[109] A signed 1998 IJPS agreement between

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[100] Presidential Decision Directive/NSTC-2, May 5, 1994, [hereinafter, PDD2].

[101] IJPS Agreement, *supra* note 82.

[102] Convergence of Civilian and Defense Polar-Orbiting Weather Satellites, Hearing before the Subcommittee on Space of the Committee on Science, Space, and Technology U.S. House of Representatives, 103d Congress, 1st sess., Nov. 9, 1993, at 1, [hereinafter, Convergence Hearings]. A study was conducted by U.S. Congressman George Brown and was later contained in the National Performance Review, popularly called Reinventing Government, that was issued by U.S. Vice-President Al Gore. In 1994, the United States Executive Branch directed the Commerce and Defense Departments to integrate the POES and the DMSP into a "single, converged, national polar-orbiting operational environmental satellite system." PDD2, *supra* note 100.

[103] The Air Force and NASA were unable to reach agreement on the parameters of a single, but complex, sensor, the High-Resolution Multispectral Stereo Imager (HRMSI). This occurred despite the fact that Congress had already mandated that they must jointly operate the program in the Policy Act. The provisions to work together were changed in interagency negotiations and condoned by the Executive Branch: "Working within their partnership on *Landsat*, and recognizing the difficulties imposed by today's budget environment, NASA and DoD mutually agreed to proceed in a manner that would transfer the responsibility of the program to NASA with an assurance by DoD of remaining a major user of Landsat data." Letter from Vice-President Al Gore to Rep. George Brown, Chair House Committee on Science, Space and Technology, Feb. 4, 1994.

[104] Convergence Hearings, *supra* note 102.

[105] Gore, Al, Creating a Government that Works Better and Costs Less, Report of the National Performance Review, (1993).

[106] Convergence Hearings, *supra* note 102, at 8, by Dr. D. James Baker, Under Secretary for Oceans and Atmosphere, NOAA, Department of Commerce.

[107] Space, Vision and Reality: Face to Face, Proceedings Report, United States Space Foundation, by Robert Winokur, Assistant Administrator for Satellite and Information Services, NOAA, at 46, (1995).

[108] NPOESS Integrated Operational Requirements Document, July 25, 1996.

[109] Brigadier General Cook, Deputy Commander for Operations, USAF Space Command, meeting with EUMETSAT Representatives, August 7, 1996.

NOAA and EUMETSAT also indicates potential success of merged systems at the international level.[110]

The potential success of convergence in the United States and merged systems between the United States and Europe, raises a number of legal issues. Among them are the legal definitions of "crisis or war", "adversary" and "critical data" and the legal separation of the military and civil space programs under United States and European law, and, perhaps, individual national laws of some European nations.

Data denial and the legal definitions of "crisis or war", "adversary", and "critical data"

Definitions are the starting points of legal rights and obligations. The NOAA - EUMETSAT IJPS agreement (IJPS Agreement) recognizes this by setting out definitions critical to the system's implementation.[111] Definitions included in the agreement are "crisis or war,"[112] "critical data,"[113] and "adversary."[114] They will be invoked for "data denial of critical IJPS data for military purposes"[115] from ten United States instruments flying on both spacecraft.[116] Two other United States instruments are explicitly excluded from the data denial provisions.[117] "Data denial" is undefined but criteria for determining when denial is to be implemented are set out, including the requirement for United States Cabinet level authority.[118]

The data denial provisions raise the need to define the IJPS in legal terms.[119] Under WMO Resolution 40

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[110] IJPS Agreement, *supra* note 82.

[111] IJPS Agreement, *supra* note 82, at Article 8, Annex, sec. 1.

[112] IJPS Agreement, *supra* note 82, at Annex, 1.
"Crisis or war is an international situation involving U.S. and/or Allied operations which could range across the spectrum of military operations. This spectrum would include:
- a major regional conflict;
- a peacemaking or peacekeeping operation involving U.S. and Allied personnel and resources:
- a humanitarian operation involving U.S. and Allied personnel and resources: or
- a show of force operation (such as deploying naval or ground forces to reflect international disapproval) involving U.S. and Allied personnel and resources."

[113] IJPS Agreement, *supra* note 82, at Annex, 1."Data denial may be applied to data which an adversary might use to support or enhance military planning and operations. For example, satellite visual, infrared or microwave imagery and infrared or atmospheric sounding information have offensive and defensive military applications and are considered critical environmental data."

[114] IJPS Agreement, *supra* note 82, at Annex, 1."A state or group of states or a politically unrecognized force within a state or group of states which pose a distinct threat to the U.S. or its Allies, especially regarding military operations."

[115] IJPS Agreement, *supra* note 82, at Art. 8.4.

[116] Advanced Very High Resolution Radiometer (AVHRR), High-resolution Infrared Sounder (HIRS), Advanced Microwave Sounding Unit (AMSU-A), Space Environment Monitor (SEM), Solar Backscatter Ultra Violet Monitor (SBUV), Microwave Humidity Sounder (MHS), Infrared Atmospheric Sounding Interferometer (IASI), Advanced Scatterometer (ASCAT), Ozone Monitoring Instrument (OMI), Global Positioning System - Sounder (GPS - S).

[117] Satellite-Aided Search and Rescue (SARSAT), and the Data Collection and Location System (ARGOS).

[118] IJPS Agreement, *supra* note 82, at Art. 8, Annex, 2, 3, 4.
Criteria for determination:
- Whether a condition of crisis or war exists or is developing and whether the crisis or war poses an immediate and serious threat to U.S.-Allied national security objectives such as whether it affects the lives of U.S. or Allied personnel and resources;
- An adversary's ability to receive and exploit environmental data from U.S. sensors for military purposes;
- An adversary's ability to receive and exploit similar environmental data from other sources for military purposes;
- What advantage the data from U.S. instruments would provide an adversary, given that similar data may be available from other sources;
- The impact of denying data to non-adversaries who may also be affected by data denial;
- The U.S. would consider its international obligations, including those with EUMETSAT and its members, in making a decision on data denial.

[119] IJPS Agreement, *supra* note 82, at Article 3 contains a General System Description. "The IJP System consists of the following major elements: EUMETSAT and NOAA spacecraft, instrumentation, and ground segments. The spacecraft and instrumentation together are referred to as the satellite." A general description of the spacecraft, instrumentation and

some of the data from various IJPS instruments will fall under the "fundamental principle" of "broadening and enhancing the free and unrestricted exchange of meteorological and related data and products."[120] As regards the *Principles*, "remote sensing" is defined as "the sensing of the Earth's surface"[121] which places the IJPS outside of their scope. However, the IJPS Agreement recognizes "the essential role [of] environmental satellite data...[for]...other sectors of the global Earth observation and science user communities"[122] and states that the parties are cooperating "to continue and improve the operational meteorological and environmental forecasting and global climate monitoring services."[123] In so far as the *Principles* do require remote sensing to "promote the protection of the Earth's natural environment" the use of IJPS data under some circumstances perhaps those requiring an interdisciplinary scientific approach could conceivably place them within some limited application of the *Principles*.[124] However, if and when the IJPS, or its components, are operated for "military purposes" then arguably, it, or they, become a military system which removes them from these laws and presumably data denial can occur. The question then becomes, as a matter of law, what must happen for the system to make the transition from a civil environmental/meteorological monitoring system to a one used for "military purposes"? The IJPS Agreement begins to answer the question as an event defined as a "crisis or war."

The definition of "crisis or war" used in the IJPS Agreement is broad and covers activities "which could range across the spectrum of military operations" including regional conflicts, peacemaking or peacekeeping, humanitarian operations and shows of force "to reflect international disapproval."[125] Wars are threats to a nation's supreme interests and ultimately, every State that participates in merged systems, either directly or through intergovernmental organizations, has a national legal definition of "war." And although the data denial provisions only apply to some United States instruments, these definitions may or may not be compatible and could lead to political, as well as legal, differences when data denial is invoked for "military purposes".

At the United States domestic level, what constitutes a "war or crisis" is increasingly the subject of the most intense legal controversies. And because these controversies are subjects of acute domestic interests, they are often driven more by domestic forces than international ones which further complicates the question of legally using a shared international asset. In the United States, for example, although the Constitution clearly provides that "Congress shall have Power To...declare War"[126] the 20th Century has engendered war-like activities without the legal requirement of a formal declaration. This has generated legislation that attempts to define the proper Executive-Legislative authority in these activities.[127] However, no United States President has accepted the constitutionality of this legislation since it was passed. If data denial is invoked for any number of activities that "range across the spectrum of military operations" it can become part of a larger, Constitutional issue considered to have more domestic importance than the use of the IJPS itself.

Other definitions used in the IJPS will also require complex legal analysis involving a number of different bodies of law. For example, the definition of "adversary" could require the application of the laws of war and the evolving law of terrorism. The definition of "critical data" will catalyze the domestic polices and

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ground segment are included.

[120] Resolution 40, *supra* note 19.

[121] Principles, supra, note 5, Principle 1.

[122] IJPS Agreement, *supra* note 82, Preamble.

[123] IJPS Agreement, *supra* note 82, Article 1.

[124] Principles, supra note 5, Principle X, regarding "averting any phenomenon harmful to the Earth's natural environment."

[125] IJPS Agreement, *supra* note 82, Annex, 1.

[126] U.S. Constitution, Art. 1, section 8.

[127] 50 U.S.C. § 1541. The War Powers Resolution.

many of the bilateral and multilateral agreements to which the IJPS members are also parties.

The question of legal standards used in the IJPS Agreement arises when considering that data denial can be invoked when a crisis or war situation "exists, or is developing" that "poses an immediate and serious threat" in which an adversary "might use" the data to be denied. The purpose of legal standards is to create a degree of certainty in the application of the law and legal instruments. How much certainty these standards provide will depend on a variety of political and legal factors. The agreement addresses certainty in temporal terms by providing that "data denial will stop 120 days after it starts"[128] and "shall be extended" only after the entire United States Cabinet level decision-making process is repeated.[129]

The free and unrestricted exchange of meteorological data has been the practice among nations, and even with important recent changes, "free and unrestricted" is still the primary standard. Therefore the introduction of a data denial policy for the IJPS does raise new questions. A policy that allows data denial from a merged civil and military system can be viewed two ways: either as a policy that establishes a compromise to meet national emergencies by a system that is otherwise presumed to operate openly; or, as a policy that establishes a compromise that inhibits data access and makes a completely open system unlikely. These competing interpretations are further complicated by the fact that although data denial is not specifically applied to European instruments, their data will be encrypted as standard operating procedure, and, in effect denied, to all except those with authorized access. This makes the question of whether the IJPS will operate in a manner consistent with the principle of openness multidimensional. Significantly, the IJPS agreement recognizes the parties' intent to "continue planning"[130] indicating that this issue and its impact on global remote sensing services is an evolving one.

[128] IJPS Agreement, *supra* note 82, Annex 1, para. 5.

[129] IJPS Agreement, *supra* note 82, Annex 1, para. 6.

[130] IJPS Agreement, *supra* note 82, Article 2.

Changing legal separation of the military and civil sectors under United States domestic law and European law

Data denial either as a result of encryption or for "military purposes" will occur within the context of the changing legal relationship between the military and civil sectors in both the United States and Europe. This changing context is an important element in considering the long-term status of data access laws and policies.

At the dawn of the Space Age, President Eisenhower chose to keep the United States military and civil space programs separate. This decision is codified in the *1958 National Aeronautics and Space Act* (NAS Act).[131] To execute this decision military assets were transferred to NASA pursuant to an Executive Order.[132] Despite this statutory separation, the line between military and civil space has never been absolute.[133] And in the intervening decades since then, budget and political pressures have consistently blurred the statutory line between civil and military space activities.[134] Specifically regarding remote sensing, there is statutory authority requiring NASA and DoD "to enhance programs of remote sensing research and development."[135] Yet, the legal separation continues as a basic feature of United States domestic space law.[136]

[131] 42 U.S.C. §§ 2451-2484, Public Law 85-568, 72 Stat., 426. National Aeronautics and Space Act of 1958, Sec. 102(b).

[132] Exec. Order No. 10,783, (1958).

[133] NAS Act § 203 (a) (12), For example, the NASA Administrator may "with the approval of the President,[...]enter into cooperative agreements" which assign military personnel to perform NAS Act functions "to the same extent as that to which they might be lawfully assigned in the Department of Defense."

[134] This "blurring" takes many forms from previously military-dedicated Shuttle missions to joint funding. There have also been formal entities established like the Aeronautics and Astronautics Coordinating Board for DoD/NASA Cooperation and other groups.

[135] 15 U.S.C. § 1531

[136] NAS Act, § 102. b.

There isn't a specific delineation between "military" and "civil" in a manner directly analogous to U.S. law in many national laws of European nations. However, the purpose of the European Space Agency is legally limited to "exclusively peaceful purposes" by the multilateral convention that established it and has generally been interpreted to prohibit military activity.[137] EUMETSAT itself has no military mandate although the EUMETSAT Convention does not contain the same "peaceful purposes" language as the ESA Convention.

In European remote sensing activities, a military-civil connection is recognized through "[the] French SPOT programme [which] has led to the development of the HELIOS military observation satellite programme in which France has been joined by Italy and Spain."[138] European civil-military relationships in remote sensing are complicated by the fact that EUMETSAT members are national meteorological services (NMSs) and some of them are funded by, or have liaison relationships with, national defense ministries. An additional level of complexity arises from the fact that all European members of the North Atlantic Treaty Organization (NATO) are EUMETSAT members, although not all EUMETSAT members are in NATO. It is reasonable to expect that these relationships will come to bear in sensitive security decisions involving IJPS and JPS data.

It is also necessary to consider the IJPS and JPS within the future ESA-EUMETSAT relationship, the interplay of the limitations contained in the ESA Convention under various EUMETSAT-ESA agreements,[139] the on-going work of ESA's Long-Term Space Policy Committee,[140] and ESA's post-2000 Earth Observation Strategy. The post-2000 Earth Observation Strategy is premised on the growing importance of Earth observation data for "political" and "geopolitical purposes,"[141] the "increasing strategic importance of Earth Observation from space [and] a need for a coordinated approach between the European players...[including] EUMETSAT."[142] The international coordination necessary to implement the strategy coordinating the ESA program with national programs, harmonizing missions and data usage, and "strengthen[ing] cooperation with...EUMETSAT"[143] provides fertile ground for legal queries regarding appropriate military-civil relations. The importance of the ESA Convention in the future of an integrated European space agenda was acknowledged by the Advisory Panel on the European Community and Space when it recommended that, "the facilities and expertise of ESA [must] be made available as far as possible in

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[137] Convention For The Establishment Of A European Space Agency, Ref. CSE CS(73)19, rev. 7, 30 May 1975, Article II.

[138] Commission of the European Communities, The European Community Crossroads In Space" Report by an Advisory Panel On The European Community and Space, number CD-NA-10410-EN-C, at 27, (1991), [hereinafter, Crossroads].

[139] These agreements are listed only as possible examples. They were listed in other sources as possible agreements for review. They were unavailable to the author at time of writing, so their applicability has not been verified.

ESA/LEG/ 96(R) Agreement between ESA and EUMETSAT on the Meteosat operational programme. Signed on 12.1.1987 and entered into force with retroactive effect from 1.1.1987.

ESA/LEG/ 115(R) Supplementary Agreement between the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) and the European Space Agency concerning the Meteosat Operational programme. Signed on 1 February 1989. Entered into force same date (see also ESA/LEG/96).

ESA/LEG/ 166(R) Agreement between EUMETSAT and ESA concerning the Meteosat Second Generation System. Signed in Paris on 17 February 1994. Entered into force on the date of signature.

ESA/LEG/ 200 Agreement between EUMETSAT and ESA concerning the MSG, Second and Third Satellites. Signed on 16 October 1996 and entered into force on the date of signature.

[140] Bomefoy. R. and Arend, H., *ESA's Earth-Observation Strategy*, ESA Bulletin Number 85, February, (1996), [hereinafter, Strategy]. http://esapub.esrin.esa.it/bulletin/bullet85/arend85.htm. Press Release - *Ministers Shape The Future Of European Space Activities* European Space Agency, Number 17-99 - Paris, 12 May 1999.

[141] Strategy, *supra* note 140.

[142] Id.

[143] Id.

meeting European security needs" but "while respecting the spirit of the Convention[.]"[144]

Among the inevitable situations that will catalyze questions of what constitutes an appropriate legal military and civil relationship are the different domestic missions of United States agencies under convergence and the different national philosophies of the States that support international mergers. In the United States, DoD's mission requirements are an assured capability to obtain timely, accurate environmental satellite data on a global basis[145] while NASA's highest objective is to meet the requirements...of NASA's Global Climate Change Research Program.[146] This means a 15 year data set...which may require instrument capabilities *beyond and at times distinct* from those required by NOAA and DoD.[147] The difference in mission requirements goes to the very core of each agency's overall mission and how they elect to fulfill it. Agreeing on system parameters means they do believe the converged system can meet all of their missions but making case-by-case determinations of system utilization under specific fact patterns remains to be seen.

At the European level, a growing desire for "a reduced dependence on the US space defence systems"[148] initially appears to be a force contrary to the decision to join the IJPS and JPS. Reconciling these contradictory political impulses will require sharpening the legal parameters of national and international defense laws and policies.

The United States converged system invites a fundamental consideration of the United States statutory separation of military and civil space activities.[149] The IJPS and the JPS invite similar analysis for the ESA Convention and related European law. Earth orbit military space operations are legal, limited by prohibitions against nuclear weapons and weapons of mass destruction[150] and Earth observations from space by the military have long been recognized as a "peaceful use" of space.[151] However, the growing importance of environmental data for "political" and "geopolitical purposes"[152] within the dynamic post-Cold War era means that the legal use of a merged military and civil space-based system can change to a questionable one with the introduction of any number of factors. And the change can have serious ramifications for a wide variety of remote sensing services that will have come to rely on the operational data from converged and merged systems.

Increased restrictions from militarily-required regulations

"Shutter control"

The *Outer Space Treaty* holds signatories internationally responsible for non-governmental activities in space.[153] This is the international legal authority for nongovernmental entities, including private remote sensing entities, to operate in space. It

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[144] Crossroads, *supra* note 138 at 27.

[145] Convergence Hearings, *supra* note 102, at 16.

[146] Convergence Hearings, *supra* note 102, at 21.

[147] Convergence Hearings, *supra* note 102, at 24 (original emphasis).

[148] Crossroads, *supra* note 138, at 27.

[149] Even the question of whether or not NPOESS ought to be considered a military system is an evolving one. Clearly it is intended to serve defense purposes and is, in part, being implemented by defense personnel. However, the fact that it will be operated on a day-to-day basis by a civil agency is critical and could, in the long term provide a much more powerful influence on the overall system than the occasional military authority invoked in times of a crisis. The counter possibility is that since it is the military that has acquisition authority for the converged system, a powerful influence can be exerted through the sheer force of the authority to spend allocated funds.

[150] Outer Space Treaty, *supra* note 56, Article IV.

[151] Christol - Modern, *supra* note 21, at 723.

[152] Strategy, *supra* note 140.

[153] Outer Space Treaty, *supra* note 56, Article VI.

also makes the signatory-state a supervising authority over private activities[154] and serves as the interface between domestic and international law, from which the domestic requirement to license private remote sensing systems stems.

In the United States, domestic authority for private systems issues from Congressional legislation[155] and Executive policy.[156] Specific licensing regulations to be implemented pursuant to this authority are being formulated.[157] Determining licensing regulations requires balancing the interests of private system operators with United States international obligations and national security and has generated a special issue related to openness and one of the most widely discussed concerns of remote sensing law: "shutter control." That is, when can the government require a commercial system to cease or modify operations for reasons of national security or international obligations? In the United States, the earliest licenses determined that it was "[i]n the event of a national security crisis, as defined by the Secretary of Defense".[158] Later licenses changed[159] and the standards are continuing to evolve.[160]

License requirements are changing, in part, from applying the licensing authorization to different kinds of technologies. As a result, new licensing procedures are emerging and new attempts at defining licensing restrictions are being made. The approach so far has been to issue licenses allowing a system to gather data anywhere, imposing temporal and geographic limits only when necessary. National security institutions are less comfortable with this approach for commercial systems using newer technologies, like hyper-spectral and radar instruments, and have begun to apply new ones. New approaches are attempting to control individual products more than operations.

One approach being used is a process that requires a licensee, under certain circumstances, to consult with, or obtain, additional government approval after the license is granted. This is a two-stage, or tiered licensing model.[161] The first tier approval licenses a system to operate up to a specific spectral and/or spatial capability.[162] To operate beyond the specified

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[154] Outer Space Treaty, *supra* note 56, Art. VI.

[155] 15 U.S.C. §§ 5621 through 5625 and the Commercial Space Act, P.L. 105-303, Oct 28, 1998.

[156] Presidential Decision Directive PDD/NSC 23 - Foreign Access To Remote Sensing Space Capabilities, 10 March 1994, [hereinafter, PDD 23].

[157] 62 Federal Register 59317 (November 3, 1997).

[158] License issued to WorldView Imaging Corporation, by Department of Commerce, January 4, 1993.

http://www.hq.nasa.gov/office/pao/History/sputnik/fl37.html, [hereinafter, Worldview].

[159] Shortly after, conditions expanded to include "when national security or international obligations and/or foreign policies may be compromised, as defined by the Secretary of Defense or the Secretary of State, respectively," and if necessary, "after consultation with the appropriate agency (ies)," and "to the extent necessitated by the given situation." License issued to Lockheed Missiles and Space Company, Inc., by Department of Commerce, Apr. 22, 1994.

http://www.hq.nasa.gov/office/pao/History/sputnik/fl39.html

[160] Licenses are also becoming complex enough to contain sensitive proprietary information that must be provided by the applicant to facilitate the licensing process. As a result, licenses must now be requested through the Freedom of Information Act so that sensitive material can be redacted before release.

[161] RDL Space Corporation license for its 1-meter resolution synthetic aperture radar (SAR) satellite, RADAR 1, Issued June 16, 1998. The Space Technology Development Corporation license for its wide-area, hyperspectral Naval EarthMap Observer (Nemo) satellite in cooperation with the U.S. Navy, issued March 26, 1999.

[162] Space News, *Orbimage Gets Right to Radarsat 2 Data; RSI's Future Unclear*, Jan. 25, 1999, at 1, 20, col. 1. RDL Space Corporation is "barred" from selling any imagery with

capability, the licensee must seek additional approval.[163] Second tier approval can also include requiring government consultation before complying with a request from a sensed state.[164]

This raises a number of legal issues. The first is, upon what statutory basis are second tier restrictions based? If they are based on the applicable licensing authorities,[165] then a complete license can be granted initially and the multi-part process is an unnecessary, and perhaps an unauthorized, administrative procedure. If the second tier authority is an attempt to address conditions not contained in the applicable authorities, then the statutory basis for the second-tier license is questionable.

The second question raised by a tiered approach is analogous to the first: which agency has the licensing authority for the second set of conditions? The *Policy Act* the statutory basis for licensing private systems authorizes only the "Secretary of Commerce."[166] Other "appropriate" agencies have "consultation" but not licensing authority.[167] If by requiring the licensee to return to the government for second tier authority, the licensee is also required to obtain new approval from an agency other than the Commerce Department, then it may be that the second tier process is a procedure outside of the private system licensing authority.

A third question raised by the two-tier process regards nondiscriminatory access. Nondiscriminatory access applies to private systems by specific Congressional intent[168] and operational activities like onboard processing can not be used to prevent access.[169] Absent a national crisis, license requirements that modify operations and which prevent nondiscriminatory access to commercial system data by a sensed state violate international and domestic law.[170] When national security is jeopardized, restrictions not otherwise allowable, are, of course, permissible. The question then becomes, what standard is used to impose the restrictions? The standard has shifted from a definable "crisis" to a nebulous possibility that any number of policies might be compromised. In the first license the standard was "[i]n the event of a national security crisis, as defined by the Secretary of Defense,"[171] and has expanded to the proposed standard which is, "[d]uring periods when national security or international obligations and/or foreign policies may be compromised, as defined by the Secretary of Defense or

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better than 5-meter resolution to customers other than the U.S. government." To sell to non-US government customers will "require an amendment to the license" Restriction was placed by "Pentagon officials." [hereinafter, Space News 1.]

[163] *Id.*

[164] Space Technology Development Corporation license for its wide-area, hyperspectral Naval EarthMap Observer (Nemo) satellite in cooperation with the U.S. Navy, issued March 26, 1999, [herein after STDC license]. *Id.*

[165] 15 U.S.C. §§ 5621 through 5625; PDD 23, *supra* note 156.

[166] 15 U.S.C. § 5621.

[167] 15 U.S.C. § 5621.

[168] Gabrynowicz, *supra* note 89 at 100.

"It thus seems clear that the United States should continue its policy of nondiscriminatory data access when space remote-sensing activities are commercialized. The Committee has drafted the legislation to reemphasize this policy forcibly, and to give it for the first time a statutory basis. Further, [it] has been drafted to provide clear guidance to the Secretary of Commerce and any system operator with respect to the commercial implications of a policy of nondiscriminatory access." H.R. Rep. No. 98-647, 98th Cong., 2d Sess., 10-13 (1984).

"[T]he Committee has refrained from making any changes in the nondiscriminatory access provision as it applies to private systems. Specifically, the Committee is reluctant to take any action which: 1) could interfere with U.S. Treaty obligations; 2) might revive debate in the United Nations about the legitimacy of remote-sensing without prior consent by the sensed nation; and 3) sets a precedent which might lead other nations to impose increased restrictions on access to their data from their government-operated remote-sensing systems." H.R. Rep. 102-539, 102d Cong., 2d Sess., 53, (1992).

[169] ABA, *supra* note 27, at 145-147.

[170] Gabrynowicz, *supra* note 89.

[171] Worldview, *supra* note 158.

the Secretary of State."[172] Although the proposed standard has yet to be formally adopted, a current radar system licensee is already restricted from providing data to a sensed state.[173] A current license also requires a hyper-spectral system operator to first consult with NOAA, who in turn consults with DoD and the State Department, when a sensed state requests data.[174] Under the broad proposed standard, the licensee could be required to deny the requested data on the mere possibility that a "policy...may be compromised."

A special question of openness is rased if a license applicant is a news-gathering agency, or will serve a legitimate news-gathering agency for legitimate news-gathering purposes. This raises specific First Amendment doctrines in the licensing process regarding "shutter control." The standard in the proposed rules is if national interests "may be compromised."[175] The Government could require a licensee to stop imaging and/or distributing data of a particular area. This standard falls far short of the Constitutional First Amendment standard that a prior restraint can only be imposed where there is a "clear and present" danger.[176] A license restriction based on what "may" occur is an impermissible prior restraint. Additionally, the proposed rules provide that the decision to impose shutter control will be made "at the Secretarial level." In the case of restricting a Constitutionally guaranteed First Amendment freedom, like news-gathering, the proper procedure is to seek a determination of legality in a court. Placing the decision "at the Secretarial level" as to whether or not a newsgathering activity may be impeded is to substitute a political decision for a legal decision.

Finally, it should be expected that openness, in this case in the form of commerce, will be compromised to the degree that conflict exists or is believed to exist. Conversely, it can be expected that in times of less conflict, the more openness will be fostered. If conflict prevails then more militarily-required regulations will continue because the new restrictions are attempting to control advanced capabilities which provide an advantage in times of crisis. Where the existence of conflict is debatable, it should be noted that the current regulations provide a bias toward openness. They require that where "a tension between the policy of promoting the commercial use of remote-sensing systems and the policies of promoting national security interests" the Secretary of Commerce has the "discretion [to] undertake reasonable efforts to satisfactorily resolve the matter in favor of commercialization."[177]

Unsurprisingly, some of these legal issues are tied to political ones. A primary political issue is regarding the role that commercial imagery will play in the future of national security. This issue is being addressed in terms of the Future Imagery Architecture, the National Reconnaissance Office (NRO)/DoD initiative to define their next generation of satellites. There is strong Congressional support for a large measure of private participation in future national security activities, particularly in the form of using private systems for military operations. It is unclear whether relevant national security institutions agree. The use of private systems is discussed further in the next section.

Joint Vision 2010, the proposed doctrine of "Space Control," and employing private sector remote sensing systems for military uses

With the end of the Cold War and the turn of the millennium, institutions around the world are looking ahead for new purpose and direction. This includes the military whose responsibility and effectiveness depends

[172] Proposed Licensing Of Private Remote-Sensing Space Systems, 15 C.F.R. § 960.10, at 59328, (1997), [hereinafter, Proposed Rule].

[173] Space News 1, *supra* note 162.

[174] STDC license, *supra* note 164.

[175] Proposed Rule, *supra* note 172 at 59318.

[176] Schenck v. United States, 249 U.S. 47, at 52 (1919).

[177] Licensing Of Private Remote-Sensing Space Systems, 15 C.F.R. § 960.1, at 267, [Revised as of January 1, 1998].

in large part on anticipating the future. In the United States, this has taken the form of Joint Vision 2010 (JV2010), a Defense Department vision statement that integrates the future missions of all branches of the Armed Forces.[178] It is a "conceptual template" for channeling "the vitality" of personnel and "leverag[ing] technological opportunities to achieve new levels of effectiveness in joint warfighting."[179] Each Armed Forces branch has, in turn, analyzed its core competencies in terms of JV2010.

The United States Air Force envisions part of its future mission to include "Air and Space Superiority" which is "establishing control over the entire vertical dimension"[180] and "information superiority, which is "the ability to collect, control, exploit and defend information while denying the adversary the same".[181] United States Space Command deems "space power [as] vital" to achieving Joint Vision 2010"[182] and has developed a Long Range Plan[183] to support it.[184] The concept of "Space Control" has emerged from this plan which is "the ability to ensure uninterrupted access to space for US forces and our allies, freedom of operations within the space medium and an ability to deny others the use of space, if required."[185]

JV2010, Space Control, and related concepts raise important general space law questions. For example, any doctrine based on the "control" or "denial" of space raises Outer Space Treaty issues under the freedom of access and right to use provisions.[186] Because the Outer Space Treaty incorporates the U.N. Charter and all of international law by specific reference[187] there are also complicated issues of the right to self-defense and other related issues to consider.

However, unlike a number of elements in these emerging doctrines which are legally questionable, remote sensing by all sectors is a peaceful, legal use of space.[188] And for remote sensing law in particular, these doctrines are important because remote sensing is widely believed to be the next major commercial space activity, expected to be used for both civilian and military purposes. In the event of hostilities, the presence of commercial remote sensing satellites in low Earth orbit and/or the use of them by national security organizations makes them likely to be among the first targets attacked by adversarial forces. This possibility raises key legal questions including whether or not attacking a civilian space asset constitutes an act of war. Is striking a licensed commercial satellite analogous to sinking a merchant ship sailing under a national flag? Is striking a licensed commercial satellite used for military purposes also in this category? If commercial systems are used for national security purposes, remote sensing legal questions also include the status of nondiscriminatory access. In the United States under domestic law, private systems are required by their licenses to provide data to sensed states and, without statutory revision, are unlikely to be

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[178] Department of Defense, Defense Technical Information Center, Joint Vision 2010, Downloadable and available at http://www.dtic.mil/doctrine/jv2010/jvpub.htm

[179] *Id* at 5.

[180] U.S. Air Force On-line Library, 1997 Air Force Issues Book, The Air Force and Joint Vision 2010, http://www.af.mil/lib/afissues/1997/issues24.html

[181] U.S. Air Force On-line Library, 1997 Air Force Issues Book, The Air Force and Joint Vision 2010, http://www.af.mil/lib/afissues/1997/issues28.html.

[182] U.S. Space Command, Director of Plans, Peterson AFB, CO., Long Range Plan, Chapter 2, at 1. Downloadable and available at http://www.spacecom.af.mil/usspace/LRP/toc.htm.

[183] U.S. Space Command, Director of Plans, Peterson AFB, CO., http://www.spacecom.af.mil/usspace/LRP/cover.htm

[184] U.S. Space Command, Director of Plans, Peterson AFB, CO., Long Range Plan, Introduction, at 1. Downloadable and available at http://www.spacecom.af.mil/usspace/LRPTOC.htm

[185] U.S. Space Command, Director of Plans, Peterson AFB, CO., Long Range Plan, Chapter 2, at 5. Downloadable and available at http://www.spacecom.af.mil/usspace/LRP/toc.htm.

[186] Outer Space Treaty, *supra* note 56, Arts. I and II.

[187] Outer Space Treaty, *supra* note 56, Preamble, Art. III.

[188] Christol Modern, *supra* note 21, at 723, 731-2.

exempted.[189] Depending on the level of secrecy desired, this could limit the effectiveness of commercial satellites for reconnaissance purposes.

While JV2010 has been accepted at the Department of Defense level, Space Control has yet to be-it is far from clear whether Space Control is a workable defense doctrine. Major factors that call its viability into question are "key policies, agreements, and treaties".[190] Remote sensing raises issues regarding antisatellite activities. Officially accepting responsibility for protecting nonmilitary satellites means being confident that, in the event one is attacked, an in-kind response is possible which, in turn, involves the intricate, decades-long political and legal problems surrounding the use of antisatellite measures.[191] Other factors that call the viability of Space Control into question are economic. Officially accepting responsibility for protecting nonmilitary assets also means establishing expensive operational assets which would place fiscal constraints on other defense priorities.

The rationale for Space Control is the increasing dependency of the United States and its allies on space assets for commerce and national security and the expectation that they will continue to become more interrelated in the future.[192] "Information dominance" is the operational concept that will, in this view, ensure security in the information age space environment.[193] The turbulent results of the temporary failure of the *Galaxy IV* commercial communications satellite, in May, 1998, have been referred to as a minor example of the kind of chaos that can occur with the loss of a space asset. This is the kind of crisis which Space Control concepts are intended to prevent and which is advanced as the justification for the kind of strategy it requires. However, space has been an exclusively weapons-free, peaceful, legal, political and operational environment for decades. This is, in very large part, due to the rule of law and diplomatic measures which were implemented as practical avenues to preventing hostile space activities. Risking this stable environment with provocative doctrines ought not be undertaken lightly. And with "no peer competitor on the horizon for American military power,"[194] the post-Cold War era presents an opportunity to reinforce law and diplomacy at a time of reduced space threats.

When the use of private systems are used either as a justification for, or as an implement of, Space Control then issues regarding openness and the expansion of global remote sensing services arise. Where public-private separation is a value using the private sector to provide available services rather than using government capabilities, is an expansion of space-based services. The national security community is already looking to private services to provide and enhance their capabilities.[195] However, considering that the commercial viability of remote sensing has also been linked to defense needs by the economic reality that commercial systems are unlikely to survive without the government as a reliable, long-term customer,[196] another interpretation is possible. This situation may be creating a self-reinforcing post-Cold War military-industry relationship that is giving rise to a nascent military-informational complex analogous to the military-industrial complex of the Cold War. If this is the case, then openness, as an operating principle, may

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[189] Gabrynowicz, supra note 89.

[190] U.S. Space Command, Director of Plans, Peterson AFB, CO., Long Range Plan, Chapter 11. Downloadable and available at http://www.spacecom.af.mil/usspace/LRP/ch11.htm

[191] Christol, Carl Q., *The Role of Law in United States - Soviet Arms Control and Disarmament Relations*, 21 The International Lawyer at 519 - 560, (1987).

[192] U.S. Space Command, Director of Plans, Peterson AFB, CO., Long Range Plan, Chapter 5.Downloadable and available at http://www.spacecom.af.mil/usspace/LRP/toc.htm.

[193] U.S. Space Command, Director of Plans, Peterson AFB, CO., Long Range Plan, Chapter 5, at 1. Downloadable and available at http://www.spacecom.af.mil/usspace/LRP/ch05a.htm

[194] International Institute for Strategic Studies, The Military Balance 1997-1998, (1998).

[195] Space News, *U.S. To Buy Private Imagery for Intelligence*, April 12, 1999, at 1, col. 1.

[196] Defense Information and Electronics Report, *Experts: DoD Needs To Back Commercial Imagery Efforts to Reap Benefits*, May 7, 1999 at 1.

be at risk and if the commercial satellites evolve into an extension of military functions more than as a service to the general market, then the expansion of ground-based data and information services may be restricted.

Yet, in attempting to define new missions in the post-Cold War era, even previously highly-classified national security institutions are moving toward levels of openness that were once inconceivable.[197] It may also be that to justify their missions in the information age, maintaining a level of accessibility and visibility that was once unnecessary will become a practical requirement and will lead to an unprecedented era of openness. Time will tell. Finally, while this particular discussion is about emerging United States issues, it must be noted that other countries are involved in Space Control-like policies[198] and similar matters,[199] making concepts like these of a more global interest.

Establishing and maintaining long-term, coherent regional and global remote sensing data archives

Like the Cold War human spaceflight programs, the early political rationale for remote sensing was to demonstrate technological superiority of the participating nations. This meant that the primary focus was on the space segment where satellites displayed technical sophistication overhead. Satellites, like spacecraft that carried humans, became symbols of national preeminence and remote sensing nations offered data as an incentive for aligning with them.[200] And, to a large degree, it worked. This space-segment focus meant, however, that attention to the satellites' product, data, was virtually nonexistent. As a result, a long-term, coherent regional and global approach to the archiving of remotely sensed data has yet to be established. Data from numerous satellites has languished in uncoordinated, fractured repositories in nations around the world.

While enormous progress has been made in designing, developing and operating remote sensing satellites, an analogous effort for the ground segment has only recently begun. Some nations did, relatively early, recognize that their strength would be in the ground segment and placed their national efforts on developing it.[201] However, it was not until this decade the economic value of data has been recognized in both the public and private sectors and has become the primary driver for data-oriented organizational efforts. The emerging approaches are occurring quickly with a strong emphasis on intellectual property rights and data protection. Where the necessary focus is on relatively short-term interests like cost-sharing of publicly-funded satellites or generating revenue from private satellites, this is to be expected.

However, data, unlike the wealth-generating physical products of the industrial age are not depleted when sold or distributed and can be combined with other data to make entirely new, also nondepletable, products. In many cases, data values shift from economic to scientific over time.[202] Therefore legal

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[197] Consider, for example, the educational outreach role of the previously highly-classified National Reconnaissance Office http://www.nro.odci.gov/index.html and the on-line commercial information of the National Imagery Agency, formerly the Defense Mapping Agency. http://164.214.2.59/nimahome.html

[198] Ha'aretz, *supra* note 17.

[199] Reuters, *U.S.-Israel Satellite-Imaging Firm Plans Bond Issue*, Tel Aviv, Israel, February 28, 1999. Regarding a proposed commercial Israeli system, it was reported that, "governments [are expected] to be attracted to[it] because it was less expensive than developing their own military surveillance program, which could cost five to 10 times as much."

[200] For example, since 1975, nations receiving *Landsat* data were required to participate in the Landsat Ground Station Operations Working Group (LGSWOG). Although still in existence, it has yet to function as a true global network.

[201] 1984 House of Lords Select Committee Report on Remote Sensing and Digital Mapping.

[202] This fact is demonstrated by the contract terms between NASA and Orbimage for the Orb-View2 satellite, also known as SeaStar with the Sea-viewing Wide Field-of-view Sensor (SeaWiFS). In this contract, the Government procures space-based environmental remote sensing data for research purposes from a commercial operator. Researchers can receive data freely but only after the data is at least two weeks old, when the initial commercial value of the data has declined.

structures for long-term preservation meaning a century or more ought to be considered on regional and global terms. These inquiries ought to go beyond issues of space segment operations and require analysis of international law and the laws of many nations in fields beyond international space law: intellectual property, archival preservation and management, trade law, and more. It also requires consideration of these same subjects as they relate specifically to remote sensing.[203]

These are subjects that go well beyond the scope of this paper.[204] They are being raised more as an invitation to mount a long-term, concerted effort to consider this most complex -and important- remote sensing activity. The reason for this invitation was most eloquently described by economist and futurist, Herman Kahn:

> "We keep records for the same reason that we build schools, or rear our children, or support our aged parents. It is one of those things that we do without asking ourselves whether or not it represents a profitable investment but simply because it is our innate assumption that civilized men can do nothing else. We know that because we are not barbarians we must keep records. In other words, the keeping of records in a civilized society is primarily an act of faith. We keep records because of our deep emotional and intellectual commitment to the values of the civilization of which we are a part, and to what our ancestors did and to what we hope our children will do."

Conclusion

Imagine a meeting of space lawyers in the year 2050. Possible agenda items may include identifying appropriate conditions for denying severe weather data from a multinational remote sensing system dedicated to both military and civil missions; interpreting provisions of the *2005 Treaty Relating to Remote Sensing of the Earth from Space;* or access rights to seventy-five year old data. Attendees will, as part of their analyses, look to precedent for guidance. From their future position, these space lawyers may be able to look back and analyze how budgets and technology changed early space law principles. From their vantage point these future lawyers may also see that their 1990's predecessors worked in a dynamic post-Cold War legal environment that expanded some global remote sensing services while limiting others. The legal work done in the 1990s required releasing obsolete precedents, establishing new ones, and identifying enduring precedents to be preserved for future generations.

Let that work begin.

Acronym Glossary

ASCAT	Advanced Scatterometer
AVHRR	Advanced Very High Resolution Radiometer
AMSU-A	Advanced Microwave Sounding Unit
ARGOS	Data Collection and Location System
CEOS	Committee on Earth Observing Satellites
COPUOS	Committee on the Peaceful Uses of Outer Space
DOD	Department of Defense
DMSP	Defense Meteorological Satellite Program
ESA	European Space Agency
EUMETSAT	European Organisation for Meteorological Satellites
GPS - S	Global Positioning System - Sounder
HIRS	High-Resolution Infrared Sounder
IASI	Infrared Atmospheric Sounding Interferometer
IJPS	Initial Joint Polar System
JPS	Joint Polar System
JV2010	Joint Vision 2010
METOP	European Meteorological Operational System

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[203] *Principles, supra*, note 5, Principles VI, VII, and VII, and 15 U.S.C. 9 5652, for example.

[204] Gabrynowicz, J.I., *Earth Observations: the View From The Ground*, 13 Space Policy, 229-244. This paper presents a survey of various ground segments and suggests the complexity of ground segment issues.

MHS	Microwave Humidity Sounder
NATO	North Atlantic Treaty Organization
NASDA	National Space Development Agency of Japan
NASA	National Aeronautics and Space Administration
NMS	National Meteorological Service
NOAA	National Oceanographic and Atmospheric Administration
NPOESS	National Polar Orbiting Environmental Satellite System
NRO	National Reconnaissance Office
OMI	Ozone Monitoring Instrument
POES	Polar-orbiting Operational Environmental Satellite
SAR	Synthetic Aperture Radar
SARSAT	Satellite-Aided Search and Rescue
SBUV	Solar Backscatter Ultra Violet Monitor
SEM	Space Environment Monitor
USSPACECOM	United States Space Command
WMO	World Meteorological Organization

Commentary Paper

Carlos H. Rebellon Betancourt

In view of this important activity it is urgent and necessary to clarify the legal situation with respect to remote sensing activities with an international treaty in addition to existing space law and principles of international law. Thereby the present fragile reality of the Remote Sensing Principles as contained in United Nations Resolution 41/65 could be changed. These Principles are considered by many lawyers as binding customary law. For others this is not the case because United Nations Resolutions are not considered to be obligatory and binding - they are an expression of general principles only. It is important that global expanding remote sensing services are firmly linked with space law as well as general international law and not only with the rules of the commercial market. Global expanding remote sensing services must rule without any kind of restriction in the sense that they must be open to the benefit of all peoples and countries of the Earth irrespective of their degree of economic, social, cultural, scientific and technological development. The information obtained should not be used to the detriment of any country or peoples regardless whether the public (including the military) sector or the civil sector is concerned. The United Nations and their specialized agencies, Intergovernmental Organizations, Non-Governmental Organizations, countries and peoples must be encouraged in all aspects to undertake remote sensing activities not only for scientific research, educational programs, and meteorological observation but also for commercial activities. International cooperation is fundamental to global expanding remote sensing services, and it is important and necessary that at any time more States can participate in this activity not only as an owner of satellites, but also as an operator of remote sensing services, etc. The 21st century will be the century of expanding global remote sensing services and lawyers of the world must be familiar with space law in order to be able to formulate domestic regulations in their countries with respect to space activities which have commercial application. To the next UNISPACE Conference global remote sensing services will be a reality in the same sense as space telecommunication services are a reality to the UNISPACE III Conference today.

Commentary Paper

Alexander V.Yakovenko

The UN Principles on Remote Sensing of the Earth by Satellites play an important role in international space cooperation today. In Russia, for example, no specific legislation concerning Remote Sensing exists. Therefore, the Principles are directly applicable to the regulation of this important matter.

Nevertheless, notwithstanding the fact that a great many countries are acting in approximately the same manner, the Principles are not to be regarded as true

treaty-type obligations of international law. Again, the UN General Assembly Resolution containing the Principles can be utilized as a sound basis for the further development of international space law.

The key issue today on the path towards the further development of the Principles and their modification into a legally-binding document remains the matter of the availability of information.

The Principles distinguish three types of information:

- "primary data", which are acquired by remote sensors borne by a space object and transmitted or delivered to the ground by telemetry in the form of electromagnetic signals, photographic film, magnetic tape or any other means;
- "processed data", which means the products resulting from the processing of primary data, needed to make these data usable;
- "analyzed information", which results from the interpretation of processed data, inputs of data and knowledge from other sources.

The commercialization of remote sensing systems will lead to the situation when processed data and analyzed information will have their own commercial value, stemming from the very simple fact that certain funds have been invested in those systems, while processed data and analyzed information can and have to be sold, at commercially viable prices, to compensate for the costs.

This fact, in turn, creates the very complicated situation at the hypothetical negotiations on the issue of turning the Principles into a legally-binding document on Remote Sensing, because, in this case, the fragile compromise achieved while drafting the current set of Principles may be violated. The principle of free access to the sensing of a state's territory was accepted in return for access to information. This principle problem is also indirectly dealt with in Principle V, which states that countries carrying out remote sensing activities are to promote international cooperation in these activities. To this end, they shall make available to other States the opportunities for participation therein. Such participation is to be based in each case on equitable and mutually acceptable terms. The private sector may well conduct its activities on other grounds in the absence of national legislation, reflecting the contents of the UN-adopted Principles.

Principle VI sets forth the desirability of concluding regional agreements and arrangements, when possible. Principle VII underlines the necessity of making available technical assistance.

Thus, if it comes to the elaboration of a new legally-binding document, the issue arises of the legal regime of the three types of data mentioned previously, which will be in the hands of the private sector.

There are serious doubts that the current political solutions may be reiterated in a legal form. New ones will have to be found in the course of negotiations. It can be supposed that such a compromise could more easily be found within the framework of a comprehensive new treaty on Outer Space, which would be based on the principle of "package solutions". In any case, however, we will most likely have to set *differentiated legal regimes for the dissemination of primary data, processed data and analyzed information.*

Commentary Paper

M. G. Chandrasekhar

Space programs worldwide are poised for a transformation into a mature scientific and industrial sector, with multiple players and changing roles. Earth observation, which began as a small scale activity aimed at mapping the earth's surface features, has become a commercial activity, comprising of satellites and an entire chain of associated activities and players. Information is the currency of power and the advances in space technology has made it possible to have accurate and strategically important information derived from satellite data, in a cost-effective and timely manner. *The increased thrust on commercialization and industrial investment is leading to a scenario*

where the developments are more and more determined by market forces. The improved awareness about potential and prospects as well as reduction in governmental controls is paving the way for multiple players including private agencies operating satellite systems for earth observation The dualism between strategic co-operation and competition is becoming the order of the day and the evolution of a new set of relationships among different players - Government, Industry, User agencies and International organizations - have already begun, leading *to a vibrant commercial remote sensing market.*

It is in this context that the legal aspects of expanding global remote sensing services need to be examined. Various aspects discussed in the paper on Principles clearly *demonstrate the need to transmit the terms of the Principles into a treaty.* But, while adapting to the current environment, it is essential that various associated aspects need to be carefully discussed and concluded by the international community, even though these Principles have sustained the pressures and provided the framework at a critical and evolutionary stage.

On the issue of openness and data access, the question is one of *determining the limits and boundaries of information access and control.* While the complex dynamics of politics, economies and technology interacting with the Law may affect the progress in this regard, the decisive factors are going to be the application potential and their ramifications in a given political environment. As the technological advances are bound to enable extraction of critical and strategically important information from satellite data, the dual power of information, either destructive or constructive, is going to influence the decision making, more or less analogous to the current state of dual use technologies, but much easier to decide on access or 'shutter control' in view of the transparency in application potential and prevailing political environment.

In a fast changing technological scenario, neither the heritage nor the origin of an innovation should matter much. In other words, the military heritage of earth observation technology has only helped in making certain technological 'leapfrogs' possible in the beginning and 'convergence' later on, in some cases. It may not be the lineage, but the resultant technological advancement and hence the information on content that brought certain restrictions on data access. As the emerging post-cold war contribution of 'military-informational complex' analogous to the 'military-industry complex' of the cold war is going to put openness principle at risk, the efforts of the international community have to be focused on arriving at a framework to ensure the availability of data for peaceful applications, in spite of such doctrines as that of 'space control'.

Establishing and maintaining long-term, *coherent regional and global remote sensing data archives arises as one of the good suggestions* to meet the peaceful application needs, particularly of the developing countries. The technological advances in communication and information as well as in other associated sectors makes it possible to have easy access and dissemination of data from these archives.

Summary Report

Three fundamental Considerations by the *Primary Author Prof Joanne Gabrynowicz* were examined, namely:

1) U.N. Principles have acquired the force of law. COPUOS ought to consider transmitting its terms into a treaty.

2) Increasing access restrictions (shutter control) are weakening the openness principle upon which much of remote sensing law is based.

3) Establishing and maintaining long-term, coherent regional remote sensing data archives.

The Commentators *Dr. Carlos H. Rebellon Betancourt, Mr. Alexander V. Yakovenko, and Dr. M.G. Chandresakhar* underlined the necessity to clarify the legal situation by transmitting the Principles of

1986 into a treaty. One opinion was that this could be done possibly within the framework of a "package" solution". The need to investigate the possibility of setting up data archives was stressed.

There followed a lively discussion in which took part *Luc Dufresne*, CNES (France); *Prof. Gabriella Catalano Sgrosso*, Italy; Ms. *Masami Onoda*, Japan/UN Office of Outer Space Affairs; *Dr. Bhupendra Jasani*, United Kingdom; Prof. *Ram Jakhu*, McGill University Montreal, Canada; *Prof. S. Bhatt*, India; *Prof. Mani*, India; *Dr. Patrik Salin*, Canada; *Mr. Icometela*, Rep. of South Africa and *John Gantt*, USA.

The proposals made by the primary author and further elaborated by the commentators were discussed. It was proposed that the transformation of the UN Principles on Remote Sensing into a Treaty should take into account the following:

Since the Principles were adopted almost 15 years ago they have to be adapted to the needs to the 21st century. They should take into account the growing globalisation and privatisation of remote sensing services. In this connection also national security interests have to be taken into account as well as the legitimate use of such services for monitoring arms control measures.

THE ROLES OF INTERNATIONAL ORGANIZATIONS IN PRIVATIZATION AND COMMERCIAL USE OF OUTER SPACE

SESSION 5

Chair: Mr. G. Lafferranderie (European Space Agency)
Coordinator/Rapporteur: Dr. B. Schmidt-Tedd (Germany)

SESSION FIVE

The Roles of International Organizations in Privatization and Commercial Use of Outer Space

Discussion Paper

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The views in this discussion paper are those of the author and do not reflect necessarily those of EUTELSAT.

Preliminary note

The purpose of this discussion paper is to comment on the impact of the intergovernmental satellite organizations in the development of the commercial use of Outer Space and to provide information on the reasons, processes and methods used in restructuring these organizations, together with some related remarks about space law.

The International Satellite Organizations have considerably helped foster the development of the commercial use of Outer Space

In the early nineteen sixties, any utilization and, above all, any commercial use of Outer Space was not conceivable with the involvement of entities other than intergovernmental agencies. This was due to the strategic importance of space activities and the huge amounts of funds involved in embarking upon these activities. In addition, telecommunications were provided by Administrations in a monopolistic situation within their own respective territories and the broadcasters were national, public bodies, subsidized by their individual governments. All telecommunications, radio and television services were considered as public services. Finally, the satellite telecommunications industry was in its infancy.

In 1964, eleven nations decided to establish a global satellite telecommunications system via a kind of international cooperative to provide telecommunications services on a universal non-discriminatory basis. This resulted in the creation of the International Telecommunications Satellite Organization (INTELSAT).

The reason for establishing INTELSAT was defined as the design, development, construction, establishment, maintenance and operation of the space segment of a global commercial communications system (see Article II a) of the INTELSAT Agreement). Inmarsat began in 1979 as the International Maritime Satellite Organization established under the auspices of the Intergovernmental Maritime Consultative Organization (now the International Maritime Organization, IMO) to provide the space segment for improving maritime communications especially distress and safety services. Inmarsat's competence has subsequently been expanded to include aeronautical and land mobile communications. The European Telecommunications Satellite Organization (EUTELSAT) was established on a permanent basis on 1 September 1985 to implement a digital network in

Europe for the provision of telecommunications services through its space segment. It was not conceived as a global organization like INTELSAT and Inmarsat but as a regional organization. The European Space Agency (ESA) played an active role in the creation of EUTELSAT.

INTERSPUTNIK was founded in 1971 to establish and develop an international satellite communication system. At its inception, it was composed of members of the Eastern block but its membership has now been expanded to countries like Yemen, Laos and Nicaragua.

Finally, the Arab Satellite Communications Organization, which is composed of Arab countries from the Middle East and the area around the Mediterranean sea, was created in 1976.

As an additional comment on existing intergovernmental satellite organizations, this paper excludes both the European Space Agency, as it is not involved in operational services in space, and the European Meteorological Satellites Organization (EUMETSAT), as it does not offer services in the field of telecommunications, radio or television but, rather in the field of meteorological data where the economic, competitive and regulatory environment is totally different. Like ESA and EUMETSAT, the only current members of INTERSPUTNIK and ARABSAT are States that are responsible for taking all decisions (not only of a political, strategic or institutional nature but also operational and financial).

As far as INTELSAT, Inmarsat and EUTELSAT are concerned, each was built on the same model; the same legal form of intergovernmental organization created on the basis of an international treaty (Convention for Inmarsat and EUTELSAT, Agreement for INTELSAT) signed and ratified by member states (the Parties) complemented by an Operating Agreement signed by the Telecommunications Operators, one per country, designated by their respective Party to be the "Signatories". These constituent instruments are closely inter-related. In addition, as for any intergovernmental organization, there is a Headquarters Agreement and a Protocol on Privileges, Exemptions and Immunities, the same internal structure with:

an Assembly of Parties in charge of deciding primarily on the general direction of the organization, its relations with States and other international organizations, on matters affecting policy or the long-term future of the organization and applications for accession by new members,

a Board where Signatories, as investors, take all operational, financial and commercial decisions. Signatories voting rights are linked to investment shares,

an executive organ headed by a Director General which is the permanent organ of each organization. It implements the Board's decisions and submits proposals to it,

the same or substantially the same provisions in the Convention/Agreement and in the Operating Agreement in each of the three organizations,

application of the same principles of non discrimination in the three organizations, same tariffs and equitable access to the space segment from the territories of the members, irrespective of their geographical location or the level of their investment share,

the same purpose, i.e. not to make a profit but, in accordance with their charter to operate on a sound economic and financial basis,

basically, the same members as far as European States are concerned,

procurement policy on an international competitive basis,

a system like a cooperative where Signatories contribute financially to the system in proportion to their investment shares calculated in accordance with their use of the space segment and provision of services by the Signatories in competition with each other using space segment capacity leased at cost.

Since the date of inception of these organizations, it can be said that they have fulfilled their mission and

demonstrated that the sharing of risks and responsibilities at international level and under public control within public/private hybrids for huge long-term investments has proved to be of paramount importance for the development of the commercial use of Outer Space.

The procurement of a very large number of satellites and launchers has given industry a unique opportunity to develop a new and very important market with improving competitiveness. The services provided via the space segment of the organizations have developed considerably into the telecommunications sector (telephony, data and mobile services, radio and television, etc.).

As for the relevance of public space law to these intergovernmental satellite organizations, suffice to say that they are committed to act for peaceful purposes and that they follow the procedures established by the International Telecommunication Union for frequency coordination. With regard to the international conventions on Outer Space, only ESA and EUTELSAT have declared their acceptance of the rights and obligations provided for in the Convention on International Liability for Damage Caused by Space Objects of 25 March 1972. ESA has also declared its acceptance of the Convention on Registration of Objects Launched into Outer Space of 14 January 1975. Up to now, EUTELSAT has not been in a position to do the same even if a declaration of acceptance has already been approved by the Assembly of Parties, because the condition of majority under Article VII of the Convention on Registration has not yet been fulfilled as only twenty two of the forty seven EUTELSAT member states are Parties to the Convention on Registration. For the time being, practical arrangements have been made with the French government for the temporary inclusion of the relevant satellite data, once the satellites have been launched, on the register of France.

It is worth noting that because of their size, it is much more difficult for INTELSAT and Inmarsat than for ESA or EUTELSAT to follow the acceptance procedure for these Conventions because of the condition of majority. In any case, following analysis, these two organizations did not see any immediate purpose in making efforts towards acceptance of the rights and obligations of these Space Conventions.

The development of the commercial use of Outer Space has contributed to the restructuring process of the international satellite organizations

At the beginning of the nineteen nineties, changes occurred in the market place with dramatic growth in competition together with a progressive liberalization of the telecommunications sector. Consequently, under the pressure of the Parties and Signatories which, as telecommunications operators, were becoming progressively privatized, the international satellite organizations more or less at the same time started to study how they could accommodate their operational activities to the competitive environment of satellite services and adapt their structure accordingly.

A gradual process was initiated as early as 1991 in order to define through a number of extensive studies and meetings of specialized working groups how the legal structure of these organizations could be adapted. As a first step for change, INTELSAT, Inmarsat and EUTELSAT endeavoured to ensure that the organizations evolved in two areas:

Relaxation of the consultation procedures relating to economic harm in the case of a space segment separate from that of these organizations being established or used to provide international public services: INTELSAT and Inmarsat, decided on progressive increases in the ceiling of traffic beyond which this consultation procedure was needed. EUTELSAT decided to eliminate de facto the application of this procedure as from 1992. Such relaxation gave more opportunities for new entrants on the market for satellite communication services.

Improved access to the space segment: arrangements were set up to admit "non-Signatory entities", that is to say entities having direct access to the space segment and investing directly, subject to an agreement at national level between the relevant Party

and Signatory but with no right to participate and to vote together with the Signatories.

As a second step, various amendments were decided in particular so as to allow a member State to designate more than one Signatory in its country. These amendments have not yet entered into force as the required number of acceptances by the Parties has not yet been reached (two thirds of the Parties whose Signatories hold at least two thirds of the investment shares).

It should be noted that the purpose of such efforts was to optimize the way in which the organizations functioned by adapting or even reinforcing their underlying principles (see the concept of multiple Signatories per country) rather than to reform and modify.

In parallel, and even though INTELSAT, Inmarsat and EUTELSAT had already been facing with competition for some time from high capacity terrestrial fibre cables and private satellite operators such as SES and PANAMSAT, and also national systems, growing pressure for change increased, driven by certain Parties and Signatories and by competitors that criticized the structure and the privileges and immunities, particularly in the case of INTELSAT. Rather than being obliged to accept changes imposed by external forces, the three organizations decided to be proactive in their restructuring process.

A wide range of alternative scenarios were prepared and examined before decisions could be taken on the long-term evolution of each of these organizations, from a complete reshaping of the structure, which would remain nevertheless an intergovernmental organization, to the formation of purely private company.

In the case of Inmarsat, the Council decided in May 1994 to create a private limited company under English law as an affiliate in order to provide a valid alternative to the consortia created for the provision of satellite personal communications services to be operated through constellations of satellites located in low earth orbit or intermediate circular orbit (GLOBALSTAR, IRIDIUM, ODISSEY, etc.). Inmarsat holds a minority shareholding in the Company named ICO and has a seat on the Board of Directors.

New Skies NV was created in 1998 as a company under Dutch law, to which five INTELSAT satellites have been transferred together with the rights to frequencies and orbital locations originally used by INTELSAT and now under the authority of the Dutch Administration. The purpose of this spin-off company is to provide space segment capacity for direct broadcast and multimedia services. There are commitments from INTELSAT to operate an arm's length policy vis-à-vis the company in which INTELSAT holds a minority shareholding.

The issue of the legal structure of the three organizations was still under discussion.

Inmarsat restructuring culminated in the entry into operation of a holding and an operating company under English law on 15 April 1999. The decisions on EUTELSAT restructuring were taken at the 26th meeting of the Assembly of Parties in May 1999.

The method adopted by Inmarsat and also by EUTELSAT is the following: amendments to the Convention provide for transfer of the assets, operational activities and associated liabilities to a private company under national law (several in the case of Inmarsat). The Operating Agreement and the Signatories disappear and are replaced mutatis mutandis by the Articles of Association and the shareholders in the company. Eutelsat S.A., a company under French law, will be established by mid-2001. The staff is also transferred to the company but with a change of status.

An intergovernmental organization remains but with a role limited to the supervision of basic principles which are equivalent in both organizations: non-discrimination, commitment on service to geographical areas, fair competition, universal service/public service obligations (which consist in the case of Inmarsat in continued provision of services for the Global Maritime Distress and Safety Systems).

The remaining EUTELSAT intergovernmental organization has no share (in the case of Inmarsat, there is a special share in the company) and cannot interfere in its commercial activities.

A contractual document (Arrangement for EUTELSAT, Public Service Agreement for Inmarsat) between the intergovernmental organization and the company defines their respective rights and obligations, in particular with respect to the performance of the basic principles by the company.

Inmarsat requested and obtained the agreement of the European Commission to its restructuring package in September 1998 and EUTELSAT made a similar notification on 9 July 1999.

The European Commission gave guidelines for the changes in the International Satellite Organizations when advocating in the green paper on satellite telecommunications of 20 November 1990 direct access, deletion of the economic harm procedure, decoupling of investment shares from utilization, commercial independence of the organizations, cost-orientation of tariffs and separation of regulatory and operational aspects.

For INTELSAT, even if the decisions on restructuring have not yet been taken, it is likely that a similar scheme to the one adopted by Inmarsat and EUTELSAT will be followed. One pending issue which needs careful consideration is how to ensure in the future continued international, and in some cases, even domestic telecommunications traffic, for a very large number of developing countries. It is not certain that a mechanism for supervision of such public service activities within the remaining INTELSAT intergovernmental organization and via some type of contract with a company would suffice in practice. Another possibility to explore would be to insert special provisions in the Articles of Association of the company so as to give directly to the operators of the countries dependent on the INTELSAT satellite system certain rights regarding matters related to continuity of services, utilization rates, etc.

Among legal issues raised in the restructuring process of Inmarsat and EUTELSAT, one deserves particular attention, namely provisional application of amendments to the Treaty. In addition to the issue of the amending procedure itself (for such extensive changes, is the amendment procedure enough? should an intergovernmental conference be convened to terminate the existing Treaty and adopt a new one?), the issue of provisional application raised complex legal questions. Article 25 of the Vienna Convention on the Law of Treaties provides for such a possibility. According to the amending procedure contained in the Inmarsat and EUTELSAT Conventions, no amendment can enter into force as long as the Depositary has not received acceptance of the amendment from a required number of Parties (two thirds of Parties whose Signatories represent at least two thirds of the investment shares).

It was considered essential to secure a fixed date for the entry into operation of the company and in parallel, therefore, to the "normal" amendment procedure allowing a reasonable time for Parties to notify their acceptance of the amendments, it was agreed by the Assembly to fix a specific date when, should the required number of acceptances not be reached, the amendments would nevertheless be provisionally applied and the company would start to operate. Some provisions were included to avoid legal difficulties of a constitutional nature in certain countries.

It should be noted that the decisions on provisional application in Inmarsat and EUTELSAT were taken without a vote and by consensus. In the case of EUTELSAT, there were even no statements attached by Parties.

In the case of INTERSPUTNIK, two interesting steps were taken. The first was the introduction of Signatories having more or less the same rights and obligations as the Signatories in INTELSAT, Inmarsat and EUTELSAT. The relevant amendments have not yet entered into force (three more notifications of acceptance are required). The second is that INTERSPUTNIK formed a joint-venture with Lockheed Martin Corp. in April 1997 named Lockheed Martin Intersputnik (LMI).

After this short description of the restructuring process of the intergovernmental satellite organizations, it can be said that the new companies stemming from the international organizations will not be in a position to accept the rights and obligations of the Space Conventions, and it is doubtful whether the remaining intergovernmental organizations with no further operational activity in space would accept any liability deriving from acceptance thereof. In the case of Inmarsat Ltd., established under English law, the United Kingdom is a Party to the Space Conventions mentioned above and this is also the case of France and Eutelsat S.A. which will be established under French law.

Concluding remarks

The intergovernmental satellite organizations have been created on the same model and have worked for a number of years according to the same principles; because of their purposes and of the markets on which they operate, they have been faced with the challenge of adapting their mission and structure to a new environment. It is likely that this unprecedented change in intergovernmental organizations will result, even if there are many similarities in the restructuring models which have been adopted, in entities with very different destinies in the future.

Commentary Paper

Restructuring of Inmarsat

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Reasons For Restructuring

1 Inmarsat's restructuring was completed on 15 April 1999, when the Inmarsat system was transferred to private sector UK-based holding and operating companies ("the Companies"). However, the intergovernmental organization ("IGO") continues under an amended Convention in order to oversee and enforce the continued performance of the Global Maritime Distress and Safety System (GMDSS) services and certain other obligations by the Companies under a Public Services Agreement.

2 Inmarsat was the first of the international satellite organizations (ISOs) to privatize but Intelsat and Eutelsat are also engaged in similar processes. This report explains why Inmarsat's Member States felt it necessary to embark on this privatization and sets out the main features of the new structure as well as mentioning some of the special corporate, commercial and legal problems which had to be overcome.

3 On the initiative of the International Maritime Organization (IMO), Governments set up Inmarsat in 1979 to utilize space technology for worldwide maritime communications, especially for safety of life at sea. The 1980's were years of steady growth for Inmarsat, with few commercial pressures. Its services were extended to aeronautical and land mobile communications, and today there are over 150,000 users of the system worldwide.

4 From around 1990, however, a combination of factors urged change upon Inmarsat's co-operative and inter-governmental structure, namely:

increasing privatization of the telecommunications industry in many countries;

the advent of competing satellite systems such as Iridium and Globalstar, affecting the risks associated with further investment in Inmarsat;

a demand by regulators including the European Commission for wider access to space segment capacity and a demand for removal of privileges and immunities, to create a level playing-field with the competitors;

an urgent need for a more normal corporate structure, with limited liability of investors and a small, fiduciary Board able take decisions quickly, and raise capital from the financial markets for new systems;

the desire of many of Inmarsat's owners to maximise the value of their investment in the Organization which could mainly come about through public trading of their shares; the owners also wanted to be able to invest on a voluntary basis at levels of their own choosing, instead of on a mandatory basis in proportion to their investment shares.

5 The challenge was how to restructure while retaining governmental interests. Inmarsat's Parties insisted on guarantees that the Organization's public service obligations would be maintained. In 1996, the Eleventh Inmarsat Assembly decided that five Basic Principles should underlie any new structure, namely:

continued provision of services for the Global Maritime Distress and Safety System (GMDSS) set up by the International Maritime Organization (IMO);

non-discriminatory access to services;

service to all geographical areas where there is a need, including rural and remote areas;

peaceful purposes;

fair competition.

6 Other Essential Elements of the restructuring included continued governmental oversight of the basic principles, broad ownership of the corporate entity, and participation by developing countries and small investors.

7 Over 9 years from 1990, the restructuring process underwent various phases ranging from proposals to modify the financial and governance structure to the realization that full scale privatization was necessary for Inmarsat's long-term financial viability. It was necessary to reconcile widely differing policies of its Members, many of which wanted to retain the IGO structure, while others would only accept a privatized entity competing equally with other satellite system operators.

8 The reluctance of many of Inmarsat's large shareholders to invest further in the existing structure led to the loss of a major satellite handheld communications market opportunity, known as Inmarsat-P in 1994. As a result, a separate and independent company, ICO Global Communications (ICO), was formed to provide such services. In 1996, an opportunity for investment in a global Inmarsat satellite navigation service was also declined.

The New Structure

9 The long restructuring process culminated in the decisions of the Inmarsat Assembly at its Twelfth and Thirteenth Sessions in 1998 which led to the privatization on 15 April 1999. Wide-ranging amendments to the Inmarsat Convention and Operating Agreement were adopted to transform the Organization, with the following main features:

(i) The Inmarsat assets and business, and its staff, were transferred on 15 April 1999 to a multi-corporate structure, consisting of a holding Company (Inmarsat Holdings Limited) and an operating Company (Inmarsat Limited) incorporated under English law, and based in London at the same headquarters.

(ii) The former Inmarsat Signatories received ordinary shares in the holding Company in a cash-free exchange for their previous investment shares. They also have limited liability.

(iii) The Companies' objects are to continue to provide global, regional and domestic satellite services, especially maritime, aeronautical and land mobile commercial services, and distress and safety and navigation services.

(iv) The Companies have no privileges and immunities, and have the same status under national regulation and in IGOs such as the ITU and the World Trade Organization, as any private competitor.

(v) There are some special features in the structure of the Companies intended to reflect the varying interests of the current membership and the global scope of Inmarsat's operations. The fiduciary Board of Directors of the holding Company will have up to 15 members, including shareholder directors, independent

directors, and three directors from smaller shareholders or developing countries. There will be an identical Board in the operating Company.

(vi) Other special features include a limit on shareholding by any one investor to 15% of the issued capital, except that the United States shareholder will be able to retain its existing share of about 22% for the time being.

(vii) There is also a requirement for the Company to hold regional meetings to consider local interests.

(viii) During the initial 12 months after 15 April 1999, trading of shares will mainly be possible among the existing shareholders; thereafter, it will be possible for the holding Company to issue shares to multiple investors from any country and to strategic investors. The holding Company will make an initial public offering (IPO) on appropriate stock exchanges within approximately two years after that date.

(ix) The operating Company will continue to act as a wholesaler of space segment capacity to the existing land earth station operators, which are owned by former Signatories and provide the existing services to the mobile end-users. This arrangement was made under Land Earth Station Operator Agreements (LESO Agreements) concluded between the Company and each of the operators, on identical conditions, for an initial five year term.

(x) The IGO will continue to exist, with an amended Convention, but its only organs will be the Assembly and a small Secretariat. The purpose of the IGO will be to ensure that the Company continues to meet the following Basic Principles referred to above.

Other obligations of the Companies are to observe the international regulatory requirements and international standards of the ITU, IMO and ICAO, and also to work towards the IPO for the holding Company's shares.

(xi) The IGO will own a Special Share in the holding Company, entitling it to veto changes to specified parts of the Company's Memorandum and Articles of Association that relate to GMDSS and the other public service obligations.

(xii) There is a contract, called the Public Services Agreement (PSA), between the IGO and the Companies, enabling the IGO to oversee the Companies' performance of the basic principles and other public service obligations, and, if necessary, to take certain enforcement action. The continuing existence of the IGO will be reviewed when IMO confirms that there are alternative providers of GMDSS services.

(xiii) The IGO will continue to cooperate with the UN and the Committee on the Peaceful Uses of Outer Space, and its Specialized Agencies.

Special Problems

10 Various corporate, commercial and legal problems had to be resolved during the long restructuring process.

Corporate and Commercial Issues

11 These issues included the delinkage of investment shares from utilization; early dilution of ownership through a public listing; the right of shareholders to determine their own level of investment; the size of the fiduciary Board of directors; enhancement of the interests of developing countries through pricing and other policies; demand for appointment of Directors from smaller and developing countries; the need for independent Directors; limits on the size of individual shareholdings; and restraint on convergence of Inmarsat with ICO.

12 Another hard-fought issue was to negotiate the standard form of the LESO Agreement referred to in paragraph 9 (ix) above. Most of the LES operators had been Inmarsat Signatories, in control of Inmarsat's commercial decision-making through the Inmarsat Council. Restructuring would mean the loss of that control, and they insisted on having the LESO Agreement in order to guarantee their investments and

business in their LESs for a minimum period after the restructuring.

13 There was, on the other hand, broad agreement on maintenance of GMDSS services and other Basic Principles, and on many Essential Elements such as the need for more commercialization, improved governance, broader ownership and access to space segment, and removal of privileges and immunities.

Limited Liability

14 Consideration was given to restructuring in the form of a treaty-based public international corporation This raised an important public international law problem as to whether limited liability of shareholders could be achieved in such a corporation. Research indicated that this could not be assured, and according it became necessary to establish a national law corporate structure.

Provisional Application

15 The most crucial legal problem was whether the restructuring amendments could be provisionally applied. Normally, amendments to the Convention and Operating Agreement took years to enter in force. It was considered vital to implement the new commercial structure without delay to enable decisions to be made on large investments and new satellite systems and services, on which the future commercial viability of Inmarsat would depend.

16 Though provisional application is recognized under Article 25 of the Vienna Convention on the Law of Treaties, its use by decision of a governing body of an IGO is not so extensive. The problem is one that has faced other organizations. Legal analysis of the issue supported the view that the Inmarsat Assembly had power to decide to implement the amendments provisionally.

17 Some Parties were precluded by their constitutions from accepting provisional application without special legislation, particularly where the Convention did not itself provide explicitly for provisional application as was the case with Inmarsat. For those countries, practical solutions were proposed whereby a provisional application decision by the Assembly would be subject to the internal laws of each Party, but without affecting the restructuring of the Organization at the international level.

18 In accordance with the decision of the Assembly, the restructuring amendments to the Convention and Operating Agreement were therefore applied provisionally as from 15 April 1999, pending eventual formal entry into force of the amendments.

Conclusion

19 Inmarsat is the first international satellite organization known to have restructured itself into a private sector entity. The process established a new form of constructive relationship between the private sector and governments as to the way in which space telecommunications are provided to the world community. Another special feature of the restructuring is the role of IMO, which is not a party to the Public Services Agreement, but whose decision about the availability of alternative satellite systems able to provide GMDSS services will affect the duration of the Companies' legal obligations under that Agreement.

20 The influence of Inmarsat's pioneering work in restructuring has already been seen. For example, in May 1999, Eutelsat's Assembly of Parties adopted a similar decision on accelerated (or provisional) implementation on its restructuring amendments. Another example is in the Draft Final Report of EC's Ad-Hoc Working Group on the Set-Up of an Organisational Framework for GNSS, May 1999. Though the Report has not yet been adopted by the Commission, it refers to the restructured Inmarsat IGO and the Public Services Agreement as one of a number of possible models for a proposed GNSS Administration which would have responsibility for establishing and managing the future GNSS.

Commentary Paper

Transformation of Intersputnik's regulatory basis at the phase of commercial operation of its space segment

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In the context of the processes of liberalization and deregulation of the global telecommunications market INTERSPUTNIK faced the necessity to radically change its principles of activity as well as the strategy of its development. The new challenges of time required from the Organization highly efficient operation of the satellite system in order to obtain the maximum profit. These challenges were met by INTERSPUTNIK entering into the third phase of establishing an international satellite communications system as stipulated by Article 5 of the Agreement on the Establishment of the INTERSPUTNIK International System and Organization of Space Communications (hereafter – Basic Agreement), i.e. "the commercial operation of the communications system using a space segment owned by the Organization or leased from its members".

In 1993, the XXIInd Session of the Board resolved to procure the Organization's own space segment for the purpose of its commercial use. To this end it was necessary to promptly change INTERSPUTNIK's regulatory basis to adapt it as much as possible to the new requirements. First of all, it related to the above-mentioned Basic Agreement. In 1993-1996 an ad-hoc group of legal experts of the Member countries of the Organization elaborated and coordinated two new Constructive Instruments of the Organization – the Protocol on Amendments to the Basic Agreement and the Operating Agreement. Subsequently, these documents were approved at the XXVth Session of the Board. The Protocol will take effect as from the date of receipt by the Depositary of the Basic Agreement, the Russian Government, of notifications of acceptance by two thirds of Organization's Member countries. The Operating Agreement, in its turn, should be signed by the communication entities appointed by the INTERSPUTNIK Member countries no later than three months after the Protocol coming into force.

During the elaboration of the above documents, the group had to resolve a number of complicated legal problems.

Firstly, it was decided to draw up the Protocol and Operating Agreement simultaneously in order to avoid conflicts between them and eventual "legal vacuum". One should note, that the Operating Agreement is an interdepartmental international treaty and should be signed either by a Member of the Organization (Government) or by a telecommunications entity falling within the jurisdiction of the appropriate INTERSPUTNIK Member (Signatory).

Secondly, the problem arose of the so-called "dual membership". In full conformity with provision 4 (C) Article 30 of the Vienna Convention on the Law of Treaties, it was decided that the Members of the Organization which do not adopt the Protocol and, correspondingly, do not appoint any telecommunications entity to sign the Protocol, will continue their membership in the Organization. The Basic Agreement will be effective in its original version as regards the relationship between a Member of the Organization, which adopted the Protocol and a Member, who did not.

Thirdly, it was decided that amendments to the Basic Agreement should be drafted in a form of Protocol because the amendments to an agreement shall have the same legal status as the agreement itself. Thus, it was initially understood that the Protocol on Amendments will have a status of an international treaty and should be adopted by the Member countries by means of ratification.

The Protocol and Operating Agreement provide for the following changes in the INTERSPUTNIK's structure and principles of activity:

A space segment can be leased not only from the Member countries of the Organization, but from any other country. The satellites of the Organization can be launched, positioned in orbit and controlled by contractors who are not Members of the Organization. A new body, Operations Committee, is established. It is a body of the Organization for immediate examination of and decision-making on different issues related to the Organization's activity. The Operations Committee is given extensive powers. At the same time, the sessions of the Board are held less often, its competence is limited to the most important policy issues and long-term goals of the Organization. The Auditing Commission will be accountable to the Operations Committee and not to the Board.

The institution of Signatories is introduced. A Signatory is a telecommunications entity appointed by its government. The government has the right to appoint more than one Signatories from a relevant country. Any duly licensed telecommunications entity regardless of their form of ownership can be appointed Signatory.

Correlation between the Protocol and the Operating Agreement is also manifested in the fact that a state cannot be a Party to the Basic Agreement if the above state or a Signatory appointed by it do not sign the Operating Agreement. Thus, the termination of the membership of a Signatory in INTERSPUTNIK or the termination of the membership of a Member will automatically entail termination of the membership of the Signatory or a Member in the Organization respectively.

The weighted voting procedure is implemented in the Operating Committee, each Signatory having a vote equal to its investment share in the Share Capital.

All financial liability issues, including the shares in the Share Capital are transferred from Members of the Organization to the Signatories.

The above modification of the INTERSPUTNIK legal foundation made it possible to start endeavours aimed at procuring INTERSPUTNIK own space segment. According to the resolution of the Board, the Organization procures it by, firstly, filing INTERSPUTNIK's own orbital slots in geostationary orbit and, secondly, manufacturing and operating Organization's own communications satellites.

In view of the fact that in accordance with international law the frequency-orbit resource can belong to states only, but not to international organizations, it was decided to file orbital slots in two ways: firstly, by asking the Member countries to facilitate the filing, coordination and notification of possible INTERSPUTNIK's orbital slots, and, secondly, by using orbital slots, earlier notified by the Member countries of the Organization, which do not use them at present.

The 6th meeting of the Committee of Plenipotentiaries adopted and the Board subsequently approved "The Procedures of ITU notification of satellite networks planned by INTERSPUTNIK and their international legal protection". Under the above Procedures, the decision in principle to submit a filing for planned satellite networks to the ITU should be taken by the Committee of Plenipotentiaries (Operating Committee). The terms and conditions applicable to the notification and international legal protection of a planned satellite network shall be stipulated by agreement concluded by the Director General of INTERSPUTNIK and the notifying administration. Financial terms and conditions shall be stipulated by additional protocols between the Director General and notifying administration. Any terms and conditions applicable to the reimbursement for the allocation by the notifying administration of its geostationary orbital positions to INTERSPUTNIK shall , as soon as these positions are coordinated, be covered by the terms of reference of the Committee. The Director General (Directorate) and a Notifying Administration are responsible for filings and international and legal protection of such satellite networks.

As of mid-1999, 20 geostationary orbital slots were allocated to INTERSPUTNIK . The Republic of Cuba

filed two orbital slots for INTERSPUTNIK's purposes (Agreement on Cooperation in the Field of International Legal Protection of the LATAMSAT Planned Satellite Networks of November 10, 1998), the Republic of Belarus provided 13 orbital slots (Agreement on Cooperation in the Field of International Legal Protection of the INTERBELAR and INTERSPUTNIK Planned Satellite Networks of June 2, 1996). INTERSPUTNIK also received two Mongolian slots (Agreement on Cooperation in the Field of International Legal Protection of the Planned Orbital-frequency Assignments to the Broadcasting and Fixed Satellite Service of September 29, 1998) and three Ukrainian slots (Agreement between the Cabinet of the Ukraine and the INTERSPUTNIK International Organization of Space Communications on Cooperation in the Filed of the Utilization of the Satellite Communications Networks of September 24, 1998).

In the framework of the INTERSPUTNIK Board decisions regarding the Organization's own space segment a strategic alliance with Lockheed Martin Corp. was struck. On April 18, 1997, a Joint Venture Agreement between the INTERSPUTNIK International Organization of Space Communications and Lockheed Martin was signed (Agreement). The document became a unique one as it was the first experience of formalizing such an alliance between an intergovernmental organization and a transnational corporation. The specific feature of the Agreement resulted in a number of non-standard provisions stipulated in it.

The following main conditions of the Joint Venture Agreement were set forth in the resolutions of the Board and Committee of Plenipotentiaries:

Mutually acceptable percentage of interest was set up;

- INTERSPUTNIK's contribution is its satellite operator experience, orbital slots and marketing of transponder capacity
- For operating the first satellite, INTERSPUTNIK will get a fixed percentage of the total satellite revenue.
- LM's contribution is satellites and relevant investments (launch, insurance etc.).
- Joint Venture's name will be changed to Lockheed Martin INTERSPUTNIK (LMI)
- Joint Venture's Board of Directors will consist of nine directors: 7 LM directors and 2 INTERSPUTNIK directors. The directors are not entitled to any compensation from the LMI.
- Principal issues will be decided by a supermajority affirmative vote of 80% of the Board of Directors' votes.

Thus, INTERSPUTNIK does not invest in LMI, its share being the experience in the field of satellite system operation, marketing and coordinated orbital slots for the new satellites.

The XXVIth Session of the Board resolved to appoint INTERSPUTNIK's Director General and his Deputy to the LMI Board of Directors. The INTERSPUTNIK Board also decided that INTERSPUTNIK's representatives on the LMI Board of Directors should have a consolidated vote which cannot be split without a relevant resolution of the Board (Committee) of the Organization.

In July 1998, in Vienna, the LMI BoD decided to implement the participation for Khrunichev State Research and Production Space Center (Russia) as a class B shareholder which does not provide for voting at the Shareholder's Meetings and does not give any rights to dividends. The Board of Directors was extended to 10 persons and one director from Khrunichev State Research and Production Space Center was nominated with the right to vote at the Board of Directors. Accordingly, it was decided that all the resolutions which require a supermajority of the votes should be adopted by a majority of 81% of the Board of Directors votes.

The fourth LMI Board of Directors meeting held in May 1999 took an important decision that the Company should implement the goals and purposes it was established for. Therefore, the potential and resources of its shareholders should be used to the maximum extent to ensure management, administrative and operational services of the Company. In the light of the signed Memorandum on itemizing the interaction principles between INTERSPUTNIK and LMGT, the

Board noted that LMI was responsible for operative control of the LMI-1 satellite and INTERSPUTNIK, in its turn, was responsible for the customer network control and LMI-1 payload. The interaction conditions between the Parties are subject to a tripartite agreement between INTERSPUTNIK, LMI and State Unitary Enterprise "Kosmicheskaya Svyaz" (Russia), which is being finalized.

To summarize, one can say that the establishment of the Lockheed Martin INTERSPUTNIK joint venture is a result of a long and hard work to aimed at procuring Organization's own space segment. It can become a milestone in the history of INTERSPUTNIK and provide the following benefits to the Organization:

- new satellites manufactured without any investments from the Member countries;
- INTERSPUTNIK significantly influences the operation of LMI;
- INTERSPUTNIK keeps its operator functions;
- usage of new satellites creates opportunities to increase traffic, expand the range of the services provided, earn higher revenues and profits.

Commentary Paper

Leonard S. Dooley
Vice President, External Affairs
INTELSAT

INTELSAT Background

- Established in 1964
- Global commercial cooperative
- UN Resolution named in INTELSAT Agreement as the first reason for its establishment

INTELSAT Today

- Currently have 143 member-nations
- Interconnect over 200 countries
- Own and operate a fleet of 17 satellites with 5 INTELSAT IX spacecraft on order
- INTELSAT Serves the World
- Revenue by Service
- Revenue by Region
- Worldwide Service

INTELSAT Responding to Change: The Current Competitive Environment

- The Competition: Large, well-funded competitors such as Hughes PanAmSat, Americom, Skynet, Astra/Asiasat
- Investment Obligation: Investment responsibility increasingly falls on developing countries
- Core business PSN (telephony) not growing: growth will come from video, Internet, and private/business networks
- Market/Financial Analysis: Advisors say we will have difficulty competing as intergovernmental cooperative
- Regulators are calling for the restructuring of INTELSAT
- European Commission calls for a public stock offering with limited role for residual intergovernmental organization (IGO)
- U.S. Senate seeks to encourage full privatization of INTELSAT by end-2001 by creating risk of loss of access to U.S. market and withdrawal from INTELSAT

First Steps

- Effective removal of Economic Harm Test in Article XIV (d)
- Direct access arrangement
- Multiple Signatory Amendments
- Spin-off of New Skies Satellites, N.V.

INTELSAT Privatization: Background

- INTELSAT is committed to transforming from cooperative to private company as necessary for survival
- First step in INTELSAT restructuring occurred in April 1998 at the Assembly of Parties in Brazil
- Created spin-off company New Skies Satellites N.V. (NSS)
- Parties asked for INTELSAT to change
- INTELSAT's Shareholders in April 1999 called for further rapid changes to improve competitive position
- Overwhelmingly endorsed study of privatization plans
- Clear mandate to protect Lifeline Connectivities

INTELSAT Privatization: Goals

- Continue to fulfill Lifeline Connectivity Obligation (LCO)
- Maximize value to customers and shareholders
- Offer enhanced services and attractive terms and conditions
- Attract outside investment to expand current markets and enter new growth markets
- Improve INTELSAT's competitive position
- Preserve INTELSAT assets in single entity
- Same market access as other commercial competitors

March 1999: The Board Evaluated Four Options for Commercialization

Option 1 Maintain structure, with "liberal interpretation"
Option 2 Maintain structure, amend key provisions
Option 3 Create private INTELSAT with residual IGO to ensure Lifeline Connectivity Obligation (LCO)
Option 4 Fully commercial INTELSAT with LCO preserved in Corporate Commitments.

Nine Core Principles

- Competitive and Commercially Viable
- No Division of Assets
- Protect the LCO
- Ability to Expand Service Offering
- Maximize Customers and Shareholders Value
- Ability to Serve Domestic and International Markets
- Adhere to Fair Competition Principles and Practices
- Provide Distribution Opportunity for Investors
- Ability to Pursue Rand D

Eleven Business Evaluation Factors

- ITU Orbital Registrations
- Protection of the LCO
- Corporate Governance
- Ground Segment Investments
- Financing Future Investments
- System Access and Distribution Channels
- Transfer of Signatory Contracts and Obligations
- Capital Structure/Liability Limits
- Jurisdiction
- Landing Rights
- Impact on Cash Flows and Dividends

Five Privatization Models Analyzed by June 1999 Board

Pure Corporate Model ("Model A")

- Full commercial powers
- Governance board with fiduciary duty to New INTELSAT elected by all shareholders

Modified Corporate Model ("Model B")

- Full commercial powers

- Governance board with some members representing specific interests but still owing duty to New INTELSAT and all shareholders

Special Purpose Corporation ("Model C")

- Full commercial powers
- Governance board owing duty to both New INTELSAT and to specific constituencies which directors represent

Cable Consortium Model ("Model D")

- All capacity pre-sold to owners
- No growth

Modified Cable Consortium Model ("Model E")

- INTELSAT today without privileges and immunities

June '99 Board's Conclusion of Five Model Analysis

- Concluded that further analysis must be done on Model B ("Modified Corporation"), and possibly on Model A ("Pure Corporation")
- Instructed INTELSAT Management to focus on Corporate "New INTELSAT" by developing a detailed business plan of New INTELSAT for the September '99 Board
- Developed guiding principles for protection of countries which rely on INTELSAT as their sole communications lifeline to the rest of the world
- Requested a draft transition plan for privatization for September Board meeting
- Requested additional work on issues including governance of New INTELSAT, the LCO, the role of any remaining IGO, and the appropriate jurisdiction of New INTELSAT
- Formed a "Special Committee on Restructuring" of the Board to work with INTELSAT Management on these issues
- Made recommendations for adoption by the upcoming Assembly of Parties in October 1999 including:
  - Recognition of the importance of continuity of service and that a precondition to privatization is the acquisition of landing rights for New INTELSAT in a significant number of countries
  - Grant New INTELSAT landing rights for all existing and planned services
  - Recognize the importance of Signatories and Parties not foreclosing, or seeking to foreclose, landing rights to New INTELSAT's competitors

In Conclusion Privatization: Seamless Transition

In the areas of Governance:

- Governance structure for a privatized INTELSAT must include a voice for smaller owners

Continuity of Service:

- Sales and marketing, operational and technical resources would continue to be in place with privatization of INTELSAT

Landing Rights:

- When single privatization option selected, IM can begin process of ensuring landing rights are in place

Enforcement of LCO Protections

- Upon its inception, New INTELSAT will honor all existing commitments
- LCO qualifying countries have the added option of accepting the LCO arrangements
- LCO arrangements will be legally binding on New INTELSAT
- LCO obligations will be enshrined in the charter documents of New INTELSAT

- If there is a residual IGO, its primary function would be to mediate and, if necessary, seek enforcement of the LCO

Privatization: Summary

- INTELSAT remains committed to its unique mandate to provide lifeline connections to its customers
- New INTELSAT will honor existing contract prices and terms and conditions
- Privatization will strengthen INTELSAT's ability to compete and attract new funding
- INTELSAT will be able to target key growth markets

Commentary Paper

Mr. P. Hulsroj
EUMETSAT

Should the UN be privatised? No, not possible you say instinctively, but is it instinctively in the same fashion as we said: no, not possible, when privatisation of parts of INMARSAT was first mooted?

So, to answer the question let us not rely on instincts, but on analysis.

If we look at the UN's peace-fostering and humanitarian role, it is clear that many areas are, in fact, already partly privatised. Private aid organisations abound and Jimmy Carter went to Haiti to broker peace more in his personal capacity, than as a representative of the United States. In an age where "alternative dispute resolution" mechanisms are making rapid advances, they can be expected also to be increasingly involved in peace-fostering. And yet the UN cannot be privatised, because at its core it is an institutional framework to channel inter-state political will. It has an inalienable function, if not as world government, then as a tool of world governments. The functions of the Security Council or the General Assembly cannot be privatised.

But we are not here to discuss privatisation of the UN, but to discuss privatisation and commercialisation in relation to the intergovernmental space organisations. And yet there is something to be learned from the UN example, and that is the crucial distinction between commercial and public service functions.

This is, indeed, a crucial distinction when we try to analytically grasp the present trend of privatisation of international space organisations. INMARSAT, INTELSAT and EUTELSAT are involved in markets; markets which are being de-regulated and where the vestiges of sovereign power are being swept away by the current of the market's demand for a level playing field for all.

In essence the argument for privatising these international organisations is that they are engaged in what has become a commercial market and that it would be wrong and unfair if such international organisations would enjoy tax- and funding advantages compared to their regular commercial competitors. A compelling logic, particularly when you keep in mind how national telecommunication monopolies are also being dismantled and privatised.

Nevertheless, you will, no doubt, also hear from Mr. Sagar how INMARSAT has had to create special mechanisms for dealing with its remaining public service function; a function which cannot be privatised.

And that is the crux of the matter: there are, also in space, functions that cannot be privatised; which remain of a public sector nature.

Intergovernmental organisations were created to take care of public service functions. Where a market develops the intergovernmental organisations disappear, but where this is not the case intergovernmental organisations remain. Just like branches of government normally disappear when no longer needed, but government itself subsists.

Now, you could argue that there would be no reason to retain the special status of intergovernmental organisations, even if a dedicated organisational framework would be needed for carrying out public service functions. Why should states not just incorporate a company in any given country to carry out the common will of the involved states? Here, however, all the reasons that existed when intergovernmental organisations were first created remain valid.

In a "joint venture" of states no domestic legal system should preside, no domestic enforcement mechanisms should apply and states should not, directly or indirectly, pay taxes to the hosting state of an intergovernmental joint venture.

In other words, there is still a link between public service functions and intergovernmental organisations, which it would not be in the public interest to break.

Moving then to EUMETSAT as a specific case, the question is whether EUMETSAT can be considered to be one or the other species.

EUMETSAT is an international meteorological satellite organisation with 17 European Member States. EUMETSAT manages the European meteorological satellite system and provides the funding, which it, again, gets from the Member States which contribute according to relative GNP.

It is, on the one hand, it is clear that there is a nascent market for meteorological products in many of EUMETSAT's Member States, with also commercial entities offering meteorological services. It is, on the other hand, also clear that this nascent market would have no possibility of sustaining the real cost of operating a meteorological satellite system. Economic imperatives mean that the provision of meteorological data will remain a public service function in the foreseeable future and that, therefore, it should be provided through the framework of an international organisation. This, however, does not mean that EUMETSAT and its Member States do not heed the call for commercialisation. EUMETSAT restricts its activities to securing the satellite data, but does not transform it into weather-forecasts or other direct user-applications. This is the task of the meteorological services and the private weather firms.

And in order to provide a level playing field between meteorological services and private weather firms access on equal conditions are given to both groups, i.e. the commercial arm of a meteorological service is obliged to pay the same license fee as a private weather firm. By this EUMETSAT and its Member States ensure that competition in weather-services take place fairly. In other words, EUMETSAT implements down-stream commercialisation.

This notwithstanding, you may find that is sounds complacent, when I argue that the international organisation frame still fits EUMETSAT well. No such thing! It is recognised that the international organisation frame fits only public service functions, and great endeavours are therefore had in EUMETSAT to streamline operations to make sure that EUMETSAT itself only covers its core public service functions. This is, in a sense, similar to the streamlining efforts that have almost universally taken place in government.

In EUMETSAT it manifests itself in empowering industry wherever possible, through contracting, outsourcing and extensive use of consultancy. The consequence is a fairly limited number of staff and thus a fairly small international organisation.

I would like now to turn to another feature of public service functions, related, yet fundamentally different.

Currently the space treaties in reality treat space as an unlimited resource. Despite the logical finiteness prioritisation of the use of space has not been seen as necessary and this is even the underlying tenor of the ITU, with its first come, first served principle.

However, with time there has been a growing recognition that space is not only logically finite, but also practically so. The crowding of the geo-stationary orbit is the most prominent example.

And yet the question of prioritisation is not being tackled. The first come, first served principle of the ITU was, admittedly, challenged at the height of the

"North-South" redistribution confrontation, where the not very successful argument went that the highly industrialised countries should not be allowed to monopolise space communications and that developing countries should have reserved orbit slots. But this was a different debate than the one I seek to stimulate here on prioritisation, since my challenge is to the "value-neutrality" of the first come, first served principle. My challenge is to the principle that a satellite dedicated to bingo is treated just the same as a satellite dedicated to meteorology.

I believe that the international community has no choice, but to define priority rules, when space, or a given part of space, like the geo-stationary orbit, becomes scarce.

In domestic legal systems the state always makes sure that resources are made available for its public service functions, even if that resource is scarce. Examples are expropriation laws, even domestic frequency management.

In space we must do the same. We must not overdo it and drift towards censorship or naked power-politics, but we need to define rules and mechanisms to be able to make sensible, objective trade-offs and choices, first and foremost between public service functions and other uses.

This is difficult, raises fundamental questions on how we perceive space, and it is urgent.

This is the gauntlet I throw you.

Commentary Paper

UNIDROIT's project for the creation of a new regimen governing the taking of security in high-value mobile assets: a window of opportunity in the context of the privatisation and commercialisation of space

Martin Stanford
Principal Research Officer
UNIDROIT

I should first like to thank the organisers of the Workshop for giving me this opportunity to inform you of a project underway within UNIDROIT which is of direct relevance to the issue you have before you this morning, namely the privatisation and commercialisation of Outer Space. This project, on which we have now been working actively for six years, aims to create a new international regimen to govern the taking of security in certain categories of high-value equipment. Among the categories of equipment covered is space property.

The starting points for this initiative are appropriately not only legal but also economic. Legal, in the sense that the application of the *lex rei sitae* rule does not particularly lend itself to the resolution of transborder disputes concerning the validity, enforceability and priority ranking of security rights in categories of equipment like aircraft that will be regularly moving from one State to another or like space property that will in the ordinary course of business be located beyond the jurisdiction of any State.

Economic, in the sense that the opportunities for asset-based financing of such high-value mobile equipment have to date been extremely limited because of the difficulties lenders face in securing and collecting on such loans. To take the specific example of space property, those private lenders contemplating lending on the security of a satellite are clearly going to want first to find out whether other lenders may already also have

claims outstanding against that same asset. And there is simply not going to be any sure way for them to find this out until such time as a centralised recording system is in place for the registration of interests in space property. Another practical problem which has hitherto tended to restrict opportunities for the use of asset-based financing in respect of space property arises out of the very nature of space property, namely, the fact that, being physically in orbit, it is not going to be easy to repossess in the event of the debtor defaulting.

The proposed UNIDROIT regimen is designed to provide an answer to both these legal and economic problems. The method chosen is the creation of a new autonomous international interest in mobile equipment. This interest has been defined in such a way as to embrace not only the classic security interest but also what are increasingly recognised as its functional equivalents, the seller's interest under a title retention agreement and the lessor's interest under a leasing agreement. The categories of mobile equipment in which such international interests may be held have been consciously limited to a relatively small number of high-value assets the common feature of which is that they all move regularly across or beyond national frontiers in the ordinary course of business: aircraft and helicopters, including engines, registered ships, oil rigs, containers, railway rolling stock and space property. This restriction was designed to limit the scope for what might otherwise be considered unwarranted interferences with the application of domestic law rules.

The future Convention provides holders of international interests with a basic set of default remedies designed to be exercisable expeditiously, a matter adjudged to be of major practical significance for those contemplating lending against such high-value assets.

The international interest will be registrable in an International Registry to be set up under the future Convention. Separate registries are envisaged for each of the categories of equipment covered. Plans are already well advanced for the setting up of an Aircraft Registry, for example.

Registration will be the key to the international interest enjoying priority over any other interest subsequently registered as over any unregistered interest, international or otherwise. Registration will also be the key to the international interest's validity against the administrator and creditors in the debtor's insolvency.

The fact that the International Registry is intended to be fully computerised means that it will be possible for a potential lender to make a search from any point in the world and to find out, more or less instantaneously, the precise status of the asset against which he is considering advancing funds. This fact alone explains why the future Convention may be expected to make such a major difference to the future pattern of the asset-based financing of high-value mobile equipment.

In structure, the future Convention is intended to be supplemented and implemented for each of the categories of equipment which it covers by a Protocol. Each Protocol will contain the rules necessary to adapt the general rules carried in the Convention to the equipment-specific characteristics and requirements of each category. For example, the future Space Property Protocol will need to provide a definition of the types of space property to be caught by the new regimen. This raises all manner of policy questions, annotated by the co-ordinator of the Space Working Group, Peter Nesgos, in the preliminary draft Space Property Protocol which is annexed to the written paper I have provided for distribution.

The future Space Property Protocol will also contain modifications to the default remedies to be provided under the future Convention. The need for these modifications stems, as I have mentioned, from the ineligibility of most types of space property for physical repossession. The solution advocated in the preliminary draft Space Property Protocol is that of the constructive repossession of an orbiting satellite by means of the relevant tracking, telemetry and command facilities.

In addition, it is anticipated that most of the registration provisions for space property will be carried in the future Space Property Protocol.

Much work has been done on this future Protocol by the Space Working Group set up by Peter Nesgos at the invitation of UNIDROIT. For the time being, though, the primary focus of our endeavours remains the early conclusion of the future Convention and the first of the future Protocols deemed ready by our Governing Council for intergovernmental consideration, the future Aircraft Protocol. A second session of governmental experts will be held next month and a diplomatic Conference is being tentatively envisaged for the end of next year. In view of the civil aviation dimension of the future Aircraft Protocol, these intergovernmental negotiations are being jointly sponsored by Unidroit and I.C.A.O.

Another future Protocol meanwhile lies ready for intergovernmental consideration. This is the preliminary draft Railway Rolling Stock Protocol, the preliminary work on which by a Rail Working Group was completed earlier this month. Intergovernmental negotiations on this future Protocol are to be jointly sponsored by Unidroit and the Intergovernmental Organisation for International Carriage by Rail (O.T.I.F.), the premier intergovernmental Organisation in this field.

The significance of Unidroit's decision to move these Protocols forward through the intergovernmental stage in collaboration with these specialised intergovernmental Organisations is to be seen in function of the very important supervisory powers over the International Registry to be exercised under the future Convention by an intergovernmental body. Amongst other functions, this intergovernmental supervisory body will have responsibility for designating the Registrar for each category of equipment. The conferring of these functions on an intergovernmental body was seen as an important guarantee of the reputation of the international registration system with prospective users. Both I.C.A.O. and O.T.I.F. have served notice of their interest in exercising such functions in relation to aircraft equipment and railway rolling stock respectively.

One of the factors remaining to be resolved in the context of the preliminary draft Space Property Protocol is the identification of the intergovernmental body that might suitably be entrusted with the exercising of such responsibilities in respect of the future Space Property Registry and the related question of the most appropriate intergovernmental Organisation or Organisations in collaboration with which Unidroit should aim to move the preliminary draft Space Property Protocol forward to intergovernmental negotiations.

Both Unidroit and the Space Working Group tend in principle to believe that the most appropriate intergovernmental partner for Unidroit in this endeavour would be the United Nations, in particular in view of the fact that both the Outer Space Treaty and the Registration Convention were concluded under its auspices. We have therefore been in regular touch with the Office for Outer Space Affairs on this issue over the past 18 months and were particularly heartened to hear Dr Jasentuliyana in Perugia in May alluding to the possibility that the United Nations would in future be paying more attention to the commercialisation of space and to collaborating more with other Organisations.

This leads me to take up Dr Doyle's kind invitation to submit recommendations for possible consideration by the Conference. I would have a two-part recommendation to make. This is:

(1) that the Conference consider adopting a Resolution recognising the importance for the commercialisation of space of the work underway within UNIDROIT for the development of a new regimen governing the taking of security in high-value mobile equipment, in particular space property and calling upon all concerned, whether States or intergovernmental Organisations, to lend their urgent and active support to UNIDROIT so as to permit early completion of work on this future Protocol; and

(2) that the Conference consider issuing a related call to the intergovernmental Organisations active in the regulation of matters pertaining to

Outer Space (such as the U.N., I.C.A.O., I.T.U., W.T.O. and E.S.A.) to collaborate actively with UNIDROIT in identifying the most appropriate means of moving the preliminary draft Space Property Protocol forward to intergovernmental negotiations, in particular through the early convening of an informal ad hoc meeting to which not only the aforementioned Organisations would be invited but also member Governments of the Committee on the Peaceful Uses of Outer Space.

I believe that the adoption of such a recommendation would be wholly in line with the announced intention, first, to introduce a greater measure of flexibility into C.O.P.U.O.S.' procedures, secondly, for it to devote greater attention to issues concerned with space commercialisation and, thirdly, to give practical expression to its desire to collaborate more with other Organisations.

Summary Report

The Workshop discussed the characteristic, trend-setting developments in the privatization of certain international organizations (IGOs), focussing on the area of telecommunications. The discussions covered:

a) the privatization models of INMARSAT and EUTELSAT already put into practice,

b) the privatization developments within INTELSAT and INTERSPUTNIK, and

c) the indirect impacts of privatizations on EUMETSAT.

In the cases of para. a) a separation has been made of the governmental, sovereign, coordinative and control functions from the operative business with a market potential. An operative company established under national law (country of incorporation), participating in the market activities with equal rights and without any privileges, is placed beside the reduced IGO. The INMARSAT and EUTELSAT models are basically the same, with INMARSAT having established an additional holding company on top of the operative company. The remaining IGO has a special share in the holding company, entitling it to veto changes to specified parts of the company's memorandum (public interests/public service). With EUTELSAT, the IGO controls the operative company directly, without any share.

In the cases of para. b) INTELSAT/INTERSPUTNIK, a new affiliated company handling the operative business was established, instead of introducing a partial IGO privatization (New Skies NV, spin-off company according to Dutch law and the INTERSPUTNIK/Lockheed Martin Coop. – LMI). As far as INTELSAT is concerned, privatization of this IGO is still being considered, although it is rather difficult to take into account the interests of the developing countries. INTERSPUTNIK has responded to the market changes by providing signatories in the Protocol and Operating Agreement, and a state may nominate several of these signatories. Any duly licensed telecommunications entity can be appointed signatory.

The example of EUMETSAT in para. c) finally shows a concentration on the public service function. EUTELSAT manifests itself in empowering industry of the nascent market for meteorological products by contracting, outsourcing and extensive use of consultancy.

In all analysed cases there was the remaining need to define rules and mechanisms to be able to make sensible, objective trade-offs and choices, first and foremost between public service functions and other uses.

As a result of the discussion the following findings were made:

Space Business is increasingly affected by the growing International Economic Law with open borderlines of public and private law and even numerous soft laws and code of conducts. An other dynamic development in space business is the privatization of IGO's. In this environment it is important that there is a mechanism for giving effect to the basic principles of Outer Space Law (such as non-discriminatory access to services/peaceful purposes/service to all geographical areas). According to the rules of subsidiarity, the UN (COPUOS) is to consider the codification facts which are not covered or no longer covered by the national legislative bodies and the IGO's. A special pending issue in this connection is the maintained guarantee of continued services for developing countries and countries with a minor industrial infrastructure. A further point is the limitation of resources in Outer Space in view of the enormous increase of Outer Space Business. The economic use of Outer Space resources is a subject of public interest. UN (COPUOS) should react in a flexible and timely manner. One additional model could be to formulate similar public soft laws or recommendations to be adopted by the relevant community.

The privatization scheme of INMARSAT and EUTELSAT is of a model character and takes into account in a suitable way the dual and parallel aspects of public services and commercial business in some important areas of space business. In restructuring the organization of an IGO, however, care must be taken to clarify when and where the sovereignty rights, which had been transferred to the IGO, are to be shifted and to which extent the countries involved will continue to exercise jurisdiction and control in the space business (esp. in cases where the former IGO accepted responsibilities under the Space Treaties). Therefore the termination of an IGO should be subject to a formal decision, preferably an intergovernmental conference.

The workshop recognised the positive role of states as a single point of contact in questions of jurisdiction and control. The compatibility of new developments (growing influence of private, international actors in space business) with the principles of the Outer Space Treaties depends on the good will of the states. The role of the UN as a co-ordinator should be strengthened. It is suggested to provide COPUOS with its own administrative staff in order to be able to handle the new tasks. A concentration of the tasks in accordance with the space registration agreement at the UN could help to overcome identified deficits. ITU as a technical forum will not be the ideal organization to deal with the task. The need to discuss a reform of the Registration Treaty was identified.

Parallel to the dynamic development taking place in the private sector the United Nations should take care of all relevant quasi (non)-governmental organizations and non-profit establishments with competence in special areas of public interest (e.g. co-operation of IMO with INMARSAT). There is the need for the definition of "public service". The necessary efforts of various organizations (e.g. UNIDROIT) to achieve an unification of legislation should be recognised. Special attention should be paid to the various aspects of liability and security.

EXPANDING GLOBAL NAVIGATION

SESSION 6

Chair: Mr. David Sagar (Inmarsat)
Coordinator/Rapporteur: Mr. Marco Ferrazzani (European Space Agency/Italy)

SESSION SIX

Expanding Global Navigation Services

Discussion Paper

Paul B. Larsen
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Only the author is responsible for the contents of this paper. He expresses his appreciation for the helpful comments received from Mr. David Sager. The paper may be printed and duplicated for the UNISPACE III Conference. Copyright retained by the author.

Introduction

The world is becoming GNSS-dependant in the same way that it has become Internet dependent. GNSS is both a positioning and a navigation service. It provides accurate navigation service for the different modes of transportation, including aviation, water, road, railroad and navigation in outer space. It has the potential to become the sole tool for navigation. GNSS provides positioning for land surveys, agriculture, fisheries, satellite communications, and many other uses, in addition to transportation. GNSS service includes several military purposes.

The GNSS provider determines the amount of precision that will be accorded in its basic service to the user. The user can obtain augmented precision from other sources. Basic GNSS services are being augmented extensively from both land and space.

GNSS is a rapidly developing issue which did not exist at the time of previous UNISPACE conferences. Now there are lively discussions about GNSS around the world. The subject has such magnitude and potential that the United Nations can consider the issue and its legal implications at UNISPACE III. Among several topics the conference will "examine present and planned systems for provision of navigation services by satellite and consider matters involving universal access, continuity of services, implications for international ownership, international co-operation and issues of system standardization."[1]

This document will focus on GNSS legal issues. It only describes GNSS technology to the extent necessary to illustrate legal issues.

Existing GNSS Systems.

Two independent Global GNSS systems are operational and currently provide services. They are the U.S. Global Positioning System (GPS) and the Russian Federation's GLONASS.[2] The United States, and many other countries individually and jointly are augmenting the GPS to make it more accurate. For example maritime navigation solely by GPS currently is possible by augmented GPS. The United States has agreed to make GPS available for international navigation and positioning and Russia has made a similar agreement regarding GLONASS. Such availability "is not intended in any way to limit the rights of a state to control the operation of aircraft and enforce safety regulations within its sovereign airspace."[3]

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[1] N. Jasentuliyana, President, International Institute of Space Law, letter of 4 January, 1999

[2] 1996 Federal Radionavigation Plan (hereinafter cited as FRP) at 1-9 and 33-24

[3] 14 October, 1994, letter from U.S. Federal Aviation Administrator to ICAO Council President. Similar letter from Russia

Planned GNSS Systems

The European Union and the European Space Agency have proposed to create a global navigation satellite system called Galileo which would be interoperable with GPS and would have the same reference system as GPS.[4] Private satellite systems capable of providing positioning and navigation service also are being considered.[5] Mobile satellite operators such as ICO Global Communications and Iridium could add navigation and positioning capabilities to their communication satellites. Furthermore, several GNSS augmentation systems are close to operability. The Wide Area Augmentation System (WAAS) will make possible Category 1 and Category II flights by airplanes. A different augmentation, the Local Area Augmentation Service (LAAS), will make it possible to land airplanes by satellite navigation (Category III flights).[6] A European augmentation system, EGNOS, is close to completion. Augmentation systems are being planned in other countries, for example Japan, as well.[7]

GNSS Investment and Technology

In legal discussions GNSS can no longer be viewed as just a navigation and positioning technology. It has become a world-wide economic and social issue. Users want access to GNSS. Manufacturers want to exploit the market. Nations want the economic advantage of having a GNSS industry. The stakes are high. The U.S. National Academy of Public Administration[8] forecast in 1995 that by the year 2005 the GNSS world market would reach $31 billion, 55% of which would be outside of the United States. In 1999 the European Commission made an even higher estimate, approximately $40 billion by the year 2005.[9] The largest growth will occur in land transportation,[10] far outstripping the demand for GNSS in the aviation and maritime areas. The United States currently dominates the GNSS market.[11] Understandably industries outside the United States also would like to profit from GNSS and wish to challenge the U.S. market domination. Furthermore, labor interests would like to expand employment into the GNSS industry. The 1996 U.S. Presidential Decision Document (PDD) estimated that the GPS industry would create 100,000 jobs within five years.[12] The EU estimates that 100,000 jobs would be created by the year 2008, if the proposed Galileo project goes forward.[13] As U.S. Vice President Gore has said: GNSS "has become an engine of economic growth and efficiency as businesses and consumers are continually developing new and creative applications of the system."[14] GNSS development is aided by price reduction of GNSS receivers which now are mass produced, so that price is not the barrier that it once was: a basic receiver can be purchased for $99, although sophisticated receivers are more expensive. Finally, the technology of the GNSS satellites is improving as second and third generation GNSS satellites and receivers are entering the market place.

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[4] European Commission, Galileo, Involving Europe in a New Generation of Satellite Navigation Services, 9 February, 1999 (hereinafter cited as Galileo)

[5] See Boeing's application to U.S. Federal Communication Commission for radio frequency to provide satellite navigation and positioning service, 1999.

[6] FRP supra n. 2 at 3-11 to 13.

[7] Larsen, GNSS Augmentation: Legal Issues, 40 Coll. on the Law of Outer Space

[8] The Global Positioning System: Charting the Future, National Academy of Public Administration, National Research Council, 1995, at XXVI

[9] Galileo, supra n 4, at iv.

[10] Galileo, supra n 4, at iv.

[11] Galileo supra n. 4, at 2

[12] March 29, 1996, U.S. Presidential Decision Document

[13] Galileo, supra n. 4, at 4.

[14] March 30, 1998, Gore Statement

Institutions that have Legal Authority over GNSS

International Institutions

The United Nations

The UN is the only institution that has a special comprehensive institutional role to consider not only specific GNSS uses but all GNSS functions.[15] No other organization can meet the needs of every category of user. The UN Committee for Peaceful Uses of Outer Space, within its authority over space activities, has produced several international treaties that are relevant to GNSS operation. They are:

The 1967 Treaty on Principles Governing the Activities of States in the Exploration and use of Outer Space, including the Moon and Other Celestial Bodies;[16]

The 1968 Agreement on Rescue of Astronauts, the Return of Astronauts and of Objects Launched into Outer Space;[17]

The 1971 Convention on International Liability for Damage caused by Space Objects;[18]

The 1974 Convention on Registration of Objects Launched Into Outer Space.[19]

The 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies[20] (which though relevant, has not achieved the universal acceptance of the first four treaties).

The Committee has authored and continues to author United Nations General Assembly Resolutions on outer space matters that impact GNSS. For example the Committee is working on a legal instrument on space debris. Furthermore three times the Committee has sponsored comprehensive international conferences on space issues, this time examining GNSS.

International Civil Aviation Organization (ICAO)

The Convention on International Civil Aviation (Chicago Convention), Article 37,[21] gives ICAO the important function of adopting international standards and recommended practices (SARPS) and procedures for air navigation (PANS). In accordance with Article 37, ICAO has developed and continues to develop SARPS for GNSS. On the basis of this authority, ICAO currently is assuming even wider legal authority over GNSS. The 1998 ICAO Assembly at its 32nd Session revised the Number 1 item on the ICAO Legal Committee's active agenda to include consideration of a legal framework for GNSS.[22] The ICAO Council later explained that analysis of legal aspects would include communications, institutions, liability and related issues.[23] The ICAO Assembly affirmed the ICAO Council's decision to establish the Study Group on Legal Aspects of CNS/ATM Systems, and instructed the Council to "consider the elaboration of an appropriate long-term framework to govern the operation of GNSS systems, including consideration of an international Convention for this purpose, and to present proposals for such a framework in time for their

[15] Larsen, Positing Satellites: Current Institutional Issues, 37 Coll. on the Law of Outer Space.

[16] 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, International Instruments of the United Nations, at 288

[17] Id. at 291

[18] Id. at 293

[19] Id at 297

[20] Id. at 299

[21] 1944 Convention on International Civil Aviation, (Chicago Convention) ICAO Doc. 8900

[22] ICAO Assembly Resolution A32-20

[23] ICAO Doc. C-CW/11026

consideration by the next ordinary Session of the Assembly."[24]

The International Maritime Organization (IMO) and INMARSAT

The International Maritime Organization, as the counterpart to ICAO, adopts and continuously reviews the navigation rules and procedures for GNSS maritime navigation. For example, IMO requires GNSS equipment on board ships in international carriage beginning with the year 2000.[25]

The objects of the privatized Inmarsat company, Inmarsat Limited, include the provision and support of global, regional and domestic satellite services, including radiodetermination and radionavigation.

International Telecommunication Union (ITU)

GNSS satellites communicate with GNSS receivers by use of radiofrequencies. GNSS signals are rather weak. Radio interference can be a problem. Radio frequencies used by GPS, GLONASS, and proposed mobile satellite systems (MSS) are all close to each, other although so far interference does not appear to have been a problem. It is a cause of future concern, however. Augmentation of GPS also requires use of radio frequencies. GNSS use of several radio frequencies cause manufacturers to build more complex receivers that can receive multiple frequencies, thus increasing the price of multiple receivers.

Radio frequencies are coordinated within the ITU at World Radiocommunication Conferences (WRC). In the year 2000 WRC the ITU will specially focus on radio spectrum allocation to GNSS operations. Unfortunately, the GNSS providers and users have to compete in ITU with other users of the radio frequency spectrum. Their main concern is that the mobile satellite system (MSS) operators would like to use or share the use of the GNSS radio spectrum, thus endangering the reliability of the GNSS signals.

Only Governments have voting rights in ITU so all GNSS interests, through their government representatives to the WRC, are seeking to join forces to protect the GNSS radio spectrum at the year 2000 WRC. An example of such joinder of forces is the coordination taking place among Europeans in the European Conference of Postal and Telecommunications Administrations (CEPT). There is a natural alliance between the Europeans in CEPT with other states that are concerned with preserving radio frequencies for GNSS. This joinder of interests includes the United States which also is anxious to preserve and protect its current GPS frequencies and will need additional frequencies to meet future needs.[26] GLONASS has a natural concurrence of interest with the Europeans if GLONASS and Galileo are joined in some form.

European Union (EU), the European Space Agency (ESA)and EUROCONTROL

In 1994 the European Commission, EUROCONTROL and the European Space Agency (ESA) agreed on the European Geostationary Navigation Overlay System (EGNOS).[27] EGNOS is a multimodal satellite augmentation system. It is scheduled to become operational in the year 2002. Furthermore, the European Commission and ESA have proposed an independent GNSS system called Galileo to be operational in the year 2008. Galileo would cost approximately $2 billion. The Commission proposed that the "the system should be global from the start in order to allow full development of the global market."[28] Galileo may be joined with GLONASS if the parties can reach a satisfactory agreement. In May and June, 1999 the ESA governing body decided to proceed with

[24] See discussion of maritime standardization at IV below

[25] Galileo supra n. 4, at 16; see discussion of standardization at IV below

[26] Galileo supra n. 4, at 23

[27] Id. at 12. See Larsen, GNSS Augmentation: Legal Issues, 40 Coll. on the Law of Outer Space

[28] Id. at 12. See Larsen, GNSS Augmentation: Legal Issues, 40 Coll. on the Law of Outer Space

the Galileo project, and the EU Council of (Transport) Ministers similarly approved Galileo funding. The EU Council of Ministers will make the final decision.[29] In time EGNOS would transit into and become incorporated into Galileo.

National Institutions

Russia

Russia's GLONASS system is changing. On February 18, 1999.[30] President Yeltsin decreed that the Russian military would share control over GLONASS with civilians. The decree creates a joint military-civilian board to operate GLONASS. Russia is open to the possibility that the GLONASS may become the basis for a joint Russian and European Global Navigation Satellite System. Russia would benefit from European financial contributions to maintain the GLONASS system. President Yeltsin's decree also opened the door for foreign private companies to invest in GLONASS. Independent of the GLONASS satellites, the GLONASS radio frequencies are very valuable. The possibility exists that GLONASS could disappear if outside funding is not provided. By a financial joinder with the Europeans GLONASS would become subject to a joint control.

United States

There continues to be interest in the institutional administration of the U.S. GPS; the European Union has recently tried very hard to obtain shared control and management over GPS.[31] It is interesting to observe that there has been U.S. study of options for shared control and management of GPS. In 1995 the Rand Critical Technologies Institute's study[32] identified six options for management and operation; they were:

- GPS could continue as a U.S. military system.
- GPS could become jointly or exclusively governed by one or more U.S. civilian agencies.
- GPS could be privatized and managed by a U.S. entity
- GPS could be privatized and internationally managed.
- GPS could be augmented by civil/private/foreign elements (based in space or on the earth's surface)
- GPS could gradually be displaced by private space systems or other technologies

Rand did not consider these options to be mutually exclusive. For example a U.S. military GPS could be augmented by elements from foreign countries, or by an international organization. Likewise, a private GPS could be part of an "international venture in related space-based communication services." Being able to charge for services would be essential to any private GPS operation.[33] However, the Rand study could not quite visualize how a private operation could collect charges from non-governmental users except through some kind of tax. Thus continuation of the operation of GPS by the U.S. military appeared to Rand as the most dependable and feasible.[34]

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[29] Space News, May 24, 1999, at 1. SATELLITE TODAY, 21 June, 1999. The EU Commission hopes that EU members will only have to provide 50% of the funding and that the private sector will provide the remainder. While the EU decision does not constitute final approval of Galileo, it is a step in that direction

[30] Space News, March 18, 1999, at 4

[31] Galileo supra n. 4, at 5. The United States did not agree to share control of GPS

[32] The Global Positioning System: Assessing National Policies, 1995 Rand Critical Technologies Institute, at 163-164

[33] Id. at 164

[34] Id. at 166

Military

The military designed and created the GPS. The military continues to operate and maintain the GPS and to replace GPS satellites as necessary. The GPS service is available continuously to all military and civilian users. However, the more accurate GPS, so-called Precise Positioning Service (PPS) is only available to military users. The standard GPS (SPS) is available to all users. This is called selective availability (SA).[35] GPS is used not only by the U.S. military but also by foreign military in NATO. NATO participants are expected to continue to use GPS. To do otherwise could interfere with coordination within NATO. The military has become more dependent on GPS than the civilian sector has. This has resulted in establishment of two new civilian radio signals effectively separating the civilian and the military GPS users.[36]

Civilian

Civilian GPS uses are becoming more extensive than military GPS uses. The increased civilian pressure for adequate GPS service caused the U.S. President to issue the 1996 Presidential Decision Document to sort out GPS responsibilities between DOD and DOT. When civilians, such as the maritime users, began to use GPS as their sole navigation system, it became more difficult for the military to discontinue GPS signals for testing or other purposes, because civilian users need a navigation system that is virtually available without interruption. (Available 99.7% of the time for maritime users. ICAO Annex 10 requires that aviation navigation systems be available 99.97% of the time).[37]

The Presidential Decision Document selected the Department of Transportation to be responsible for all civilian GPS matters. A permanent inter-agency GPS Executive Board (IGEB), jointly chaired by DOT and DOD, coordinates GPS. Serving on the Board are DOT and DOD executives, including the joint Chiefs of Staff, as well as the Department of Commerce, Interior, Agriculture and other agencies.

Many events regarding GPS, having legal effects, are taking place currently in the United States. For example, the U.S. Coast Guard and the FAA are issuing Notices to Mariners and to Airmen regarding DOD's testing (that is, jamming) of the GPS signals. These notices also are sent to international organizations and to other countries. However, it may be difficult to locate some users, for example farmers and recreational users, to give them adequate notice, thus raising legal issues of reasonable forseeability and due care. The FAA and the Coast Guard are involved in other regulation of GPS. The Federal Railroad Administration (FRA) regulates use of GPS signals to separate trains. The FCC is examining public safety radio regulations. In 1998 the White House issued decisions regarding the new second and third radio frequencies. The Congress adopted legislation that funds GPS and its augmentation thus influencing the availability of GPS. Many other U.S. Government activities that affect civilian uses are taking place.

International Coordination of GNSS

Technical Coordination among GNSS Services

Both the U.S. GPS and GLONASS can be used consistently by the same user. GNSS receivers are built to receive and use both systems. It is the intention of the Europeans that Galileo be designed for use consistent with both GPS and GLONASS.[38] Consequently, all GNSS services are and will be interoperable.

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[35] See discussion of Selective Availability at V below.

[36] Id. On 25 January, U.S. Vice President Gore announced that the United States would add two new civilian frequencies to GPS

[37] Navigation signals should be available 99.7% of the time for maritime users. ICAO Annex 10 requires that aviation navigation systems should be available 99.97% of the time

[38] Galileo, supra n. 4, at v

Coordination and Standardization of Global Navigation and Positioning Services

Both GPS and GLONASS are dual use services. That is, they serve both military and civilian users. Consequently, the military and the civilian authorities constantly have to coordinate. Furthermore, the civilian GNSS users have to coordinate and establish GNSS standards and recommended practices in order that the many categories of users know the exact nature of the navigation and positioning service as it applies to this particular category. There needs to be standardization within each category of user such as aviation and maritime users; and also among the various categories of users. In regard to augmented GNSS there probably also needs to be more coordination and possibly provision of augmented GNSS in the countries which have not made plans for augmented service to establish uniform world-wide service.[39]

Aviation

ICAO is authorized by the 1944 Chicago Convention to oversee international civil aviation. Article 37 of the Convention establishes ICAO as the competent body to establish international minimum Standards and Recommended Practices for navigation of aircraft by GPS. ICAO is the major institution for discussion of GNSS relating to air navigation, communication, surveillance, and air traffic management. ICAO also is the forum for discussion of legal issues relating to GNSS aviation uses . ICAO actively establishes GNSS standards and has approved standards and recommended practices.[40] One commentator states the importance of standardization of integrity data between adjacent service providers and of satellite-based augmentation systems, though suggesting that such standardization will probably best take place in impartial forum outside of ICAO.[41]

Maritime

The International Maritime Organization (IMO) is the maritime counterpart to ICAO. Like ICAO it establishes international navigation standards. IMO Resolution A.815 (19) on the Worldwide Radionavigation System was adopted on 23 November, 1995; and IMO Resolution A.860 (2) establishing maritime policy for future GNSS systems, was adopted on 27 November 1997. IMO standards require GNSS on board ships beginning in the year 2000.

IMO has a long interest in space communications, and it took the initiatives to establish the International Maritime Satellite Organization (Inmarsat) in order to provide satellite communications for shipping worldwide. Inmarsat's satellites provide navigation differential correction for GNSS through navigation equipment on Inmarsat-3 satellites. "The Inmarsat-3 navigation payloads will be used in both the U.S. Wide Area Augmentation System (WAAS) and the similar European Geostationary Overlay System. WAAS will not provide integrity data for the GLONASS satellite, but EGNOS specifications do provide for GLONASS integrity data. Although each service provider has different design criteria and service intentions, it is absolutely critical that all such systems should be interoperable and that user receivers will function equally well in any one of the satellite-based augmentation systems."[42]

Other Coordination and Standardization

There has not been significant standardization of the surface transportation uses although the greatest future GNSS growth will be in automobile navigation. Neither has there been significant standardization in land survey and agricultural or other uses of GNSS.[43] There is need for coordination of standards being established for the various modes of users. The need for unified regulatory coordination among the standard-setting organizations is recognized by the European Union. The Galileo

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[39] George V. Kinal, Satellite Navigation Developments at Inmarsat, Paper presented to 1997 Gothenburg Conference, at 9

[40] See ICAO discussion at III above

[41] Kinal, supra n. 39, at 9

[42] Id. at 2

[43] Galileo, supra n. 4 at Annex IV (b)

report states: "Consideration need to be given to whether there is a need... to set up a European GNSS Regulatory Co-ordinator" to consider standardization for all users.[44] The Galileo report continues: "The standard developed could then be incorporated into regulation by the appropriate bodies (e.g. ICAO, IMO, ISO, CENELEC, IEC, EUROCONTROL and ETSI). The Coordinator "would have an important role to promote the introduction of harmonized regulatory performance requirements across transport modes and between user groups."[45] Therefore the Galileo report proposes establishment of " a GNSS Regulatory Co-ordinator to develop mandatory standards to be implemented by all Member States to satisfy the objectives of the Trans-European Positioning and Navigation Network."[46]

Within individual governments efforts are made at coordinating GNSS standardization among the categories of civilian GNSS users. For example, within the U.S. Department of Transportation, the Secretary of Transportation seeks to coordinate and standardize the varying GNSS uses by the aviation, maritime, highway, rail, and other civilian transportation uses. While the modal GNSS uses are divided into the FAA for aviation, the U.S. Coast Guard for maritime, the Federal Highway Administration for highways, the Federal Railroad Administration for trains and yet another separate administration for transportation of hazardous materials, all these administrations are under the supervision of the Secretary of Transportation. It becomes the Secretary's responsibility to seek transportation system-wide coordination and standardization. The President also has delegated to the Secretary of Transportation to coordinate civilian GNSS use by non-transportation users.[47] Thus it is the Secretary's function to provide overall coordination among all the civilian users.

Other governments will have similar government-wide efforts at coordinating GNSS.

Other Legal Issues

GNSS Financing

GLONASS service is free of charge. U.S. GPS is also free and the United States intends to continue to provide the service free of charge. The U.S. Government has found that it would be difficult to assess direct user charges. The cost of GPS services is financed either through general tax revenues (Department of Defense and U.S. Coast Guard costs) or through air transportation trust funds which are supported by a fuel tax or value added tax.[48] The Galileo service would initially also be publicly funded. The possibility exists of self-financing at a later stage through a public private partnership (PPP).[49] As long as the U.S. GPS is free, it will not be possible to charge for corresponding Galileo service. However, the EU envisions a charge for service that requires a high level of guaranteed accuracy, availability and integrity. Furthermore, a general tax on GNSS receivers is being considered for Galileo.[50] The Europeans have experience with administration of a charge for radio and television services. (There is no corresponding experience in the United States and such a flat charge may not work in the United States). Such a charge would cover all GNSS services including basic navigation service.[51] The tax would include the cost of maintaining Galileo after initial establishment. Finally, a special charge for guaranteed, highly accurate and dependable GNSS

[44] Id. at 23

[45] Id. at 24

[46] Id. at 25

[47] Supra n. 12

[48] 1996 FRP, supra n. 2, at 1-27

[49] Galileo, supra n. 4, at vi.

[50] Id at 16. The Europeans have experience with administration of a charge for radio and television services. There is no corresponding experience in the United States and such a charge may not work there

[51] Id.

probably would require encryption in order to limit access.[52]

Universal Access to GNSS

The Chicago Convention, Art 15, states the principle that air navigation facilities provided for public use shall be accessible under "like uniform conditions" for aircraft of all contracting states. The treaty principle of non-discrimination has been upheld by U.S. national courts.[53] The principle of non-discriminatory access to air navigation assistance being well established both internationally and nationally, there appears to be no objection to non-discriminatory access to GNSS. A precedent exists in the UNGA Resolution on remote sensing satellites which guarantees access to data on non-discriminatory terms. The principle of non-discriminatory access (including access to augmented GPS services) under uniform conditions was adopted in the ICAO Charter on Rights and Obligations of States Relating to GNSS Services.[54]

A right of universal access would be compatible with a charge for services as long as all GNSS users are charged uniformly. The UNGA Resolution on Remote Sensing is a precedent.[55] While it provides for non-discriminatory access it does not preclude remote sensing services from charging for their services.

Selective Availability

Selective Availability (SA) of the GPS service deserves mention because GPS will change in the future when SA is eliminated. GPS currently is available at two levels of service: the Standard Positioning Service (SPS) and the Precise Positioning Service (PPS). The SPS is available world-wide free of user charges. SPS provides positioning accuracy of 100 meters horizontally and 156 meters vertically and time transfer accuracy to Coordinated Universal Time within 340 nanoseconds. The more accurate PPS is available to U.S. government and to other governments (for civilian and military uses) through special agreement with the Department of Defense. It provides the most accurate direct positioning, velocity, and timing information continuously available from the basic GPS. It provides predictable positioning accuracy of at least 22 meters horizontally and 27.7 meters vertically and time transfer accuracy to Coordinated Universal Time within 200 nanoseconds.[56] The purpose of this difference in quality of service is to provide an advantage to the military users and to deny such advantage to others. SA evidences the military origin of GPS.

The end of SA was announced in the 1996 U.S. Presidential Decision Document (PDD) stating that the SA will be terminated and that the more accurate GPS service will become available to the civilians users as soon as military technology enables the military to obtain the equivalent of the SA advantage in different technical ways. For that purpose, each year beginning in the year 2000, the President will evaluate whether SA can be eliminated. The PDD decided that SA will be turned off at the latest in the year 2006.[57] Related to the PDD, U.S. Vice President Gore announced on 30 March, 1998 that a second civilian signal will be provided by GPS. The Vice President announced that the United States will provide the second civilian frequency by the year 2005. The new signal will be built into the next generation of GPS replacement satellites (Block IIF satellites). Vice President Gore further announced: "GPS civil signals are, and will continue to be, provided free of charge to consumers, businesses and scientists around the world." Yet a third signal dedicated to safety-of-life will also be made available by the year 2005.[58] This means that "civilians soon will have access to the same type of capability [as

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[52] Galileo, supra n. 4, at 22

[53] Aerolineas Venezulana v. Dade Country Airport, 1960

[54] ICAO Doc. A32-WP/24, Appendix A. See discussion of Charter on Rights and Obligations of States Relating to GNSS Services below at VII

[55] Principles Relating to Remote Sensing of the Earth from Outer Space, International Instruments of the United Nations, at 305

[56] SPS accuracy is increased greatly by GNSS augmentation

[57] Supra n. 12

[58] Supra n. 36

military users]"[59] Augmentation still will be necessary for landing airplanes and other navigation and positioning activities that require great precision. However, removal of SA will have effect on GNSS augmentation.[60]

GLONASS does not have a Selective Availability feature. The civilian users receive the same level of service as the military.

International Ownership of GNSS Services

Precedent for jointly-provided international navigation services exist in ICAO. The Chicago Convention, Article 77, provides: "Nothing in this Convention shall prevent two or more contracting States from constituting joint air transport operating organizations or international operating agencies." Furthermore, the Chicago Convention, Article 71, permits the ICAO Council to provide air navigation facilities "for the safe, regular, efficient and economical operation or international air services." Under this provision the ICAO Council in 1947 accepted responsibilities for maintaining the North Atlantic Ocean Weather Stations. With this precedent there appears to be no legal obstacles for international ownership and operation of GNSS. EUROCONTROL is an excellent example of international operation of air traffic control. Indeed the Galileo project under which the EU and ESA jointly would operate a GNSS facility indicates the appropriateness of international ownership and operation of GNSS. Finally, the 1998 ICAO Charter stated that States had the right to establish jointly-owned GNSS services.[61] So the principle is well established.

Sole Use

An important current discussion is whether GNSS will become the sole navigation and positioning tool of the future. Large economic resources would be saved if all current navigation and positioning services, for example land-based air navigation technology, could be discarded and countries could instead depend solely on GNSS technology. There is safety in the existence and availability of several GNSS systems, each of which can provide back-up in case another GNSS system goes down. There are, on the other hand, conditions such as severe solar storms[62] (burst of energy from the sun can trigger phantom signals) or meteorite showers which would affect all GNSS satellites. Issues of intentional or unintentional signal jamming and the need of the service provider to disrupt service for the purpose of testing signals also raise questions whether or when sole use of GNSS will be possible. Nevertheless, some maritime users have moved to sole GNSS use (in the United States), and some airlines (Continental Airlines) now navigate over oceans solely by use of GNSS.

GNSS Liability

Sovereign Immunity of States from Liability for GNSS operations

Liability of the GPS operator for negligent commissions or omissions is a major unresolved legal issue. Because U.S. GPS is the major operating GNSS service, it is important to know the applicable law for private damage claims brought by non-U.S. nationals and by U.S. nationals in U.S. courts. The Rand study expresses the view that GPS is much like government navigation and air traffic control assistance. Once an aid is established, the government has a duty to maintain it and is liable for failure to do so.[63] The U.S. government provides notice to the public that GPS service is available and is reliable. Notices are issued in the FRP, the Federal Register, FAA Notices to Airmen, Coast Guard notices to Mariners, and through the Coast Guard GPS Information Center.[64] The argument for liability for U.S. GPS service is supported by a

[59] Joint DOD/DOT news statement, 30 March, 1998

[60] Kinal, supra n. 39, at 9

[61] ICAO Doc. A32-WP/24. Appendix A, June 6, 1998

[62] Paul Recer, Sun storms may leave us in the dark, Seattle Post-Intelligencer, June 1, 1999 at 1

[63] Rand supra n. 32 at 192

[64] Id.

famous U.S. Supreme Court case called Indian Towing v. U.S.[65] in which a ship ran aground owing to the failure of a light in a lighthouse. The U.S. government conceded that it was not entitled to governmental immunity under the U.S. Federal Torts Claims Act (FTCA)[66] and the Court thus found the governmental immunity had been waived by the Act. A number of air traffic control cases support this point of view.[67]

On the other hand Government liability was recently restricted by the US Supreme Court in a case called Smith v. United States.[68] The Supreme Court held the FTCA does not apply to governmental negligent acts and omissions outside U.S. territory. According to the Smith case outer space is outside U.S. territory, as defined by the FTCA, and thus the Supreme Court is of the view that the FTCA does not permit the government to be sued for outer space activities such as GNSS. Government immunity prevails.

The sovereign immunity of other sovereign governments is governed by their laws. Several states do not recognize the notion of sovereign immunity. The sovereign immunity of intergovernmental institutions is governed by international laws.

International Liability Regime

The 1971 Convention on International Liability for Damage Caused by Space Objects makes the launching state liable for loss of life, injury, damage to property of States or their natural or juridical persons. The launching state is absolutely liable for damage caused on the Earth's surface and in airspace; damage caused in outer space is based on a fault regime. Under the Liability Convention claims for compensation are presented by States, not by individuals, that is, the Convention does not permit private citizens to bring claims against their own government. However, major space powers interpret the Convention to the effect that it does not apply to liability for indirect damages. GNSS damages may be considered to be indirect damage.[69]

Future Liability Regimes

In principle GNSS service which is provided for a charge and which is guaranteed to be of a certain quality "could be made more attractive if liability cover was provided for the services subscribers receive."[70] GNSS services would thus become more marketable. Liability would be in the nature of insurance justifying greater reliance on the GNSS services.[71]

Amendment of the Liability Convention to allow for liability for GNSS type activities would place GPS navigation on the same legal basis as current government liability for navigation and traffic control. As the Rand report points out,[72] there is good reason for the provider to assume liability for its GNSS negligence. Potential liability for negligence is a safety incentive.

Work is in progress in ICAO[73] on a liability regime which would make GNSS providers liable for negligent GNSS services affecting aviation air transport. If such a specialized liability regime is adopted it could result in discrimination among GNSS users. Whereas GNSS activities in aviation would be subject to liability, similar activities in all the other GNSS services would not result in liability.

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[65] Indian Towing v. United States, 350 U.S. 61 (1955)

[66] 28 U.S.C. 2671

[67] Eastern Airlines v. Union Trust, 221 F.2 62. Aff'd per curiam sub nom. United States v. Union Trust, 350 U.S. 905 (1955). Also see Dalehite v. United States, 346 U.S. 15 (1952)

[68] Smith v. United States, 507 U/S. 197 (1993) For discussion see 63 J. Air L. & Com 517 (1998)

[69] See Spradling, The International Liability Ramifications of the U.S. Navstar Global Positioning System, 33 Coll. on the Law of Outer Space

[70] Galileo, supra n. 4 at 16

[71] Id.

[72] Supra n. 63

[73] Supra n. 23

Charter on Rights and Obligations of States relating to GNSS Services

As mentioned above,[74] ICAO's announced long term objective is to create a framework to govern the operation of GNSS. The ICAO Assembly instructed the ICAO Council to have such a legal framework for presentation to the next ICAO Assembly (in the year 2001). As an interim measure, ICAO adopted a Charter on Rights and Obligations of States Relating to GNSS Services.[75] The Charter is similar to the UNGA Resolution establishing Principles Relating to Remote Sensing of the Earth from Outer Space, except that the Charter applies only to aviation.. The ICAO Charter provides that: (1) Safety is the paramount purpose of GNSS. (2) There shall be non-discriminatory access to GNSS (including augmented GNSS) under uniform conditions. (3) GNSS providers shall respect the sovereign rights of states to control air navigation within their states. (4) GNSS shall be standardized in accordance with ICAO minimum standards and recommended services. (5) States shall work together towards the greatest possible uniformity of GNSS services. (6) User charges shall be non-discriminatory. (7) GNSS shall provide mutual assistance and cooperation to other states in planning and implementing GNSS. (8) GNSS providers shall respect interests of other states; and (9) the possibility of jointly-provided GNSS shall not be inhibited. ICAO's Charter on Rights and Obligations would only govern aviation users because ICAO's authority is limited to aviation.[76]

The Charter approach is familiar territory for the United Nations Committee for Peaceful Uses of Outer Space. As mentioned above, it is like the UNGA Resolution on remote sensing which the UN Committee adopted unanimously.

While ICAO's authority is limited to aviation, the authority of the UN Committee encompasses all GNSS uses. Thus the UN Committee could very appropriately examine not only the GNSS issues but also the possible universal need for such Charter. A UN Charter on GNSS could have the same effect as the other UN legal instruments on outer space: it would provide direction for all GNSS.

Multifaceted GNSS

The future law of GNSS could develop in either of two ways: a general legal regime for GNSS with specialized regimes for each use; or separate legal regimes for each use or mode. This is an important legal question because the individual categories of users are beginning to establish rules for their singular use without consideration for how those rules would affect other users.

An example of a singular regime is the new ICAO Charter adopted at the 1998 Rio Conference and confirmed by the 1998 ICAO Assembly.[77] GNSS has been approved as the primary means of air navigation in several parts of the world. The number of aircraft equipped with GNSS receivers is growing rapidly. While it is not yet possible to land airplanes with GNSS, the FAA is moving rapidly towards that goal with its augmented GPS. GPS can become the primary air navigation system by using WAAS and LAAS. Other countries are moving in the same direction. So it is not surprising that the aviation mode feels that GPS is for aviation and that the legal regime should primarily be for airplanes. This results in ICAO's ambitions for a comprehensive GNSS legal regime and a specialized regime for liability described above.[78]

The International Maritime Organization is establishing international maritime navigation standards. By use of augmented GPS, ships now navigate solely by GPS. Law suits for negligent navigation using GPS are beginning to appear in the

[74] Id.

[75] ICAO Doc A32-WP/24, Appendix A, supra n. 54

[76] Id.

[77] Id.

[78] Larsen, GNSS International Aviation Issues, 41 Coll. on the Law of Outer Space

courts. Thus maritime users have a strong feeling that GPS is for maritime navigation.[79]

However, the largest growth in GPS use is in the automotive area. There are about 650 Million automobiles in the world. By the year 2025 there will be 1 billion cars, most of them with a GPS receiver. So this mode of transportation justifies attention as international laws and regulations are established for GNSS.[80]

Railroad authorities, such as the U.S. Federal Railroad Administration, are very actively promoting the use of GPS to monitor the location and speed of trains in order to improve the safety and efficiency of the railroads. With wider availability of DGPS throughout the United States, the beneficial effect of GPS on this mode of transportation exists and justifies attention.

Availability of accurate land surveys through GPS is altering the surveying business, saving cost of construction material and of labor, and producing greater accuracy[81]. The surveying business depends on accuracy, so that any aspect of GPS that will promote that is of interest to the surveyors. Land surveying affects the law of conveyancing. GNSS-generated land surveys generally are considered to be legally authentic and are legally acceptable to courts and other tribunals.

Agriculture, the fishing industry, recreation interests, telecommunications, outer space navigation, all have an active stake in GPS laws and regulations. They do not want to be left out or overshadowed by any one mode. They want to be part of the community that formulates these laws and regulations.

In conclusion, while each mode may view GNSS as their issue, GNSS clearly is multifaceted. There is danger of conflict between differing operating principles for GNSS. The larger GNSS constituency, rather than each modal constituency, could more effectively achieve the general principles. The same reasoning applies to liability. The maritime, rail, automotive users and the farmers, fishermen and surveyors would certainly be unhappy to learn that they could not recover for negligent GNSS, but that airlines could.

Opportunity exists for a multi-functional international body such the UN Committee for Peaceful Uses of Outer Space to adopt multi-functional GNSS legal principles. The alternative may be that we may are left with piecemeal, conflicting GNSS legal principles. To support COPUOS multi-functional legal principles, coordination of legal principles and technical standards among the regulatory organizations (ICAO, IMO, and others) is desirable.

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[79] See IMO Resolution A.815(19 on Worldwide Radionavigation System, adopted on 23 November 1995, and IMO Resolution A.860(20) on Maritime Policy for a Future Global Navigation Satellite System (GNSS), adopted on 27 November 1999

[80] See Washington Post, supra n. 10

[81] Larsen, Use of Global Navigation Satellite System (GNSS) Evidence for Land Surveys: Legal Acceptability, 38 Coll. on the Law of Outer Space

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Commentary Paper

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I wish to offer my congratulations to Professor Paul Larsen for the excellent paper presented by him. I am particularly thankful to him for his kind references throughout the paper to ICAO's work in this field. Indeed, in this decade, the International Civil Aviation Organization has dedicated a large portion of its work to the implementation of CNS/ATM systems, in which GNSS is one of the key elements. Among other things, ICAO has organized two worldwide conferences for this purpose. The first was the Tenth Air Navigation Conference held at the headquarters of ICAO in Montreal, Canada, in September 1991, which was attended by 85 States and 13 international organizations; the second was the World-wide CNS/ATM Systems Implementation Conference held in Rio de Janeiro, Brazil, from 11 to 15 May 1998, which was attended by 123 States, 27 international

organizations and 32 industry delegations. ICAO gives high priority to this programme because the new system has special significance to aviation. While aviation users may account for a minority of the users of GNSS, as compared with, for example, users in the sector of automobiles, aviation has unique characteristics which differentiates it from other modes of transportation. Most of you present today, I believe, came to Vienna by air. I am sure that you have strong concerns if the aircraft you took received wrong, faulty or inaccurate navigation signals. You would probably be less concerned if your car did not pick up the right signals when you drove to this conference centre. Clearly, in aviation, safety of aircraft, and more importantly, safety of the travelling public is at stake and the risks involved are of a totally different magnitude. Accordingly, consideration of multifunctional GNSS legal principles in the U.N. forum should necessarily take into account the special situation of aviation users and should be closely coordinated with the current work of ICAO and perhaps other international organizations such as IMO.

There is no doubt that GNSS is multifaceted. Its multiplicity is not only reflected in different modes of users, but also, in ICAO context, in that it is one of the components of the Communications, Navigation Surveillance and Air Traffic Management. The legal issues would be considered, for example, together with legal issues relating to communication satellites. Furthermore, the implementation of CNS/ATM systems, including GNSS does not only involve legal matters but also technical, financial and institutional matters. For instance, In addition to general legal principles, there are also specific technical standards and recommended practices which need to be worked out and updated from time to time. These multifaceted tasks will not only require coordination among lawyers, but also coordination among other professions in or outside the U.N. specialized agencies.

Close coordination is necessary because ICAO's work has been under way for quite some time and has achieved certain results, such as the Charter. There has been a general consensus in ICAO that consideration of the legal aspects of GNSS should not delay implementation of CNS/ATM systems. When the 32nd Session of the ICAO Assembly adopted the Charter in the form of Resolution A32-19, it also adopted Resolution A32-20. This latter resolution called for the expeditious follow-up of the recommendations of the Rio Conference and the Panel, especially those concerning institutional issues and questions of liability. It would not achieve the expeditious result if one tried to reinvent the wheel in a new forum without taking into account the current arrangements in place.

Concerning the question of liability relating to GNSS, this is one of the subjects currently being studied by ICAO. The vast majority of ICAO Contracting States believe that an international convention is necessary. This convention will address, among other things, the question of liability. It has been pointed out that due to the multiplicity of providers of GNSS elements, there is a risk that victims of a GNSS-induced accident would be obliged to engage in multiple and complex actions in several jurisdictions in order to obtain what could turn out to be incomplete compensation. The establishment of new international rules under which liability issues could be resolved by a simple, clear and speedy procedure is therefore necessary. On the other hand, there is no consensus in this respect. Views have been expressed that the introduction of GNSS does not change the existing liability system. The issues of liability were already in existence even before space-based navigation aids were introduced. The ICAO Secretariat Study Group on Legal Aspects of CNS/ATM Systems is currently studying the issues of liability. The Group will hold another meeting in October of this year.

To summarize, GNSS is multifaceted and a multifunctional approach is desirable. Such approach should take into account the special situation of aviation, and probably those of other sectors, without prejudice to the arrangements already in place. Close international coordination is essential in order to achieve fruitful results.

Commentary Paper

Expanding Global Navigation Services: Selected Legal Issues

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Introduction

Satellite navigation technology was introduced, applied and tested almost thirty years ago. While it remained a military tutelage no political or legal issues were raised. Thanks to its introduction to the civilian arena[82], for which we must all be grateful to the two superpowers (the United States of America and the then USSR), not only has the system seen gigantic improvements but the providers of the system, quite against their will, have been forced to give in to civilian wishes even in issues bordering on national security and the defence of their states.

Over the past fifteen years, the reaction of the civil community have ranged from amazement at the offer by the US and Russian Federation to freely provide their military signals for civilian use to that of curiosity and scepticism with reference to the stated accuracies and capabilities. This healthy human attitude has consequently led to immense improvement of the US GPS and the Russian GLONASS systems and led to the design and deployment of augmentation systems like WAAS, EGNOS and MSAS. While forcing the military to make concessions, often putting them in the defensive, the civilian community has not been merely interested in improvement of the technical capabilities of the military system.

Concerns regarding the accuracy, integrity and general suitability to full civilian use has further resulted in the latest proposal of the European Community and the European Space Agency to launch a more civilian oriented satellite navigation system under the current name of Galileo[83].

Law as usual has followed technical developments. In less than a decade, thanks mainly to the intense legal and political debates and work of the ICAO, a core of legal principles has gradually been distilled, resulting in the latest ICAO Charter on the Rights and Obligations of States Relating to GNSS Services[84]. In addition extensive legal debate has been going in academic publications and legal conferences on the legal issues relating to this new technology.

That this Workshop has been convened as part of UNISPACE III is a clear indication of the importance of the technology, its impact on civilian life globally and to global legal developments.

This comment on Professor Larsen's Background Paper focuses on a few issues, most of which have been exhaustively dealt with in my book on the subject[85]. Following this introduction I will comment on the following issues:

- International Ownership/International Cooperation
- Interference
- Access and Non-discrimination
- Space segment liability
- General Legal Principles on Space Application

I will begin each issue with a thesis. In the conclusion I shall propose that given the extremely global and multifaceted nature of GNSS, UNCOPUOS should, following UNISPACE, consider developing legal principles applicable to GNSS and other space applications.

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[82] The unfortunate crash of the Korean Air Flight 007 in 1984 was the immediate cause for the promise to provide international civil aviation with this military capability, which was already in service but really complete.

[83] European Commission, "Involving Europe in a New Generation of Satellite Navigation Services" COM (1999) 54 Final, 10 February 1999

[84] ICAO Assembly Resolution A32-19.

[85] B.D.K. Henaku, "The Law on Global Air Navigation by Satellite: A Legal Analysis of the ICAO CNS/ATM System", Issue 1 AST Law Monographs, Leiden 1998.

International Ownership/ International Cooperation

- *While international ownership is desirable to guarantee a higher level of user state confidence, GNSS system providers are, not least because of industrial politics, not likely to open their systems up to international participation.*

Many experts who have been involved with or looked at the EU's Communication on Galileo would be surprised and could flatly dismiss this statement. It is worth recalling that the authors of the Galileo Communication propose various ways of cooperating with the Russian Federation, Japan, the US and other countries. In spite of this willingness to cooperate, there must be something in it for the European Space Industry and for the receiver manufacturing industry. A major policy goal of Galileo is to ensure that Europe can take a fair share of the global market and related jobs and to further European industry at the leading edge of the development of future applications.

The same industrial policy underlies the hesitation of the US to allow international ownership or active international cooperation in GPS. It is worth recalling that the 1996 US Presidential Decision Directive on GPS categorically stressed economic competitiveness and productivity as some of the policy goals on GPS. These policies, undoubtedly, go for Japan as well as for the Russian Federation.

The bottom line is that the system provider or the initiator of the system must gain maximum industrial benefit from the satellite navigation system. International ownership should not be considered as the first objective of any state investing heavily in satellite navigation. This is not to question the integrity of the EU and the ESA. Nor should it be seen as spelling a doom on international ownership. The fact however is, the usefulness of stressing ownership of the system is questionable. International ownership should not be a condition for the introduction of a civil international system. While that is, politically, most desirable; while international ownership could mean a commercial success of such a venture, the most essential parameters to consider at the moment should be the extent of cooperation among the system providers and potential participants to resolve the technical difficulties that have arisen as a result of the gradual proliferation. Additionally, cooperation should be intensified and participation sought from other interested states and regions for the purpose of creating inter-regional link-ups.

Satellite navigation is gradually developing into a commercial service. The European market for satellite navigation user equipment, services and exports between 2005 and 2025 is projected to be Euro 270 billion[86]. On the issue of financing of Galileo, the initiators of the system expect to raise a substantial private capital to be able to finance the almost Euro 3 billion project. Given these circumstances, it is rather questionable to insist or unduly emphasise international ownership.[87]

The legal community could therefore do a good service to satellite navigation by concentrating and developing rules on cooperation to eliminate the technical problems of interoperability, proliferation of systems, uneconomic utilisation of radio frequency and related issues. An appropriate multinational forum should be created to enable effective cooperation. Currently the ad-hoc interchanges between the primary system providers and the secondary providers are not conducive to ensuring the needed safety nor is it effective to lead to a properly global system. The issue is which forum would be suitable for such international coordination.

The multifaceted character of GNSS in terms of usage, system providers and service providers makes it essential for the UN to seek actively means to create such a forum under the auspices of the UNCOPUOS. From that perspective, this initiative must be applauded and supported.

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[86] Galileo, A EC Brochure produced by an industrial consortium.

[87] See Henaku, op.cit. note 3 p. 176 et. seq. for a discussion of the unfortunate bundling of ownership, control and global acceptability of GPS.

Interference

- *In spite of the right of a State to adopt the course which it considers best suited to the exigencies of its security and to the maintenance of its integrity, the deliberate and unannounced denial of service over a selected area could be a breach of the principle of non-discrimination, a violation of the Trail Smelter principle and of the doctrine of reliance.*[88]

Interference is an issue closely linked to availability and continuity of the GNSS signal. Indeed the service to be provided must to the extent possible be free of any harmful interference. Interference from the perspective of GNSS is also closely linked to accuracy of the primary signals.

Interference may be categorised as intentional and unintentional interference. Deliberate interference is the most essential issue. To the extent possible the discussion will be limited to intentional interference, also known as jamming.

The enormous accuracy of GPS, GLONASS, and as augmented by secondary systems as EGNOS, WAAS and MSAS has been of serious concern to the military. National security and the integrity of the state could be seriously affected through the use of the accurate systems as a weapon against any other states. The Gulf War and the Kosovo Crisis have shown what powerful tools satellite navigation systems are.

Thus, one does not expect providers of the signals to remain unconcerned about their security and remain sitting ducks. On the other hand, the provider or any other state for that matter is legally not left unrestrained to interfere deliberately with reception of GPS, GLONASS or any other satellite navigation signal.

[88] Henaku, op.cit. note 3, pp. 190 – 198.

Moreover, international law limits the freedom of states to act when their acts could potentially cause damage to other states. This may be seen as preventive working of the doctrine of liability, something conceded as being one of the main objectives of the tort law in domestic law[89].

The Trail Smelter Principle: *sic utere tuo ut alienum non laedas*[90]

International law recognises the freedom of the state to, within its territory, act as it wishes, subject obviously to the law. The sovereign right of states to operate within the territories to protect the territory and the citizens of the state is a jealously guarded right. Sovereignty, as reiterated in a number of arbitral awards and court judgements, signifies independence to exercise, to the exclusion of others, the functions of a state[91]. Furthermore, "[t]he right of a State to adopt the course which it considers best suited to the exigencies of its security and to the maintenance of its integrity, is so essential a right that, in case of doubt, treaty stipulations cannot be interpreted as limiting it ..."[92].

At the same time, however, international law recognises the right of states not to be injured by the acts of other states. The right of the one state to protect itself from danger coexists with the right of the other state not only to prevent danger but also not to be subjected to any harm by the other state in its action to prevent danger to its territory.

Thus, to that initial right is a correlative duty: a duty resting on states not to cause harm or injury to another state or its citizens. In other words, inasmuch as one has the right to enjoy and protect his property as

[89] See I. Englard, *The Philosophy of Tort Law*, 11 *et seq* (1993).

[90] Henaku, op cit. note 3, 193

[91] *Island of Palmas* (1928).

[92] *The Wimbledon Case* (1923). PCIJ Rep. Ser. A. No. 1 Dissenting opinion by Anzilotti and Huber at 37.

he wishes, one should do so in such a manner as not to injure another or his property. This general principle of law is operative and effective in national as well as international law and applicable to states as to private citizens[93]. The International Law Commission's (ILC) consideration of the question of "International liability for injurious consequences arising out of acts not prohibited by international law" has resulted in considerable attention being given to this rule reflected in the maxim *sic utere tuo ut alienum non laedas*.

One may recall the vivid expression of the rule and its application in the landmark arbitral award of the *Trail Smelter* Arbitration[94] where it was thus stated:

"... (n)o State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence."

Reliance[95]

Additionally, the freedom of the provider state is also limited by the fact that states will be relying on the offers made to permit the use of GPS, and the fact that aircraft operators are relying on the system to navigate.

This legal principle of reliance, also referred to as the Good Samaritan principle, is applied in its various forms in many legal systems throughout the world.

As succinctly rationalised by a common law expert[96], though the law will not heed the promisee's disappointment at losing the benefit of a promised performance[97], it does not disqualify him from complaining of genuine tort losses inflicted on him by the promisor.

The law does not require the existence of an intimate personal relationship. Furthermore, a duty may be found in justifiable reliance on a more general assumption of protective care. Thus the railways have been held liable for level crossing accidents to persons who relied on a practice of signals or closing gates at the approach of trains, the argument being that, the promisee, the railways ought to have contemplated that if a self-imposed duty is ordinarily performed, those who know of it will draw an inference if on a given occasion it is not performed[98].

In the US, the Good Samaritan doctrine holds that whenever one voluntarily comes to the aid of another and the latter relies upon such an undertaking, there is imposed a duty of care upon the former[99]. The principle has been applied in many US cases, among which some involving air traffic control[100].

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[93] *Handelskwekerij G.J. Bier B.V. et al. v. Mines de Potasse d'Alsace S.A. (MDPA)* District Court of Rotterdam, 8 January 1979, *NJ (1979) No. 113*: 313 at 319. Translated in *vol XI NYIL* (1980), 326.

[94] UN Reports of International Arbitral Awards vol. III, 1965.

[95] Henaku, op.cit. note 3 p. 197.

[96] J.G. Fleming, *The Law of Torts*, 149 (8th ed. 1992).

[97] This is in virtue of the common law doctrine that consideration must support even a promise.

[98] *Mercer v. S.E. & C.R. Rly* [1922] 2 KB 549 at 554, per Lush J.

[99] Sections 323 and 324A, Restatement of the Law (second) Torts, vol. 2, American Law Institute Publishers, 1965. Section 323 provides:

> "One who undertakes, gratuitously, or for consideration, to render services to another which he should recognize as necessary for the protection of the other's person or things, is subject to liability to the other for physical harm resulting from his failure to exercise reasonable care to perform his undertaking if: a) this failure to exercise such care increases the risk of such harm or: b) the harm is suffered because of the other's reliance upon the undertaking."

[100] Ingham v. Eastern Airlines, 373 F. 2d 227 at 236 (2nd Cir.,) cert. denied, 389 U.S. 931, 88 S.C.T 295, 19 L. Ed. 2d 292 (1967). This case involved the failure of a FAA approach

The Good Samaritan doctrine can be applied to the promise to provide GNSS signals to the civil community. The provider states were not compelled by any international duty to so promise the signals to states. By undertaking to offer the signals to the international community, the providers have placed themselves in the position of the parabolic Good Samaritan and have consequently assumed a duty of care involving taking all necessary measures not to cause injury to any state or any user for that matter. Any unannounced interference by signal providers which result in damage to any state or citizen of any state will result in liability claims being brought against the provider state. Thus the provider is required to act as any private person or private company will act when involved as promisor and provider of satellite navigation services.

Universal Access and Non-discrimination

Universal Access and discrimination are two sides of the same coin. The ICAO Charter on Rights and Obligation of requires that states have access to GNSS services on non-discriminatory basis. This clearly is an application of the principle of non-discrimination as espoused in the Outer Space Treaty.

Logically, access can only be had within the geographical coverage area of the GNSS system in question. Thus MSAS systems providers are not required, unless they profess to be able to do so, to provide their services to cover all North Atlantic or North African routes.

Additionally, the non-discrimination clause is only applicable when service is available to the whole area under the same terms and conditions. Some of the conditions, which could later lead to the inapplicability of the non-discriminatory clause, are charges and the nature of the receiver equipment on board a particular aircraft. While, in the interest of safety, it is important to make GNSS services available to all states and operating aircraft, it should still be possible to deny access to some states or transport operators who refuse to pay for the service offered when globally agreed charges are introduced. Of course such denial should not violate the primary objective of international air and maritime navigation, namely: the safety principle. The GNSS service provider has a responsibility of being reasonable in its denial process putting it into operation after a reasonable time has elapsed and the state, marine or aircraft operator concerned has been informed within a reasonable time. A reasonable period is required because no state has the right to, by its action of denying access to a particular state, marine or aircraft operator, create danger to international navigation and thereby breach the safety of international transportation.

The introduction of differentiated services under the Galileo system raises a very practical issue. Is the provision of smart cards allowing different users to receive and accordingly pay for different services a violation of the principle of non-discrimination? It may be recalled that the Commission Communication suggests the introduction of different levels of service:

- Level 1 service to the mass market
- Level 2 a certifiable service
- Level 3 safety of life and security-related services.

Level 1 would be available free of charge, at least until the US and Russia review their policies regarding charging for their signals. Level 2 and 3 would be controlled access services, available to subscribers in return for fees. From the above, it may be correctly surmised that I do not consider it unlawful to introduce discriminated service as long as the all users in the same lass are offered the opportunity to make use of the

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controller to inform incoming aircraft that visibility had dropped from one mile to three quarters of a mile. The plane crashed while attempting to land while at the same time engulfed in swirling ground fog. The US government was found liable with the Court holding that a duty arose with the government voluntarily assuming the responsibility of providing control services when it was not required by statute to do so. One essential fact emphasised in this judgement was the fact of reliance by passengers and pilots on the governments services.

available facilities. Obviously, a hypothetical decision by the European authorities to exempt European commercial airlines from paying or a decision to reduce the amount payable by European commercial shippers would not only be contestable under the MFN rules of the WTO but would be in stark violation of the no-discrimination principles as adopted under the ICAO Charter. It is doubtful that such a decision would be violating the Outer Space Treaty while on the other hand a decision to grant access to non-European airlines access to the basic service on condition of subscribing to the Level 3 service would.

On the other hand, denial of service on political grounds is a violation of the global access principle, particularly in relation to aviation and maritime usage where safety is of the essence. Where denial can for instance not be justified on grounds of national security or technical reasons, and where denial is so clearly selectively applied to one country or a group of countries, given the global nature of GNSS and the growing dependence on it, that action by the provider state should be considered in violation of the non-discrimination principle. It is however important that this principle be strictly defined in order to avoid possible abuse and danger to the provider state. From that perspective, the state denied service could also under certain circumstances be made to justify why it still needs to be granted access. This situation could however only be applied in cases of blatant and continuous threat to use the technology as a weapon against the provider or any third state.

Liability of the GNSS Space Segment Provider

GNSS liability should under no circumstances be equated to liability of telecommunications services[101]

GNSS satellites have often been equated to telecommunications satellites. The rationale for such action is to be able to utilise the traditional disclaimers existing in telecommunications law.

While satellites broadcasting integrity and monitoring information could be so equated, the primary navigation satellites such as GPS, GLONASS and the planned Galileo are not. Though satellite maintenance and correction data is transmitted from the master control centres to the GNSS satellites, the primary signals received from GPS and GLONASS satellites are propagated independently from ground control. The ephemeris data is generated on board, using atomic clocks and emitted quite independent of human interference. Thus while communications channels are merely conduits, navigation satellites are not.

In addition to the technical issue, navigation satellites would be playing a more important role in the assurance of safety of life. In a sole means environment, where aircraft would have to depend on satellite navigation systems, the unavailability of such signals could mean the death of hundreds of persons. While human loss is imaginable as a result of a telecommunications breakdown or unavailability, the likelihood, extent and impact would pale compared with a navigation satellite failure.

GNSS liability should therefore be seen for what it is–liability arising from a error in satellite navigation–and not be saddled with telecommunications law disclaimers.

GNSS space segment providers should be held liable in international law for damage to persons and property arising from errors in or unannounced unavailability of GNSS signals

The thrust of this thesis is to accept the fact that damage arising from the crash or collision of aircraft, which event is caused by errors in or the unannounced

[101] Henaku, op.cit. note 3 p. 172. On disclaimers, see p 220.

unavailability of GNSS signals, could be subsumed under a provision such as Article 2 of the Liability Convention.

Apart from cases of jamming and intentional interference, there are situations where a degradation or disruption of the navigation signals or data error could result in some form of damage to aircraft, passengers and to persons and property on the surface of the earth. These are cases which could fall under the regime of space law. Activities involving the exploration and use of outer space, regulated in the Outer Space Treaty are also governed by a detailed regime under the Liability Convention. The Liability Convention establishes an absolute liability regime for the launching state when a space object causes damage to persons and property on the surface of the earth or to aircraft in flight. The most relevant provision of that Convention is Article II which states:

> "A launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight."

Difficulties with this assertion is to establish the following:

1. That a GNSS satellite can cause damage as perceived under Article II
2. That the damage in question is caused by GNSS Satellites
3. That the claimant can indeed claim under the Liability Convention

Of these, I will focus on the first two and simply say in relation to the last that *locus standi* is not granted to natural persons under Liability Convention and the claims procedure is burdensome.

If GNSS and other satellite applications will continue to be accepted, it will be on the condition that legal certainty exists not only in relation to causation but also in relation to claimant aspects. Each claimant should be able to seek satisfaction under such a regime. A less cumbersome regime should be devised that empowers aggrieved objects of international law to be able to successfully intiate actions against states.

Regarding the first two issues, causal connection between the damage and the space object is the main element to be established by a claimant. The launching state is absolutely liable to pay compensation only when damage is "caused by its space object[102]. Regarding GNSS signal liability, it will not be enough to establish a causal connection between any space object and the damage. The object must without doubt be a GNSS satellite belonging to that state against which the claim has been brought. In the provision of GNSS signals, two institutions have been identified, the primary provider and the secondary provider. The claimant must be categorical about which of the primary or secondary systems caused the damage. In establishing the linkage with a primary signal satellite, it may be advantageous if the secondary signal providers also suffered similar damage simultaneously, or observed the cause of the damage.

The main issue in establishing causation is on which test to be used. While some writers like prefer to use the test of "direct hit" in my view the Convention does not support such an approach. Neither does the *travaux preparatoires* nor a commonsense interpretation of the treaty. The correct test to be adopted in establishing the causal connection should be the proximity test.

The difference between the direct hit test and the proximity test is that the first will want to establish a physical connection between the aircraft in flight or the ship on the sea and the GNSS satellite while the other would want to establish whether a collision or crash could be a normal consequence of the type of failure to receive GNSS signals under critical conditions of instrument flight rules? This is a technical question which may finally need technical and system engineering expertise to settle authoritatively. It may

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[102] B.A. Hurwitz, *Space Liability for Outer Space Activities in Accordance with the 1972 Convention on International Liability for Damages Caused by Space Objects* (1992), 31.

also depend on the particular case. It is, however, imaginable for damage to be caused to navigation receiving equipment onboard aircraft, even to the extent of blocking all navigation functions to be performed by the aircraft. Where the GNSS satellite signal is the sole system on board the aircraft the fatalities are unimaginable. The same error that can cause damage to aircraft can also affect ground receiving equipment.

But could the US Air Force at the time of launching the GPS satellites on board the Delta II spacecraft have foreseen that some type of damage, as described, can occur? The response is clearly an issue of fact to be decided in each case.

The rule of thumb in this situation is, upon examining all technical details, to decide whether the damage that has occurred is one which would occur as a natural result of the technology. It must also be established that no other independent cause existed of which it might have been the result. The possible role of any other mechanism unconnected with the GNSS signal causing or contributing to cause damage is of very particular significance in this complex technology. To that extent, receiver manufacturers would carry a heavy burden. The likelihood of excuses being found in faulty receivers or faulty antennae installations should not be discounted. There are very many less esoteric and less politically charged causes one could point to for relieving the signal provider of its liability.

Beside appealing to science, one must also establish that this type of damage is in legal contemplation a normal consequence of the activity and could also have been reasonably anticipated to either expressly fall within the ambit of the legal regime concerned or that it can be accommodated thereunder. In essence would the drafters of the Liability Convention, apprised of the facts about GPS, GLONASS and Inmarsat III satellites have contemplated GNSS falling within the ambit of the Liability Convention?

The result of the hit/impact reasoning is to limit the value of the Convention to the type of damage possible in 1972. Subsequent space activities will be left out unless they fall within that category of direct impact damage. This view strongly offends the dynamism of law and the extreme sense of technological innovation involved in space exploration. It is a total disregard of the temporal value of law. As was argued earlier, legal obligations and rights need to be reassessed in the light of the interplay of new social facts with the evolution of international legal conduct. Law, after all, is dynamic, not static. Consequently, when confronted by the intermingling of new and old technologies, the scope of the duty is better assessed in the light of the new facts and the development of international law.

A significant point to note is the story behind the use of the words "caused by" in Articles II and III of the Liability Convention.

In response to a proposal which tended to limit liability to physical contact cases, the Canadian, Italian, and French delegates at the Legal Sub-Committee impressed upon the meeting that not all damage was as a result of physical contact. In their opinion, the proximity test best exploited to lay down the scope of liability of the launching state. Thus what originally was framed in the following terms "if the *collision* of space objects causes damage ... " [103] was rephrased as "caused by".

This debate is significant from the fact that the delegates considered that damage caused by space objects can take on various forms; that damage can be caused irrespective of there being a form of physical contact; and that damage can be caused through interference with the radio spectrum.

What is the significance of this discussion to GNSS satellites? The significance as far as GNSS satellite liability is concerned, lies in the fact that (1) there is no requirement of physical contact and (2) that damage can be sustained by proximity to a satellite. The determination of damage will not be based on the limited conception of physical impact or hit but rather on the proximity test.

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[103] UNCOPUOS, Summary Record of the 94th Meeting, 10 June 1968, *A/AC.105/C.2/SR.94*, 52 (hereinafter, Summary Records)

General Legal Principles on Space Applications

The issues raised in this paper show clearly the need for clear rules to govern the expanding GNSS services.

Questions that need to be answered are numerous, some of which are:

- What is the legal (and technical) character of the GNSS satellite?
- Can GNSS damage be subsumed under the Liability Convention?
- If so what would be the problems to be faced?
- Is there the need for a specific Convention on GNSS?

While not in favour of rushing to design specific legal regimes for each and every field, I am of the opinion that GNSS offers ample opportunity for the UNCOPUOS to engage in a thorough analysis of the legal regimes existing so far, comparing them to the multitude of applications and determining whether the existing corpus of rules cover all those applications. GNSS clearly show they do not. In my view, it will be beneficial to providers and users alike for rules to be designed that would not only be applicable to all sectors of GNSS usage but also of other space applications.

Summary Report

Issues

This session considered the existing and planned systems for provision of navigation services by satellite and matters involving universal access, continuity of service, implications for international ownership, international cooperation and issues of system standardisation.

Suggestions

- Need for precision, cross-correlation of data for mapping, system augmentation, definition of GNSS mission, operational structure and non-interference.
- Elaboration of an action programme including:
- regional and global cooperation to achieve a seamless multi-modal system (cf EGNOS and studies for GNSS-2 in Europe),
- international cooperation to ensure compatibility between present and planned systems, and support for ICAO, IMO and ITU as key entities.
- The draft UNISPACE III Report should already set out detailed facts and GNSS issues, and its tasks are to be to supplement them by identifying issues not dealt with in the draft report.
- Need for multifunctional coordination by a forum, that represents interests of all potential categories of GNSS users, while also taking full account of ICAO's and IMO's special requirements.
- Need to identify essential principles to be incorporated in any global legal framework or a number of regional or national coordinated frameworks, including continuity of service, universal access, non-discrimination, service quality, reliability and precision.
- Need to identify non-discriminatory financial principles, particularly pricing and the need for revenue streams in systems established by the private sector but taking into account the requirements of the safety services.

- Resolution of liability issues including a review of the applicability of the 1972 Liability Convention or an international compensation fund, or contractual remedies. Evaluate the commercial practice in GNSS including insurance, the telecommunications practice and the wider concern of liability in information technology related services. Find the best solution to give GNSS worldwide acceptance, guaranteeing quality of service to users.

- Need to define the global use of GNSS and in particular a basic and public safety service to be provided on a secured basis by the interoperable systems operators making up GNSS. Consideration to be given to needs of developing countries respecting sovereignty, while promoting growth of GNSS in revenue expanding applications.

- Exploiting the full benefits of GNSS requires support from the world-wide community of users and recognition by States of the social and economic advantages to be derived from an increased level of service and therefore also their support to settle issues of frequency allocations at ITU.

POSSIBLE INTERNATIONAL REGULATORY FRAMEWORKS, INCLUDING LEGAL CONFLICT RESOLUTION IN EXPANDING SPACE COMMERCIALIZATION

SESSION 7

Chair: Professor Karl-Heinz Bockstiegel (Germany)
Coordinator/Rapporteur: Ms. Anna Marie Balsano (European Space Agency)

SESSION SEVEN

Possible International Regulatory Frameworks, Including Legal Conflict Resolution in Expanding Space Commercialization

Discussion Paper

The Relevance of International Economic Law and the World Trade Organization (WTO) for Commercial Outer Space Activities

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Introduction

The commercialization of outer space activities increasingly also engages rules of international economic law and involves international organizations entrusted with law-making and dispute settlement functions in this area. It is still a matter of dispute among scholars what the term "international economic law" exactly covers. The main problem in this respect is the close interconnection of the law governing international economic relations with the domestic law of states. At any rate, the core of international economic law includes the international regulation of the establishment by foreign business of various factors of production (persons and capital) on the territory of other states (and in areas beyond national jurisdiction), on the one hand, and of international transactions concerning goods, services and capital, on the other hand.[1]

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[1] See P. Malanczuk, *Akehurst's Modern Introduction to International Law*, (7th ed. 1998), p. 222 et seq. with further references.

International activities of private actors[2] investing into the commercial use of outer space are increasingly falling within the ambit of the regulatory work of international organizations concerned with the formulation and application of general principles and rules dealing with international trade, foreign investment and the protection of intellectual property rights. This paper focuses on the role of the World Trade Organization (WTO) which was established in 1995 after the completion of the GATT-Uruguay-Round. The Uruguay Round Agreements include a number of instruments directly or indirectly relevant to the commercialization of outer space activities, such as the General Agreement of Services (GATS) or the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).[3] The paper concentrates on the sectoral agreement on telecommunications, annexed to the GATS.[4] The Telecommunications Annex is considered to be a major breakthrough in international trade negotiations. It also covers certain aspects of satellite-related communications.

This paper first provides some general background information on the development of telecommunications. It then addresses the relevant developments in the WTO, focusing on the GATS, the Telecommunications Annex and the specific commitments of states. It ends with a brief evaluation, including the relevance of the new Agreement on Trade in Information Technology Products (ITA).

General Background

Telecommunications has become a global industry with fierce competition of both the providers of telecommunications services as well as of the manufacturers of telecommunications equipment, particularly between the triad of Japan, the United States and Europe.[5] The process of competition and global restructuring of the industry, with the formation of "strategic alliances" on the world level, has been enhanced by the wave of privatization, deregulation and liberalization of monopolies which had commenced in 1984 in the United States and in the United Kingdom. Within the framework of the European Community/European Union this process has led to an intensive deregulatory activity since 1984.[6] European organs have been mainly using the instrument of directives in a step-by-step approach addressing individual sectors and issues in recognition of the decisive economic, social and technological role of telecommunications in building Europe and sustaining its position on the global market. Some 40 legal instruments have been adopted to deal with areas such as telecommunications services, voice telephony and universal service, open network provision (ONP) principles governing private access to public telecommunications networks and services, mutual recognition of licences for the provision of telecommunications services in all member states, rules governing interconnection, tariffs, taxes, the market for terminal equipment, public procurement, competition law, satellite communications, mobile communications, the coordination of frequencies, numbering and data protection and privacy.

Especially significant for market liberalization, for example, are competition rules and instruments such as Directive 97/33/EC of 30 June 1997 on interconnection in telecommunications with regard to ensuring universal

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[2] See P. Malanczuk, Actors: States, International Organizations, Private Entities, in: G. Lafferranderie/D. Crowther (Eds.), *Outlook on Space Law over the Next 30 Years. Essays Published for The 30th Anniversary of the Outer Space Treaty* (1997), pp. 23-36.

[3] *International Legal Materials*, Vol. 33 (1994), p. 1 et seq. and p. 1125 et seq. See Malanczuk, *Akehurst's*, supra, p. 231 et seq.

[4] *International Legal Materials*, Vol. 36 (1997), p. 354 et seq.

[5] See P. Malanczuk, Information and Communication, Freedom of [with Addendum], in: R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. II (1995), pp. 976-991; P. Malanczuk, Telecommunications, International Regulation of [with Addendum 1998], in: R. Bernhardt (ed.), *Encyclopedia of Public International Law*, Vol. IV [forthcoming].

[6] See P. Malanczuk, Ten Years of European Telecommunications Law and Policy - A Review of the Past and of Recent Developments, *Telecommunications and Space Journal*, Vol. 1 (1994) 27-51.

service and interoperability through application of the principles of ONP; the Communication from the Commission on the application of the competition rules to access agreements in the telecommunications sector - framework relevant markets and principles (97/C 76/06); and the Guidelines on the application of EEC Competition Rules in the Telecommunications Sector (91/C 233/02). The last telecom monopolies in the EC were supposed to be abolished as of 1 January 1998, but there were still a number of member states lagging behind.

Telecommunications now belongs to the fastest growing markets on both the European and the global level. Converging with modern computer and information technology, world-wide telecommunications networks provide the technical backbone of the process of the "globalization" of the world economy, with multinational companies emerging as driving forces of the globalization process and as important non-state actors on the international level.[7]

In essence, the advance of global communications, involving basic changes in the traditional notion of information, is a technology driven process. But it is also influenced by the political and legal framework conditions. Digitalization makes it possible to translate various kinds of information (films, books, television programmes, pictures, music, computer programmes, speech) into digital signals which can be stored in computers and/or transmitted globally via radio transmissions or fibre optic media. The emergence of the so-called "information society" rests upon the convergence of speech, pictures and data on the levels of the terminal equipment, the software and the transmission of information. In addition, storage capacity, transmission capacity and transmission speed are continuously increasing. Also more and more use of the Internet is being made. While in 1991 there were less than 5 million users, it is expected that by the turn of the century there are likely to be more than 300 million users.

In creating a global communications network the use of space technology (satellites) complements the linking of distant regions through submarine cables, trying to meet the growing demand for international telecommunications services. New satellite systems are in preparation to provide for truly global coverage of a broad variety of telecommunications services for companies and individuals wherever they are located. There are 20 private consortiums presently engaged in such projects, of which the "Iridium" project is probably the most known. Iridium is one of three large satellite projects of Motorola and is designed to offer mobile services all over the globe. The first 5 of a total of 66 Iridium satellites were deployed in orbit in May 1997, with a total project budget of some US $ 5 billion. The Motoral "Celestri" project, with 63 satellites, is designed to deal with the market for high-speed data transfer and television and video transmissions. The third Motorola project "M-Star", consisting of 72 satellites, costing about $ 6.1 billion, is primarily aiming at the market for internal data transfer of global corporations (intra-corporate communications). Competitors of these projects include the "Teledisc" project, controlled by the businessmen Craig McCaw and Bill Gates, the "Globalstar" project of Loral and the "Ico" project of an international consortium. Market analysts expect that in the coming decades some 1000 commercial satellites will be launched. However, whether this is economically really feasible remains to be seen, also in view of the existing "paper satellites", which have given rise to disputes in view of applications for the allocation of radio spectrum and orbital positions by applicants who have no immediate intention or capacity to make use of them.

Intercontinental cable network projects, on the other hand, are also advancing as highly potent telecommunication networks. They include the China-US undersea fibre-optic cable which is scheduled to go

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[7] See P. Malanczuk, Globalization and the Future Role of Sovereign States, in: Friedl Weiss / Paul de Waart / Eric Denters (eds.), *International Economic Law with a Human Face*.(1998), pp. 45-65; P. Malanczuk, Multinational Corporations and Treaty-Making - A Contribution to the Discussion on Non-State Actors and the "Subjects" of International Law, in: *Proceedings of The American Society of International Law/Graduate Institute of International Studies, Forum Geneva, Multilateral Treaty-Making: The Current Status of Challenges and Reforms Needed in the International Legislative Process, May 16, 1998, Geneva, Switzerland*, [forthcoming].

into operation at the end of 1999. The Japan-US submarine cable network, due to be operational in the second quarter of 2000, will connect Japan with the US mainland via Hawaii. In order to meet the increasing demand for multimedia traffic on the Japan-Europe and Japan-US routes, the planned TAT-14 Cable Network will link the US mainland with the UK, France, the Netherlands, Germany and Denmark, starting also in the fourth quarter of 2000. In March 1998, Gemini, the first transatlantic telecoms cable network to cater primarily for Internet traffic entered into service, costing about $ 500 million to lay and which directly connects London and New York. There are also a number of other current transatlantic sub-sea cable ventures and the next generation of cables due to be deployed in 2000-2005 is expected to increase transmission speed capacity tenfold.

In fact, however, global communications has remained more a phenomenon that is technically feasible than real in the sense of having created a true "global village". It is limited to the economically advanced regions of the world. Many parts of the world (developing countries) have still have very limited telecommunications penetration. There is clearly an important telecommunications gap. This problem has been addressed in a number of studies, most notably in the 1985 report "The Missing Link", produced by the Independent Commission for World-Wide Telecommunications Development (Sir Donald Maitland, UK, chairman).[8] The 1998 edition of the ITU's World Telecommunication Development Report shows that there has been little progress.[9] According to this report, at the beginning of 1997 62 per cent of all main telephone lines were installed in only 23 developed countries (Australia, Canada, the European Union, Iceland, Japan, New Zealand, Norway, Switzerland and the United States), accounting for just 15 per cent of the world population. Although 60 per cent of the population in developing countries lives in rural areas, more than 80 per cent of main telephone lines in these countries are in urban areas. With regard to new types of networks and services, it is startling to note that 84 per cent of mobile cellular subscribers, 91 per cent of all facsimile machines, and 97 per cent of all Internet host computers are located in industrialized countries. Finally, there are more cellular telephones in Thailand than in Africa, and more Internet host computers in Estonia than in sub-Saharan Africa (excluding South Africa). About half of the world population has never even made even a telephone call.

Developments in the World Trade Organization (WTO)

An important international trade regime for the telecommunications industry was established in 1997 within the new World Trade Organization (WTO) on the basis of the framework of the General Agreement on Trade in Services (GATS) and the WTO Agreement on Basic Telecommunications Services, annexed to the GATS.[10] The 69 states that have made commitments under this agreement account for more than 93 per cent of global telecommunications revenue. Among the regulatory principles accepted by the parties are the prevention of ant-competitive practices, the obligation to provide interconnection on transparent and reasonable terms and the requirement for independent regulatory bodies and other commitments facilitating market access.

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[8] D. Maitland, *The Missing Link, Report of The Independent Commission For Worldwide Telecommunications Development* (1985).

[9] ITU, *World Telecommunication Development Report* (8th ed. 1998).

[10] See P. Malanczuk, From GATS to WTO - The Legal Framework of the 1997 WTO Telecommunications Agreement, *Telecom International*, Vol. 1 (1997), pp. 22-27; P. Malanczuk/H. de Vlaam, International Trade in Telecommunications Services and the Results of the Uruguay Round of GATT, *Telecommunications & Space Journal*, Vol. 3 (1996), pp. 269-90; A.E. Appleton, Telecommunications Trade: Reach Out and Touch Someone?, *University of Pennsylvania Journal of International Economic Law*, Vol. 19 (1998), pp. 209-227; M.C.J. Bronckers/P. Larouche, Telecommunications Services and the World Trade Organization, *Journal of World Trade Law*, Vol. 31 (1997), pp. 5-47; R. Frid, The Telecommunications Pact Under the GATS-Another Step Towards the Rule of Law, *Legal Issues of European Integration*, Vol. 24 (1997), pp. 67-96.

The World Trade Organization (WTO) agreement reached on 15 February 1997 on the liberalization of international trade in telecommunications services is generally viewed as a significant landmark in the history of international trade negotiations. The agreement itself is based upon 55 so-called schedules of commitments which some 70 WTO member states (counting the offer of the 15 member states of the European Union as one offer) entered into. These schedules contain specific commitments to open certain sectors of the national telecommunications market to foreign competition. They are annexed to the Fourth Protocol to the General Agreement on Trade in Services (GATS) which was open for acceptance until 30 November 1997. The commitments were to enter into force on 1 January 1998; however, the implementation was delayed because 15 of the signatories had not ratified the agreement in time. It was then agreed that the agreement should enter into force on 5 February 1998. Thus, the GATS plus other relevant documents, such as the Telecommunications Annex, which emerged from the completion in 1994 of the Uruguay Round of GATT are of central importance for putting the results of the 1997 telecom agreement into a proper legal perspective.

In addition, there are other related specific sector agreements, such as the agreement in 1997 to remove tariffs on information technology products, and the subsequent 1997 agreement to liberalize trade in financial services. These agreements are viewed as being more than mere trade arrangements. They are seen as instruments to progress the flow of technology and information around the world and to contribute to the building of the new infrastructure of the information age, like the development of railways and shipping in the last century provided the infrastructure for the industrial age.

The GATS

Before the acceptance of GATS, the regulation of trade in services had been limited to bilateral treaties dealing with the treatment of nationals of the respective parties or to regional or bilateral agreements constituting free trade areas or customs unions. Services were included in the GATT negotiations because of the growing economic importance of the sector. In terms of value of trade, services already represent a far greater proportion than for instance agriculture (world exports in 1990 amounted to US$ 4,300 billion, of which 60 per cent were in manufactures, 19 per cent in services, 11 per cent in mining and only 10 per cent in agriculture). Today, over 20 per cent of world trade and 60 per cent of world production are in the area covered by the GATS.

The GATS is built upon several layers. First, there is a framework agreement which applies to any service in any sector, except a service provided in the exercise of governmental authority either on a commercial basis or in competition with other suppliers. Some of the basic provisions follow the corresponding provisions in GATT law on the trade in goods. Second, there are various types of commitments in national schedules to take care of the fact that most barriers to international trade in services do not arise from border measures (as in the case of goods) but from domestic regulations, affecting (and discriminating), for example, tourism, foreign consultants or construction workers, or the operation of subsidiaries of foreign banks on the territory of the receiving state. The GATS envisages successive rounds of negotiations on the progressive liberalization of trade in services. Third, individual (more sensitive) service sectors have found special treatment, including financial services, telecommunications, air transport services, maritime transport services and movement of natural persons providing services.

The preamble of GATS recognizes the growing importance of trade in services for the growth and development of the world economy and aims to establish a multilateral framework of principles and rules for trade in services with a view to the expansion of such trade under conditions of transparency and progressive liberalization and as a means of promoting the economic growth of all trading partners and the development of developing countries. It mentions the need for progressively higher levels of liberalization of trade in services to be achieved through successive rounds of multilateral negotiations, but also recognizes the right of states to regulate, and to introduce new

regulations, on the supply of services within their territories in order to meet national policy objectives.

The GATS consists of six parts and includes several annexes, including, inter alia, on air transport services, financial services, negotiations on maritime transport services, telecommunications, and negotiations on basic telecommunications.

Part I lays down the scope and definition of the agreement. It applies to measures by Members affecting trade in services (Art. I (1)) Trade in services is defined as the supply of a service through four modes of delivery: cross-border, movement of consumers, commercial presence and movement of personnel. (Art. I (2)). In practice, cross-border supply of services (i.e., database access) and commercial presence are the most important for telecommunications services. Measures by Members include not only measures taken by central, regional or local governments and authorities, but also by non-governmental bodies in the exercise of delegated powers (Art. I (3)(a)). However, the term services excludes services supplied in the exercise of governmental authority, which, in essence, is defined by its non-commercial, non-competitive nature (Art. I (3)(b) & (c).

Part II deals with General Obligations and Disciplines containing, inter alia, traditional GATT-principles, such as the "most-favoured-nation" (MFN) clause and the transparency of rules and procedures (Arts. II and III), to ensure equity in treatment of all service providers. The MFN principle stipulates that trade must be conducted on the basis of non-discrimination. Liberal rules agreed between any two GATT signatories must be extended immediately and unconditionally to all others (Art. II). MFN treatment must be granted without demanding a consideration in the form of additional advantages or reciprocity. - However, if no foreign service provider is allowed to enter a national market, then the MFN clause has no practical effect. Measures inconsistent with the MFN principle may be maintained if such a measure is listed in, and meets the conditions of, the Annex on Article II Exemptions (Art. II (2)).

Another interesting provision concerns monopolies and exclusive service providers. If a member states monopoly supplier competes, either directly or through an affiliated company, in the supply of a service outside the scope of its monopoly rights and which is subject to that Member's specific commitments, the Member shall ensure that such a supplier does not abuse its monopoly position to act in its territory in a manner inconsistent with such commitments (Art. VIII (2). This is relevant because of the possibility for monopoly telecommunications service providers to delay or deny interconnection or access to their networks for competitors. Moreover, the issues of tariffs and access charges are becoming increasingly important in this sector.

Other Articles of Part II of the GATS deal with disclosure of confidential information (III bis), increasing participation of developing countries (IV), economic integration (V), labour markets integration agreements (V bis), domestic regulation (VI), recognition (VII), business practices (IX), emergency safeguard measures (X), payments and transfers (XI), restrictions to safeguard the balance of payments (XII), government procurement (XIII), general exceptions (XIV), security exceptions (XIV bis) and subsidies (XV).

Part III addresses specific commitments, such as market access and national treatment. Art. XVI (1) provides that with respect to market access through the modes of supply identified in Article I, each Member shall accord services and service suppliers of any other Member treatment no less favourable than that provided for under the terms, limitations and conditions agreed and specified in its Schedule. The concept of national treatment in Article XVII is closely connected to the MFN principle. It deals with discrimination against foreign countries, whereas MFN concerns discrimination between foreign countries. Its intention is to provide equal conditions of competition, once goods or services have crossed the border. An important consideration is that it is subject to existing domestic legislation. The clause on its own is not suited to provide access to monopolistic foreign markets. Furthermore, the national treatment principle is only aimed at discrimination caused by state regulations.

Discrimination by private companies is not within its scope. This is becoming increasingly important in a liberalized environment, where basic telecommunication functions are provided by privatized companies with considerable, if not monopolistic, market power.

Part IV of the GATS, dealing with progressive liberalization, is the heart of the agreement in practical terms. Member states are required to enter into successive rounds of negotiations, starting not later than five years after the WTO Agreement entered into force, to achieve a progressively higher level of liberalization (Art. XIX (1)). Members are further required to set out in a schedule the specific commitments they undertake under Part III of GATS. With regard to such sector-specific commitments, the schedules must specify (a) terms, limitations and conditions on market access; (b) conditions and qualifications on national treatment; undertakings relating to additional commitments; and (d) the date of entry into force of such commitments (Art. XX (1)). Provision is finally made for the modification of schedules (Art. XXI).

The institutional provisions in Part V are likely to obtain stronger significance in the future in the case of disputes. They deal with consultation obligations (Art. XXII), dispute settlement and enforcement (Art. XXIII) and the new Council for Trade in Services (Art. XXIV). The latter body is entrusted with important functions under the GATS. Moreover, these provisions establish links to the new and more efficient WTO dispute settlement mechanism, as reflected in the Dispute Settlement Understanding.

Part VI contains final provisions concerning the denial of benefits (Art. XXVII), the definitions relevant to the Agreement (Art. XXVIII) and the Annexes, which are an integral part of the Agreement (Art. XXIX).

The Telecommunications Annex

The Telecommunications Annex deals with objectives, scope, definitions, transparency, access to and use of public telecommunications transport networks and services, technical cooperation, and the relation to international organizations and agreements. It provides notes and supplementary provisions to the General Agreement.

The purpose of the Annex is to ensure that companies can make use of the public network and facilitary services to reach customers and carry on business activities. It sets out a minimum code of good regulatory behaviour and elaborates particular features of the sector, particularly as a mode of delivery. This is an important difference to the other Annexes of the Agreement. The Telecommunications Annex applies not to the service sector per se, but governs the access to markets and the use of infrastructure. The purpose is to ensure that countries which agree to trade in various services, such as financial, business or insurance services, also offer adequate telecommunications facilities to deliver these services across the border or within their own territory. By explicitly recognizing the dual role of the telecommunications services sector as a distinct sector of economic activity and as the underlying transport means for other economic activities, the Telecommunications Annex states the objective of elaborating upon the provisions of the agreement with respect to measures affecting access to and use of public telecommunications transport networks and services (Section 1).

The Annex applies to all measures of Members that affect access to and use of public telecommunications transport networks and services concerning the provision of services accepted in a country's schedule. It does not cover measures affecting the cable or broadcast distribution of radio or television programming, or telecommunications transport network and services that are not offered to the general public (Section 2).

Telecommunications is defined as the transmission and reception of signals by any electromagnetic means (Section 3). Public telecommunications transport service means any telecommunications transport service required by a Member, either explicitly or in effect, to the public generally, including, inter alia, telegraph, telephone, telex, and data-transmission typically involving the real-time transmission of customer-supplied information between two or more points

without any end-to-end change in the form or content of the customer's information. Public telecommunications transport network is defined as the public telecommunications infrastructure which permits telecommunications between and among defined termination points. Finally, inter-corporate communications is explained as telecommunications through which a company communicates within the company or with or among its subsidiaries, branches and, subject to a Member's domestic laws and regulations, affiliates. The legal determination of the concepts of subsidiaries, branches and affiliates is left to domestic law. The definition excludes commercial or non-commercial services that are supplied to companies that are not related subsidiaries, branches or affiliates, or that are offered to customers or potential customers.

The transparency requirement obliges Members to make relevant information on conditions affecting access to and use of public telecommunication transport networks and services publicly available. This includes tariffs and other terms and conditions of service, specifications of technical interfaces, information on bodies responsible for relevant standardization, conditions applying to the attachment of terminal or other equipment, and notifications, registration or licensing requirements (Section 4).

Access and use of public telecommunications transport networks and services for foreign service providers must be accorded in a reasonable and non-discriminatory manner for the supply of a service in a signatories schedule (Section 5). Such access and use must be granted for any public telecommunications transport network or service offered within or across the border of that Member, including private leased circuits. A number of further obligations are set forth, including permitting customers to purchase or lease attachment equipment of their choice, to interconnect private leased or owned circuits with public networks, and to use operating protocols of the services suppliers or customer's service suppliers, and for access to information contained in databases or otherwise stored in machine-readable form in the territory of any Member. On the other hand, a Member is entitled to take measures to ensure the security and confidentiality of messages or to safeguard the public services responsibilities, to protect the technical integrity of the networks and services or to ensure that no services are provided outside the scope of a Member's schedule.

The Telecommunications Annex recognizes the special needs of developing countries and encourages technical cooperation to establish an efficient, advanced telecommunications infrastructure to expand their trade in services (Section 6). It finally also stresses the importance of global technical standards for compatibility and inter-operability of telecommunications networks and services, requiring cooperation with relevant international bodies, such as the International Telecommunications Union and the International Organization for Standardization (Section 7).

Specific Commitments of States

The legal regime governing the liberalizing commitments of Members is mostly based upon Articles XVI and XVII of the GATS. The actual degree of liberalization under the GATS is depending on the services included in a country's schedule. In other words, the Agreement only applies to those services which each individual state has agreed to accept in its commitment to liberalize. Most countries found it relatively easy to make such commitments concerning a range of value-added telecom services (i.e. on-line data processing, on-line data base storage and retrieval, electronic data interchange, e-mail and voice mail), and as a result of the Uruguay Round they were already covered by 44 Schedules, representing 55 WTO member states. The problem of the liberalization of "basic" telecommunications services was dealt with on the basis of the Ministerial Declaration on Basic Telecommunications and the Annex on Negotiations on Basic Telecommunications which allows countries to make MFN exemptions at a later stage than foreseen in the GATS.

The agreement on the problem of how to define "basic telecommunications" on the national level was set aside in the negotiations which included all public and private telecommunications services concerning end-to-end transmission of customer supplied

information, for example, the simple relay of voice or data from sender to receiver. The commitments made in 1997 cover not only basic telecommunications services provided over a network, but also services provided through resale over private leased circuits. Market access includes the trans-border supply of telecommunications as well as services offered by the establishment of foreign companies, or commercial presence, including the opportunity to own and operate independent telecommunications network infrastructures. Thus, the agreement, inter alia, covers voice telephony, data transmission, telex, telegraph, facsimile, private leased circuit services, such as the sale or lease of transmission capacity, fixed and mobile satellite systems and services, cellular telephony, mobile data services, paging, and personal communications systems.

At the heart of the agreement is the consequence that the liberalization must be extended to all WTO member states on a non-discriminatory basis according to the MFN principle. However, in accordance with the aforementioned legal framework, at the end of the negotiations, 9 WTO member states filed lists of exceptions services to the most-favoured-nation principle concerning measures affecting trade in basic telecommunications.

With regard to satellite services, by February 1997 50 states had made full offers guaranteeing access for all domestic and international satellite services. In addition 6 countries guaranteed market access for selected satellite services and facilities (Brazil, Columbia, Ivory Coast, Ghana, Hong Kong and South Africa). Of the 69 parties to the agreement, only 13 developing countries made no market access commitments for satellite services.[11]

Evaluation

In economic terms the agreement is a landmark in the liberalization of international trade. In 1995 the revenue from global telecom services was about US$601.9 billion (2.1 per cent of global GDP), with a growth rate of 7 per cent. While the 130 member states of the WTO cover about 95 per cent (US$570 billion) of the global telecom revenue in 1995, the about 70 WTO member states that have entered into commitments account for 91 per cent of global telecom revenues and 82 per cent of the world's telephone main lines. About 77 per cent of the global market in 1995 was shared by the European Union, the United States, Japan, Canada and Australia. Prior to the 1997 agreement, only about 20 per cent of the global telecom services market had been open to competition.

Moreover, on 26 March 1997, 40 WTO member states, representing 92.5 per cent of world trade in this sector, agreed to implement the WTO Ministerial Declaration on Trade in Information Technology Products (ITA).[12] Beginning on 1 July 1997, customs duties on computer and telecommunications products were agreed to be reduced and eliminated altogether by the year 2000, applying to all WTO member states. The ITA includes computers, semiconductors, telecoms hardware and computer software which are the conduit for the delivery of information, and its purpose is to make such products more affordable, also in the poorer countries to improve living standards, health and education. The ITA covers almost US$ 600 billion in world trade. The ITA accord and the telecoms agreement reached one month earlier together cover international business worth more than US$ one trillion. This is about the equivalent of world trade in agriculture ($444 billion in 1995), automobiles ($456 billion) and textiles ($153 billion) collectively. In view of the fact that trade in information technology is growing faster than world exports in the past ten years, these two sectors taken together are the backbone of the global economy and, in quantative terms, their liberalization amounts to a new trade round.

Developing countries, of course, have much lower shares of global telecommunications activities than industrialized countries. However, in 1995 certain countries, such as Korea, Brazil, Mexico and Argentina, ranked among the top ten in shares of global

[11] See G.C. Hufbauer/E. Wada (eds.), *Unfinished Business: Telecommunications after the Uruguay Round* (1997), p. 21 et seq.

[12] See *WTO Focus*, Newsletter March 1997 No. 17, p. 1 et seq.

telecom revenue. In international telephone traffic, Hong Kong ranked fifth and Mexico and Singapore ranked among the top ten. In terms of investment in telecommunications Korea ranked fourth, while Argentina, Korea and India belonged to the top ten. As to the number of telephone main lines, Korea was among the top five and Turkey, Brazil, India and Mexico were among the top ten. It is also worth mentioning that the growth rates in the telecommunications sector in developing countries are often higher than in industrialized countries. Still there are many places in the world where people have never used a telephone.

The agreement does not cover markets of states which have not yet acceded to the WTO (i.e. Russia and China), but part of the accession negotiations would include commitments in the services sector, such as telecommunications, to avoid the "free rider problem". On the other hand, there is also ample room for disagreement on the correct interpretation of the provisions of the GATS, the Telecommunications Annex and of the precise meaning of the national schedules among those member states which have made such commitments. Fortunately, the new World Trade Organization has not only created a single institutional framework for the numerous multilateral trade agreements, but has also established a new integrated dispute settlement order and a trade policy review mechanism applicable to all multilateral trade agreements. The dispute settlement system, including a Dispute Settlement Body and a Standing Appellate Body to review panel decisions, is much more "judicialized" than the previous GATT model and places emphasis on the legal and binding elements of the resolution on international trade conflicts. However, it is in the process of being tested at the moment and telecommunications disputes, including satellite services, are very likely to emerge as an important testing ground in the future.

Summary of the Presentation to the Session entitled "Possible International Regulatory Frameworks, Including Legal Conflict Resolution in Expanding Space Commercialization"

The presentation selects two main aspects of the problem of developing adequate international regulatory frameworks in view of the commercialization and privatization of outer space activities (which in fact mainly involve satellite communications, launching services, and, to a certain degree, remote sensing).

1. The first aspect concerns the role and legal status of non-state actors. This is a problem that has found increasing attention in general international law. With regard to space activities, - apart from privatized international organizations - , the role of (multinational) companies, viewed as the driving forces of the current process of economic globalization, is of particular interest. As far as space related activities are concerned, this is particularly so because of the significant private (and often transnational) investment made in satellite communications and other forms of telecommunications linked thereto. In terms of general international law, as it stands at the moment (de lege lata), the following propositions are made in this respect:

   a) Companies, whether national enterprises or "multinationals", are formally still not "subjects of international law" in any meaningful sense of the term, although there is an increasing limited indirect recognition of their legal personality in international law granting them rights and legal standing in certain international dispute settlement mechanisms. As such, however, their existence is barely recognized by general (public) international law, in contrast to a few numbers of special "soft law"instruments aiming at the regulation and control of their transnational activities. New developments, however, have arisen with regard to the corporate liability of companies for disrespect of certain principles and rules of international law,

especially in United States in pending litigation under the Aliens Tort Claims Act.

b) They are not parties to multilateral and bilateral treaties in the sense of international law; so-called "state contracts"or "internationalized contracts" are not treaties within the meaning of international law and have not elevated them to "partial subjects of international law".

c) Private enterprises sometimes have a formal consultative or, more often, an informal lobbying function in the negotiation of certain types of international treaties relevant to their commercial activities. It is likely that this role will be expanded in the future for two reasons. First, there is a trend in the United Nations to seek stronger cooperation with the private business sector for financial and other reasons. Second, business associations are recognizing the need to become more active on the international rule-making level to balance the political influence of environmental and human rights NGOs.

d) In practice, the influence of private business interests and their associations (i.e. the International Chamber of Commerce, ICC) has been particularly apparent in the field of international commercial law, or the law governing international business transactions in their various modes and forms, including foreign investment. The distinction between public and private international law - leaving aside the controversial concept of a *lex mercatoria* - , however, has increasingly become blurred. In the field of space law, this enhances the need for a broader definition of the scope of the subject. It must include relevant aspects of national public and private law and private international law. Moreover, with regard to the public international law aspects, the international regulatory framework of commercialized outer space activities can no longer be more or less restricted to the special outer space treaty framework and the space-related rules of the ITU. The framework must also include the relevant rules of international economic law, such as, for example, laid down by the World Trade Organisation (WTO), especially as regards the liberalization rules on satellite communications services in the Telecommunications Annex to the General Agreement on Services (GATS).

e) The development of an appropriate international regulatory framework in view of the commercialization/privatization of outer space activities requires a more integrated approach in law-making. It is therefore proposed that UNCOPUOS in its legislative activity, not only strengthen its coordination with the ITU. It should also attempt to involve more systematically the private business sector and "civil society"on a consultative basis, and coordinate its regulatory activities with those of international bodies active in international economic law-making, such as the WTO or WIPO.

2. The second selected aspect concerns the issue of appropriate dispute settlement mechanisms. In this respect, the following propositions are submitted:

a) An adequate general framework for dispute settlement mechanisms, covering also the new development in commercial/privatized outer space activities, has already been worked out in the final draft of the Revised Convention on the Settlement of Disputes Related to Space Activities adopted by the International Space Committee of the International Law Association (ILA) at the 68th ILA Conference, held in Taipeh in 1998. It is recommended that this draft be accepted as a basis for discussion and be made an agenda item of UNCOPUOS.

b) In addition, in view of the relevance of the transnational provision of services (and related foreign investment by enterprise alliances) in the field of telecommunications in general and satellite communications in particular, the following two recommendations are submitted. First, it is recommended to study more in detail the relevance of the new (inter-state) dispute settlement mechanism of the WTO. Second, it is proposed to examine which lessons should be drawn from the various forms of private investor-state dispute

settlement mechanisms to be found in recent bilateral investment protection treaties, and in multilateral instruments, such as the NAFTA agreement, the Energy Charter Treaty, or the (now shelved) OECD draft Agreement on Investment (MAI).

Commentary Paper

V.S. Mani

The summary of the paper indicates that it focuses on "two main aspects of the problem of developing adequate international regulatory frameworks in view of the commercialization and privatization of outer space activities". The outer space activities covered, principally, are: "satellite communications launching services and, to a certain degree, remote sensing".

The role and legal status of non-state actors

It is submitted that the Reparations case (1949) lays down a functional approach to the concept of international personality of entities under international law. Therefore the relevant questions to ask are:

Does an entity require a degree of international personality to enable it to perform its functions effectively? If so, how much of legal personality should it be attributed to? If the protection of national or transnational enterprises is achieved by certain principal mechanisms to ensure access to resources, freedom of activity, and settlement of disputes, with an acceptably corresponding level of international responsibility for the adverse consequences of their activities, is it not an adequate recognition of their legal personality? Indeed, the "freedoms" of access and activity must be exercised with due regard to the rights of others and the essential interests of nations (peoples) whose resources are directly involved. And no freedom without responsibility and liability.

Further the role played by private enterprises must be subjected to substantive, rather than a formalistic, assessment. Control and power wielded and exercised by these enterprises, both nationally and internationally, are of awesome order, having little correlationship with the responsibility they are obligated to fulfil. Therefore, asking for an equation of formal status with states for these enterprises is like having the cake and eating it too. The private enterprises must be made to realize their social responsibility both domestic as well as international corresponding to the access to resources, markets and profits they enjoy deriving from the national and international legal and economic order.

In addition to the space activities identified, the issues of space insurance should also be examined. These issues include the nature of international insurance market, and modes of disputes settlement.

Appropriate disputes settlement mechanism

Since the 60's, there has been an increasing recognition of the need for international disputes settlement mechanisms participated by the enterprises involved in transnational activities. The Permanent Court of Arbitration came up with a set of rules of procedure for arbitration of disputes between States and non-State entities. The 1965 World Bank Convention on the Settlement of Investment Disputes coupled with World Bank sponsored investment agreements with states made arbitration of disputes between states and private enterprises quite normal. These developments took place, in addition to the role played by non-state dispute settlement mechanisms like the ICC arbitration facility. The UNCITRAL came up with model rules for conciliation and arbitration. Indeed, at the domestic law level, in these days of increasing globalization and liberalization the law has now started promoting conciliation and arbitration to resolve commercial disputes, by even reducing the role of the judiciary to the minimum.

It is against this background that the issue of international settlement mechanism or mechanisms for space activities should be considered.

One of the recent examples of a dispute settlement mechanism to which private enterprises have a direct access is the Law of the Sea Tribunal. While this may serve as a model for resolution of space activities, there can be overlapping claims to jurisdiction by almost every international organization having a role in space activities, and more importantly by WTO. This situation may need to be remedied.

Furthermore, WTO disputes settlement body (D&B) itself needs to be reviewed. There was a tendency on the part of the GATT DSB to decline to sit in judgment over the legality of unilateral actions of States in derogation of the principle of freedom of international Trade which only remotely connected with the justifications or exceptions claimed (Article XXI). WTO DSB should be formally transformed into a tribunal and it should have the power to adjudicate upon such matters as the ICJ did in the Nicaragua Case (1986). Indeed, WTO DSB need not be bound by GATT DSB's precedents on such matters, since WTO DSB's decisions are binding on parties, whereas the GATT DSB's decisions were recomendatory in nature.

Summary Report

Major Issues

The session recognised that significant changes and development in outer space activities, having particular regard to satellite communication, launching services and remote sensing, gave rise to the need of adequate international regulatory frameworks in view of the commercialisation and privatisation of these activities;

Noted that the first main aspect of the problem concerns the role and legal status of non-space actors;

Noted that national or multinational enterprises are formally not subjects of international law and they are not parties to multilateral and bilateral international law Treaties;

Recognised the need to expand the role of the private enterprises in international law and in particular in international economic law through a more integrated approach in law-making process;

Noted that the second aspect of the problem concerns the need of an appropriate dispute settlement mechanism.

Recommendations

Regarding possible international regulatory frameworks, including legal conflict resolution, in expanding space commercialisation it is recommended to UNISPACE III:

1. that UNCOPUOS and UNOOSA strengthen their coordination with other relevant international organisations, particularly ITU, WTO and WIPO as well as with UNCITRAL;

2. that UNCOPUOS and UNOOSA provide efficient means for input from and exchange with private industry and its relevant international institutions such as the International Chamber of Commerce;

3. that UNCOPUOS and UNOOSA start consideration of elaborating an efficient machinery for the settlement of legal disputes arising in relation to space commercialisation.

   This consideration should take into account:

   a) the Revised Draft Convention on the settlement of Disputes Related to Space Activities adopted by the International Space Law Committee of the International Association (ILA) , which deals with disputes involving States, international organisations, and private enterprises;

   b) existing Arbitration Rules used in international business practice for

disputes between private enterprises and disputes between States and private enterprises in international commerce and investment.

MAINTAINING THE SPACE ENVIRONMENT

SESSION 8

Chair: Ambassador Qizhi He (China)
Coordinator/Rapporteur: Professor Maureen Williams (Argentina)

SESSION EIGHT

Maintaining the Space Environment

Discussion Paper

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Introduction

Space activities have already had their impact on the space environment. It cannot be returned to the pristine state of the times before the first launch of a spacecraft and before the first firing of a rocket. The space environment has, however, to be maintained in a state fit for space activities of future generations. The task before our generation is rather difficult. Many of the actions taken up to now, cannot be reversed. There is no easy and proved way of removing inactive objects from space. Moreover, the natural decay, in particular of objects which are at present at high orbits, may take very long times, longer than the history of humanity.

In the following paragraphs the pollution of the space environment has been discussed, in particular by solid bodies, such as space debris, by gases, such as exhaust products or fuel remnants, by radio waves encroaching on bands reserved for scientific research, and by light affecting astronomical observations. Also, the balance between the benefit and detriment of some space missions has been briefly considered.

The natural environment: the atmosphere

The lowest layer of the atmosphere, the troposphere, extends from the ground to about 10 km in polar regions and to 15-20 km in the tropics. It is characterized by a decrease of the temperature with altitude. Above that is the stratosphere where the temperature is increasing with altitude. It reaches up to about 55 km. A very important feature is the ozone layer at about 25-50 km altitude. It protects life on earth from solar ultraviolet radiation. The next layer, the mesosphere, extends up to 80-95 km. At these altitudes the atmosphere becomes sufficiently ionized by the solar ultraviolet radiation so that the free electrons affect the propagation of radio waves. It is called the ionosphere. It reaches to an indefinite height of several hundred kilometres. In the outermost layer, in the magnetosphere, reaching up to some 60,000 km in the direction towards the Sun and much further in the opposite direction, the magnetic field determines the physical properties. Its size and shape is affected by the solar wind. An important feature are the Van Allen radiation belts, located at altitudes of about 5,000 and 20,000 km respectively. They pose hazards of excessive irradiation to astronauts.

What happens in the upper layers of the atmosphere, affects, sooner or later, also the underlying layers. Since the upper atmosphere is highly rarefied, any release of gases becomes relatively important and changes the density and composition in a wide neighbourhood.

On the whole, however, the atmosphere is a very large, powerful and sturdy machine which is capable to adapt to all natural effects whether they are coming from the ground or from the interplanetary space. Among the most important effects is the influx of meteoroids. These are solid bodies of all sizes,

composed mainly of silicate minerals or iron and nickel, or both, minerals and metals. Their total mass entering the atmosphere has been estimated at 170 thousand tons per year, including 10 thousand tons of metals

The space environment

For the purposes of this paper we shall understand as space environment those regions around the Earth where artificial satellites can survive for at least one orbit. The lower limit is at approximately 100 km altitude. That value is a reasonably good approximation for most existing satellites. The precise value of the limiting altitude depends on the construction of a satellite, being lower for heavy compact objects and higher for lightweight objects with a small mass per area, such as inflated balloons. The limiting altitude depends also on the actual solar activity. If the activity is high, the temperature of the atmosphere gets higher than normal and so does the braking force on satellites. Consequently, satellites tend to de-orbit at a higher altitude than at times with a normal solar activity.

The outer limit of the region where Earth satellites can exist is far beyond the orbit of the Moon, at approximately 1 million kilometres from the Earth. Objects beyond that distance do not orbit around the Earth, they orbit around the Sun.

Orbits of most satellites, including manned spacecraft, lie in Low Earth Orbit, LEO, between 200-2000 km altitude. In High Earth Orbits, HEO, beyond 2000 km altitude, the number of objects is considerably less. There are, however, two regions which are more populated than others. One is a belt favoured by navigation satellite systems at around 20,000 km, the other is the geostationary orbital belt, GEO, at around 36,000 km. GEO is mostly populated by telecommunication satellite systems and by meteorological satellites. Beyond the GEO there are only the apogees of satellites of the Molniya communication system at around 40,000 km, orbits of a few scientific satellites, and from time to time a passing interplanetary probe.

The total number of active satellites is around 600. Out of that number about 240 are in the GEO. These numbers are in a strong contrast with the total number of objects. There are at present in orbit over 9,000 objects larger than 10 cm, over 100,000 of objects between 1-10 cm, and tens of millions of objects smaller than 1 cm.

The lifetimes of satellites are determined mainly by the drag of the rarefied atmosphere. The drag makes the satellites to spiral down and eventually to decay. The stronger the drag, the steeper is the spiral and the shorter is the remaining lifetime. De-orbiting objects get heated by friction with atmospheric gases and most of their mass evaporates. Only the most compact fragments reach the ground, their shapes disfigured by the high temperature and by the impact.

At 200 km altitude the lifetimes are of a few days, at 600 km up to 30 years and at the highest altitude of LEO, at 2000 km the lifetimes attain 20,000 years. Satellites at the geostationary orbit are permanent features, their lifetimes exceeding several million years.

Space debris

Details on the measurements, on modelling of the space debris population and on space debris mitigation measures appeared in the Technical Report[1] of the Scientific and Technical Subcommittee. The Report was prepared with the assistance of the Inter-Agency Space Debris Coordination Committee, IADC, consisting of representatives of space agencies of most active space faring countries. It lists measures for reducing the risk posed by space debris. These measures have to remain within technical as well as financial possibilities of the agencies. Otherwise they would make future activities prohibitively difficult and costly.

The final version of the report, as adopted by the Scientific and Technical Subcommittee in 1999, was

[1] Technical report on space debris of the Scientific and Technical Subcommittee, A/AC.105/720.

considered, besides the IADC, also by the International Academy of Astronautics, IAA, representing the scientific community. The Report will be further considered by the Committee on the Peaceful Uses of Outer Space, COPUOS. That committee will decide what further steps should be taken in dealing with the problem of space debris.

The Report concludes[2]: *"Space objects with diameters larger than 10 cm in LEO and larger than 1 m in GEO can be observed and tracked. More than 8,500 catalogued objects are in Earth orbit. The number of in-orbit catalogued objects has been increasing at a relatively linear rate for the past several decades. ... The trends and tendencies predicted for the future orbital debris environment are qualitatively in agreement ... The limitation of mission-related debris and the prevention of accidental explosions have been found effective and have already been introduced to some extent. Also, the transfer of GEO spacecraft into disposal orbits at the end of their active life is already customary practice. ... For some satellites on long lifetime LEO orbits, a transfer to shorter lifetime orbits is planned at the end of their active life. Such procedures, in general, could be most effective. ... Since most of the mitigation measures introduce some burden to missions, it would be beneficial if the same mitigation procedures are considered globally."*

"In most cases, man-made space debris today poses little risk to the successful operations of approximately 600 active spacecraft now in Earth orbit. However, the known and assessed population of debris is growing, and the probabilities of potentially damaging collisions will consequently increase. Because of the difficulty of improving the space environment with existing technologies, the implementation of some debris mitigation measures today is a prudent step towards preserving space for future generations ...."

Questions arising from the growing number of satellites in orbit have been also considered by the Fifth International Space Cooperation Workshop "Solving Global Problems", organized by the American Institute of Aeronautics and Astronautics, AIAA, was held at Bermuda, 11-15 April 1999[3]. The workshop adopted several recommendations which have been presented recently to the Technical Forum. This session can either express its support to some of the recommendations or it can formulate its own recommendations. For the convenience of this session, selected recommendations of the AIAA workshop follow:

1. **On the work of the COPUOS** done with assistance of the IADC and the IAA:

"The Workshop participants strongly support work being done by the UN, the IADC, the IAA, and others to develop guidelines designed to minimize the creation of new debris objects."

"The Workshop recommends that existing and future debris minimization guidelines be applied uniformly and consistently by the entire international space faring community. In addition, government licensing agencies are encouraged to promote such compliance among the space community in their respective countries."

"In addition to minimizing the creation of new debris, the problem of on-orbit debris must be addressed. Mitigation of debris on orbit can be addressed in at least two ways. First, by moving large debris, such as satellites at the end of operational lifetime, out of the way of active satellite orbits and second, by the active removal of visible, but untracked smaller debris. Some aerospace companies are not including de-orbit capabilities on their spacecraft, and hence these spacecraft will contribute to the problems of orbital congestion and debris well past their operational lifetimes."

2. On de-orbiting of spacecraft:

"Governments and the commercial sector are encouraged to promote the application of technical

[2] For a verbatim version and for details, the reader is referred to the original document.

[3] For details and justification see the Report on the workshop published by the AIAA and presented in the Technical Forum on 20 July 1999.

solutions to the de-orbiting of spacecraft, a practice which is in the best interest of all users of operational orbits."

3. On de-orbiting of small untracked objects, reacting to the method proposed by Ivan Bekey to remove small debris by irradiation with a weak laser beam:

"While the economic justification and consequences on the space environment of implementing debris removal technologies must be better understood, continued development of such technologies should be encouraged. Governments are strongly encouraged to invest in basic pre-competitive technology that could be further developed and applied by commercial operators."

4. On collision warning and mitigation as a means of reducing the number of space debris:

"An internationally recognized entity should be developed to provide reliable, timely, generally available collision warning and mitigation services for launch, in-orbit, and end-of-life operations."

"International legal provisions should be investigated to enable providers of collision warning and mitigation services to be responsible for coordinating with the parties involved in close approaches, and to assure that satellite operators are aware of the situation and can jointly develop appropriate avoidance manoeuver."

"The service provider concept should be reviewed and refined by an international body or committee that includes representatives of both industry and government. Service provider concepts including government, commercial, multiple entity, and consortia should be evaluated."

5. On the Registration Convention:

Recognizing fragments as space debris is easy by their shape and size but it is difficult to recognize as space debris those objects which are non-functional but remained more or less intact. Inactive satellites cannot be told from spare satellites waiting for their future activities or from scientific satellites investigating gravitational and other forces. It is only the owner or operator of a satellite who can decide at what moment his satellite has lost its value. It should be his duty to inform other users of space of the fact. There is a means to make such announcements through the provisions of the Registration Convention. A state owning a satellite may provide the Secretary General of the UN with additional information concerning a space object[4]. Although it is not an explicit obligation, some states have availed themselves of the opportunity and have announced the cessation of activities of its satellites. A general adoption of this practice would be highly beneficial.

In fact, only 40 States adhere to the Registration Convention, by which launching States declare responsibility for their spacecraft. Several international organizations launching or operating satellites do not register their satellites with the UN because fewer than half of their Member states are parties to the Convention. As a consequence, the UN Register of Objects Launched into Outer Space is incomplete, which restricts its usefulness. Another issue arises from the fact that the UN Register is constituted from governmental announcements, which are of different formats, use different designation of objects, and in general contain different information. There is no easy way to correlate the governmental announcements, to establish a time sequence of launches, or to find which satellites have been registered and which party acknowledges responsibility for them. Better implementation of the Registration Convention is essential:

"Action should be taken to implement the Registration Convention:

As a high priority, the UN should work to increase the number of States and international organizations actively adhering to the Convention, and

The UN COPUOS needs to request the Office of Outer Space Affairs to obtain required information on

[4] Registration Convention, Article IV,2.

space objects and to maintain a comprehensive and fully updated register on its websites."

6. On standards and recommended practices:

Increasing numbers of satellites, particularly in LEO, may necessitate an international regulatory framework for standards and recommended practices for launches and for space objects that is more comprehensive and coordinated than existing processes for ensuring an orderly, reliable, and safe environment for beneficial space activities. Such a framework should be developed in coordination among governments and industry. A credible study is needed to provide a common understanding of existing practices and their effectiveness in meeting future needs.

"An appropriate organization with international outreach, such as the AIAA, or the IAA, should survey existing organizations and practices for regulating launches and space objects, estimate probable future expansion of these activities, identify and analyze options for an international regulatory framework (including study of traffic management systems developed by the International Civil Aviation Organization, ICAO) that can formulate standards and recommend practices to ensure safe, efficient, and beneficial services, and report to the COPUOS as soon as practicable. This survey could then become the basis for international action."

7. On the term "space debris:

In the existing instruments of space law no mention has been made of space debris. The instruments use the term "space object" or "object launched into outer space". No distinction is made between valuable devices performing useful services on one hand and useless non-functional objects, such as fragments or inactive satellites on the other hand. Yet it is evident that law should protect valuable property and should facilitate the disposal of unwanted fragments and useless objects.

"The International Institute of Space Law, IISL, is requested to study the definition of "space object" and other relevant terms and recommend appropriate further steps to the UN."

8. On liability for space debris:

The international management of orbital resources through a more comprehensive system of identifying and tracking spacecraft and orbital debris and the establishment of collision avoidance services raises a number of issues related to international liability. The Liability Convention provides for compensation for damage caused by the space objects of a launching State to the Earth, aircraft in flight, persons, or other space objects. It is unclear how orbital debris would be treated under this Convention. There remains a question of what, if any, liability a collision avoidance provider would have in the event that a failure of the service resulted in damage caused by collision with another space object or space debris. It could make a difference depending on whether the service provider is a private or government entity.

"The IISL is requested to study the issue of liability and to initiate appropriate further steps."

Issues 7 and 8 have been addressed to the IISL, not to UNISPACE III. They have been mentioned here for the sake of completeness and because they touch on the subject of this session.

Impact of debris on the atmosphere

Every year about 500 pieces of trackable debris and a very large number of debris too small to be detected, decay in the atmosphere. The less compact parts evaporate and the particles remain in the atmosphere for fairly long times. The contamination, even by metals, is not critical compared to that by natural bodies. Meteoroids pass through the atmosphere in very large quantities, as stated in the section on the atmosphere. The contribution by space debris is just a fraction of the amounts of meteoroids. The total mass of all artificial objects in earth orbit is between 2000 and 3000 tons and only a few percent of these is decaying every year. The impact of debris on the atmospheric gases is negligible compared to the impact of bodies of natural origin.

Missions of questionable benefit[5]

The Outer Space Treaty contains in its Article I the principle that the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of scientific and economic development. This statement – of high moral value – tacitly assumes that it is possible to find out what is the benefit and interest of all countries. In practice, however, a benefit to one user of space may be a detriment to someone else. E.g., commemorative missions by conspicuous space objects reflecting light would indeed draw the attention of the public but astronomers strongly object whenever their valuable and unique observations have been destroyed or compromised by the spectacle. Another example: A satellite illuminating fields during the night might increase the yield of the crop but, without a proper environmental assessment, such practice might lead to undesirable effects, such as proliferation of rodents or to extinction of forms of life which need a daily dark period for survival.

Although an absolutely satisfactory solution does not exist, it is possible, as it is done in other situations, to balance the advantages and drawbacks and to decide accordingly. What is needed, is an institution competent to consider the matter, to arrive at a reasonably good solution and to make its judgment respected by space users. Could some cases be solved within the framework of national law regulations? Would other cases require a ruling by the International Court of Justice? It is proposed to bring this point to the attention of UNISPACE III under the following recommendation:

"With regard to the increasing number of satellites and to the necessity to maintain the space environment in a state fit for space activities of future generations, it is recommended to launching States to consider, from a global point of view, the balance of benefits and detriments of planned missions and to take an appropriate decision concerning the realization or modification of such missions.

Exhaust gases

There is no doubt that exhaust gases of space launchers pollute the atmosphere from the ground up to the altitude when the rocket engine is switched off. The question of how important is that effect was tackled by the French Academy of Sciences and the French National Air and Space Academy, ANAE. A study[6] by the latter surveyed the nature of the effluents emitted by space launchers, such as Ariane 5, the space shuttle, or launchers using liquid oxygen. Homogeneous reactions lead to the following effects on stratospheric ozone: Local ozone is immediately destroyed but very soon its content is restored. Regional effects persist for several days: the chlorine level increases by a few percent and the ozone depletion is less than 1%. Global effects of 9 STS and 6 Titan IV launchings per year would result in an increase of less than 0.25% in chlorine content of the atmosphere. The impact of 15 Ariane 5 launches per year would deplete the ozone level by 0.02%. Heterogeneous reactions on the surface of aerosols and aluminum particles add very little to that value.

Also experiments of rocket impact on atmospheric ozone have no significant effect. And the impact on greenhouse effect, mainly by carbon dioxide and water vapour, was found to be negligible. Summing up, the study concludes that quantities produced by present or future space launchers amount to much less than quantities produced by other human activities or by natural sources, such as large volcano eruptions.

In this respect, the atmosphere and its constituents are not sensitive to space activities or, for that matter, to air traffic. Natural phenomena occur on a much larger scale.

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[5] For more details see L. Perek: Must space missions be beneficial? Proc. 35th Coll. On the Law of Outer Space, Washington, AIAA, p. 303-306, 1993.

[6] Impact of Aircraft and Space Launchers on the Atmosphere and Climate: Recommendations, ANAE, Dossier No. 13, 1998.

Spillover of radio waves

Astronomy needs for its research observations on all wavelengths which are accessible to present day technology. They extend from very hard x-ray radiation at the short end to the entire spectrum of radio waves. The radio signals which are received from celestial bodies in our own and other galaxies are exceedingly faint. Large radio telescopes are needed for their detection but the dimensions of the antennas have a limit given by technology of about 100 m diameter. Still larger dishes can be built in fixed positions, such as a valley in Arecibo, Puerto Rico, which hosts a parabolic dish of 300 m diameter. On the other hand, radio astronomy has become an extremely important branch which brings unique knowledge on very distant celestial bodies. For this reason, selected frequency bands have been allocated by the International Telecommunication Union, ITU, to radio astronomy. Most of the bands are quite narrow, just covering important spectral lines, some are shared with other services but all are very close to bands used for strong telecommunication signals.

Radio waves are carriers of telecommunications, an extended and highly lucrative application of space technology, used for broadcasting television, mobile telephones and navigation systems for ships and aeroplanes. The ITU is swamped with requests for assignments of new bands. It happens sometimes that telecommunication signals, or side lobes, spill over into the radio astronomy bands drowning the faint signals completely.

The following recommendation, addressed to UNISPACE III, is proposed:

Support should be expressed to the principle of reserving necessary frequency bands for future research of distant natural sources of radio signals, and to their protection from spill-over.

Pollution by light

The strongest pollution of the night sky comes from sources on the ground, such as street lights or advertising. A local but potentially highly harmful light pollution is caused by space debris reflecting sunlight. Most wide-angle astronomical photographs show today traces made by space debris. These traces may destroy or compromise the value of observations which may be unique or impossible to repeat. Astronomy would benefit from all measures which are taken to reduce the amount of debris. Moreover, designers of spacecraft should avoid placing reflecting surfaces on the outside of spacecraft which produce specular reflections. As an example, Iridium satellites provide short flashes of light, mostly exceeding the brightness of planets. Sensitive astronomical light detectors aimed at faint light sources could be destroyed if illuminated by an Iridium flash. The flashes are not rare events. On every spot on the globe they occur up to 4-5 times a night. It is a beautiful sight but may cause losses to science. The matter was treated at the IAU-COSPAR Special Environmental Symposium "Preserving the Astronomical Sky", held last week.

The following recommendation should be adopted:

The principle of preserving the dark night sky suitable for astronomical research should be taken into account in planning space missions.

Conclusion

This session is a unique opportunity to inform UNISPACE III of the views of the IISL on questions connected with the maintaining of the space environment in a state suitable for future space activities. Another such opportunity might have to wait until the next UN conference on space, i,.e., some fifteen years. Therefore the recommendations adopted here could deal also with matters of a long perspective.

Commentary Paper

G. Lafferranderie

Mr Chairman, Madame Rapporteur, Professor Williams, Professor Perek, Ladies and Gentlemen,

Let me first congratulate Professor Perek on his comprehensive report. I really do not intend to comment on this report. I will do my best to offer my own perspective on the subject and propose a possible way of making concrete progress. It is ambitious enough!

I believe – indeed we are all of the same opinion – that we are at a crucial point on a specific and important issue affecting the near-term future of space activities and that this is also the point to reconsider and strengthen the role and scope of international space law and of the COPUOS.

Some facts

I would like to emphasize the following in particular and the urgency for taking action.

(a) *Space debris* is a natural and immediate consequence of the exploration and use of outer space by man-made objects. It is created by and – until perhaps new ways and means are discovered – goes hand-in-hand with the growth of space activities, the increasing number of satellites, space objects and launchers. Space activities - like other high-technology pursuits – create risks; and first and foremost, for themselves. All this we know and have always known. I cannot criticise the drafters of the Outer Space Treaty for omitting to give a clear definition of space debris from the purely legal viewpoint (I do not know whether in other fields we have definitions of aircraft, debris; the question is not the same, some will say.)

Any use of high-technology activity, any discovery, particularly that giving rise to a broad expectation of improved living conditions on Earth, has never been set aside in view of the potential risks. We have been amply aware for a long time that those risks - on Earth and in space – are set to become greater and greater (*"le temps des cerises..."* has come!)[7]. Some space agencies have, to their credit, undertaken studies and become engaged in taking mitigation measures.

(b) What now?

We now have more and more constellation-type satellites, essentially operating in low earth orbit, and small (micro or nano) satellites. Those regions offering the biggest potential for commercial activities are the most polluted. The large increase in space traffic, particularly for commercial applications (communications, Earth observation, etc.), will further increase the risk of damage.

The international space station, its assembly and operation, with humans on board, will dramatically raise the stakes. We are fully aware that the lives of these people will be at risk (on-board or during EVA, a very small piece of debris impacting the space station, or what's more an astronaut's suit, could cause serious damage or injury). We know that already some manoeuvres have proved necessary to avoid possible collision.

(Note 1: 13 June 1999- a collision was avoided between the ISS and a component part of a Russian rocket. The on-board computer of the Station had refused to obey the command sent by the ground; hopefully the element of the debris of the launch vehicle was on a trajectory more than was foreseen.) We know too that one ISS module launched has no protective shielding and could encounter problems in surviving collisions.

(Note 2: After the explosion of a proton launcher several seconds after its launch from Baikanour Kazakhstan, large pieces of debris fell to the ground)

Is the space around our planet becoming a junk yard, with dramatic consequences on Earth itself (in terms of pollution? There is light pollution, frequencies, ashes, and other envisioned activities like publicity and tourism in space. Professor Perek underlines this and I agree with him. All those types of pollution which are impacting the objectives of activities in outer space are expressed in article 1. S1 of the OST.

[7] 'Cerise': a French defence satellite that collided with an Ariane upper stage on 24 July 1996.

The accumulation of space debris has become an irreversible process. Limiting the amount of space debris by all possible means is not only a must; it is a duty.

Among the valuable initiatives being taken nationally, regionally and world-wide, I would like to mention in particular the IADC work and of course the studies conducted by the COPUOS Scientific and Technical Subcommittee, which recently produced its basic technical report. This means we have all we need to start giving this matter political and legal consideration. There is now no justification for delaying matters further and wasting yet more time. Again, it is a question of political will!

Of course, with any complex and changing technical issue, there is always scope for more and more study. But there comes a point at which we have to stop using that argument, particularly when we bring the real economic and commercial concerns to the fore. The stakes are higher than the mere technical detail. Clearly technical investigations have to continue, within the context of a set plan of action permanently under review.

Is there really a legal vacuum?

I do not believe so. Identifying possible improvements in the situation, including what legal form(s) they might take, is another matter. But we cannot forget that time is moving on and that several parties are involved at various levels. Any solution will require a combination of good will and technical plus legal solutions, by definition to be kept under permanent review. We are all concerned and we should not give undue priority to any single approach: devising the technical solution first or the complete binding agreement first.

As I have already stated, I am convinced we already have the necessary basic provisions in existing international space law (liability, consultation, etc.), particularly in the Outer Space Treaty and Liability Convention[8]. Clearly, as Professor Kopal has pointed out, the Outer Space Treaty at present is too general (failing to provide definitions, for instance). Nevertheless, these space treaties do provide us with a framework and some basic starting points. Obviously we need clearer answers and we also need to recognise that a specific situation calls for a specific legal regime. Special rules appear necessary, for example with regard to liability.

While the COPUOS Legal Subcommittee has been hitherto convening, the doctrine has continued to be active and propose worthwhile ideas as it often has in the past. For instance, action has been taken towards states for becoming parties to these treaties.

(Note 3:Working paper submitted by France at the last COPUOS meeting- Vienna, July 1999, 14-16 July: concerning space debris and proposing a plan of action. COPUOS decided to send question of graveyard orbit to Scientific technical Subcommittee.)

I should mention here the work of the International Institute of Space Law (IISL) and its various colloquia, a joint IISL/ECSL session, the International Law Association (ILA) of course and its draft International Instrument adopted at its Buenos Aires Assembly in August 1994, etc. This means that we have enough material, very well prepared by experts, so we should not spend too much time reinventing the wheel (for instance, the legal definition *of space debris*) but rather build on these ideas and structure them.

Proposal

Assuming general recognition of the space debris phenomenon as an inevitable by-product of space activities; considering, for the time being, the unavoidable growth of space debris and the dangers it is creating for the exploration and use of outer space, particularly for astronauts; and considering that the basic tenets of international space law are applicable

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[8] See Kopal article, IISL colloquium (1996), reviewing the current regulatory structure; see also article I, articles VI-VII-IX-I+ NPS Principles.

to the consequences of damage created by space debris; considering all this, what role can still be played by the lawyers as a matter of duty? What concerns are currently being inadequately addressed?

There should be an internationally-agreed list and analysis of the relevant issues, such as 'the definition of space objects', specific provisions of international space law applicable as a matter of principle (consultations, State liability) and the basic content of the Scientific and Technical Subcommittee and IADC reports (meaning), a list of other issues notably concerning space debris mitigation measures: reducing the debris increase over time, preventing in-orbit break-up, de-orbiting and re-orbiting of space objects; protection strategies, shielding, collision avoidance, etc.

(Note 4: International Astronomical Union (IAU) Role: observer to Science and Technology Subcommittee should develop criteria and specifications to be observed for safeguarding its mission should participate in the consultations between all concerned actors under the guidance of COPUOS should increase its relations with COPUOS Legal Subcommittee (the pollution as rightly pointed out in Milerek Report on light pollution, frequencies, etc.) IADC (Inter Agency Space Debris Coordination Committee) should increase relations with maritime wreckage committee (epaves du droit maritime))

What would the result be? What should the objective be? The objective must be an overall regime applicable to all space objects (civil and non-civil), whether for commercial use or not, to maintain fair competition. What legal form should this take? A further Convention seems out of the question. A Protocol? Revision of existing Conventions (on Liability and Registration)? I think not. Time is not on our side and discussing such texts and bringing them into force would be a lengthy process (unless there were strong political consensus).

I would suggest a combined approach as (a) agreed upon by States: Principle approach similar to that successfully followed for the Principles on the use of nuclear power sources (NPS) in space[9]; and (b) regulatory practices: technical "code of conduct" agreed by launching entities, public or private, satellite and launcher manufacturers and operators. Setting out the technical 'recommended mitigation practices' as precisely as possible, this 'code' would have to be implemented by all parties concerned to ensure fair competition and backed by governments in the exercise of their jurisdiction and control of space activities. A player unwilling to follow the agreed regime should barred from the competition and these technical conditions should form an integral part of the national licensing regime for space activities.

The 'Principles' would complement the existing legal provisions and could follow the pattern of the NPS Principles: definition, the various States' obligations to inform, cooperate and consult, liability, settlement of disputes, relationship between the relevant Conventions to harmonise for instance implementation, national laws, etc. I would add two points: the role of COPUOS in monitoring and providing access to a database established, funded and updated by space authorities; and substantial provision for expertise and arbitration to settle disputes. (list of arbitrators)

I think we would save time if these two documents were drafted separately, subject to any necessary cross-referencing. Draw on and benefit from that which already exists, recent achievements and the international impetus notably demonstrated at the aforementioned conference and its workshops.

In conclusion, Mr Chairman, the challenge facing us is immense. Lawyers are able to face big challenges (the Outer Space Treaty!) and I would repeat that we have important duties. Duties linked to two questions. What is the international law and its role in this context? We know we cannot compare national and international law, their sources, their scope, their aims. Here the aim is to help establish better conditions for the conduct of activities referred to as being for the

[9] See in particular: Marietta Benko and K.U. Schrogl, 'Space debris: legal problems to be solved within the United Nations', Darmstadt Symposium (1993).

benefit of all countries. These countries also each have their own duty ... a duty to each other.

(Note: Unesco Declaration on the Safeguarding the interests of Future Generations, 1997)

And it is up to the lawyers to point them in the right direction!

Thank you very much for your kind attention.

Commentary Paper

Karl-Heinz Bockstiegel

In my function as one of the Commentators of this Session 8, due to the limitations in time, I can only present some few thoughts in addition to the excellent report by Dr. Lubos Perek presented in advance of this Session.

Dr. Perek's report shows very well the growing practical relevance and risks for the space environment as well as from space for the earth environment. As we all know, many studies and meetings on the technical aspects of particularly space debris have been produced and held such as those by the European Space Agency and by the Scientific and Technical Sub-Committee of COPUOS under the chairmanship of Prof. Rex who himself is an expert on space debris.

I can, therefore, concentrate on the legal aspects involved. Also in this regard, quite a few papers have been presented over recent years many of which, however, have the weakness of being "only" by lawyers without participation of technical experts while it is rather obvious that particularly with regard to space debris any legal consideration must be based on the technical assessment of risks and the technical realistic options for improvement.

Therefore, an interdisciplinary approach seems necessary on this topic. The first interdisciplinary meeting on space debris was probably the one organized by the Institute of Air and Space Law of Cologne University in Cologne in 1998 the proceedings of which have been published (Böckstiegel (Ed.), Environmental Aspects of Activities in Outer Space - State of the Law and Measures of Protection, Studies in Air and Space Law Vol. 9, Köln, Berlin, Bonn, München 1990).

The longest and most systematic work on the legal aspects of space debris has been done by the International Law Association (ILA), its Space Law Committee, its biannual conferences, and some national or regional meetings. Starting with a respective decision at the ILA Conference in Seoul in 1986, the ILA Space Law Committee has been doing research and exchanging information and views and finally preparing drafts regarding the protection of the environment from damages caused by space activities, particularly space debris. In doing so, the legal experts in the ILA Space Law Committee have had the benefit of support from three Scientific Consultants, namely Dr. Lubos Perek from the Czech Republic who has prepared the report for this meeting, Prof. Dieter Rex from Germany who presently is the Chairman of the Scientific and Technical Sub-Committee of COPUOS, and from Prof. Humberto Ricciardi from Argentina. Landmarks of the ILA work on space debris were particularly: a regional seminar of the ILA in Buenos Aires in December 1987; the international colloquium of the Institute of Air and Space Law in Cologne in May 1988 mentioned above; discussions and a further mandate at the ILA Conference in Warsaw in August 1988; a meeting in Ascunción del Paraguay in October 1988; a report to the 1990 ILA Conference in Australia which resulted in a mandate to the Space Law Committee to start work on the elaboration of relevant principles; after the preparation of three drafts a report to the 1992 Cairo Conference of the ILA which resulted in a mandate to now prepare a final text of a draft international instrument.

After this long and extensive preparation, since 1992 three drafts had been elaborated, circulated and discussed at various stages by the ILA Space Law Committee and its three Scientific Consultants and the final text with the title "International Instrument on the Protection of the Environment from Damage Caused by Space Debris" was submitted, with an extensive

commentary by the Rapporteur of the ILA Space Law Committee, Prof. Maureen Williams, to the 66th Conference of the International Law Association in Buenos Aires in August 1994. The Conference adopted it by a formal Resolution and thereafter, the text was communicated to COPUOS and other relevant international organizations. The text of the Draft Instrument is enclosed as an annex to this paper. Major provisions in this final text deal with: definitions (Article 1), scope of application (Article 2), the general obligation to cooperate (Article 3), obligations to prevent, inform, consult, and negotiate in good faith (Article 4), compatibility with other agreements (Article 5), responsibility and liability (Articles 6 to 8), dispute settlement (Article 9), and the usual provisions on formalities of an international instrument.

As many will know, a Symposium was held in connection with the 1995 meeting of the Legal Sub-Committee of COPUOS and it was suggested there again that the Legal Sub-Committee now take up the topic of space debris in its Agenda and that the ILA Draft Instrument might be a good starting point for the relevant discussion, even if, for the time being, only a code of conduct might be contemplated.

This is in conformity with statements of many states at all recent meetings of the Main Committee of COPUOS which suggested that not only the Scientific and Technical Sub-Committee of COPUOS deal with the topic of space debris, but that also the Legal Sub-Committee put this point on its Agenda. The same suggestion has been included in the yearly statements by the International Law Association as on official observer to COPUOS in its meetings of the Main Committee.

In this context it is with pleasure that one can note the decisions taken in last week's meeting of COPUOS just before this UNISPACE III Conference according to which new working procedures have been established which seem to facilitate taking up a topic such as space debris in future work of COPUOS and its Legal Sub-Committee.

Coming to concrete proposals that might be considered here in UNISPACE III on the basis of Dr. Perek's report and other work done in this field, the following would seem to be both necessary and feasible:

1. A better implementation of the Registration Convention should be promoted to provide more detailed information relevant for space debris.

2. The options for some kind of regulatory framework for the protection of the outer space environment should be discussed in COPUOS and its Legal Sub-Committee.

3. The ILA Draft Instrument on Space Debris should be included in such discussions, irrespective of whether the final legal form might be a convention, a set of principles, standards and recommended practices or a code of conduct, or perhaps a combination of two of these as suggested by Dr. Lafferranderie during the meeting of this Session of the Workshop.

Annex

Buenos Aires International Instrument on the Protection of the Environment from Damage Caused by Space Debris

(Draft approved by the 1994 Conference of the International Law Association)

Article 1: Definitions

For the purposes of this Instrument:

(a) "Contamination/pollution" means a human modification of the environment by the introduction of undesirable elements or by the undesirable use of those elements.

(b) "Contamination/pollution" will be considered as synonyms and are inclusive of all harmful elements other than space debris.

(c) "Space debris" means man-made objects in outer space, other than active or otherwise useful satellites,

when no change can reasonably be expected in these conditions in the foreseeable future.

Space debris may result, inter alia, from:

Routine space operations including spent stages of rockets and space vehicles, and hardware re-leased during normal manoeuvres.

Orbital explosions and satellite breakups, whether intentional or accidental.

Collision-generated debris.

Particles and other forms of pollution ejected, for example, by solid rocket exhaust.

Abandoned satellites.

(d) "Environment", for the purposes of this Instrument, includes both the outer space and earth environments within or beyond national jurisdiction.

(e) "Damage" means loss of life, personal injury or other impairment of health, or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organisations, or any adverse modification of the environment of areas within or beyond national jurisdiction or control.

Article 2: Scope of Application

The instrument shall be applicable to space debris which causes or is likely to cause direct or indirect, instant or delayed damage to the environment, or to persons or objects.

Article 3: The General Obligation to Cooperate

1. States and international organisations parties to this Instrument shall cooperate directly, and/or through the pertinent international organisations, to protect the environment and implement this instrument effectively.

2. States and international organisations parties to this Instrument shall take all appropriate measures to prevent, reduce, and control any damage or significant risk arising from activities under their jurisdiction or control which are likely to produce debris.

Article 4: Obligations to Prevent, inform, Consult, and Negotiate in Good Faith

States and international organisations parties to this Instrument have, in addition to the duties set forth in Article 3, the following obligations:

(a) To cooperate in the prevention of damage to the environment and make every effort to avoid situations that may lead to disputes.

(b) To cooperate, in accordance with their national laws and practices, in promoting the development and exchange of technology to prevent, reduce, and control space debris.

(c) To encourage and facilitate the flow and exchange of information of a scientific, technical, economic, legal, and commercial nature relevant to this instrument.

(d) To hold consultations when a State, group of States or international organisation parties to this instrument have reasons to believe that activities carried out under their jurisdiction or control, or planned to be carried out, produce space debris that is likely to cause damage to the environment, or to persons or objects, or significant risk thereto.

Any State or international organisation party to this Instrument may request to hold consultations when it has reasons to believe that the activity of another State or international organisation party to this Instrument produces space debris that is likely to cause damage to the environment. Refusal to hold consultations, or the breaking up of such without justification, shall be interpreted as bad faith.

(e) To negotiate in good faith which means, inter alia, not only to hold consultations or talks but also to pursue them with a view of reaching a solution.

(f) To give special attention, when promoting these activities, to the needs of developing countries.

Article 5: Compatibility with Other Agreements

The rules laid down in this Instrument shall not be considered incompatible with the provisions of other international agreements concerning activities in outer space.

Article 6: Responsibility and Liability (general rule)

The rules laid down in this Instrument concerning responsibility and liability apply to damage caused by space debris in the space environment and, in the absence of other international agreements on the matter, to damage caused to the earth environment.

Article 7: International Responsibility

The State or international organisation, party to this Instrument, that launches or procures the launching of a space object shall bear international responsibility for assuring that national activities are carried out in conformity with the provisions of this Instrument, the 1967 Space Treaty, and the 1972 Liability Convention.

Article 8: International Liability

Each State or international organisation party to this Instrument that launches or procures the launching of a space object is internationally liable for damage arising therefrom to another State, persons or objects, or international organisation party to this Instrument as a consequence of space debris produced by any such object.

Article 9: Dispute Settlement

1. Disputes concerning the interpretation or application of this Instrument shall be subject to consultation at the request of any of the parties to the dispute with a view to reaching a prompt and amicable settlement.

2. Failing this, if the parties to the dispute have not agreed on a means of peaceful settlement within twelve months of the request for consultation, the dispute shall be referred, at the request of any party thereto, to arbitration or adjudication. In such case, the ILA Draft Convention on the Settlement of Space Law Disputes, which is appended as an Annex to this Instrument, shall be applicable, unless a party to this Instrument has excluded such application, in full or in part, by a declaration as provided in paragraph 3 of this Article.

3. Each Party to this Instrument, when signing, ratifying, accepting, approving or acceding thereto, or formally confirming its acceptance, or at any time thereafter, may declare that it chooses any of the non-binding or binding settlement procedures envisaged in the Annex to this Instrument, or that it excludes in part or in full the application of the Annex.

4. In these procedures it shall be possible, whenever appropriate, to prescribe interim measures binding on the parties in order to preserve rights or to prevent serious damage to the environment, or persons or objects. These measures shall be implemented by the parties without delay.

Article 10: Signature

1. This Instrument shall be open for signature by all States and international organisations at the United Nations Headquarters in New York. Any State or international organisation which does not sign this Instrument before its entry into force may accede to it at any time.

2. This Instrument shall be subject to ratification or formal confirmation by signatory States and international organisations. Instruments of ratification, instruments of accession and of formal confirmation

shall be deposited with the Secretary-General of the United Nations.

3. The Secretary-General of the United Nations shall promptly inform all signatory and acceding States and international organisations of the date of each signature, the date of deposit of each instrument of ratification and of accession and the date of each formal confirmation of the present instrument, the date of its entry into force, and other notices.

Article 11: Entry into Force

1. This Instrument shall enter into force among States and international organisations which have deposited instruments of ratification or formal confirmation thirty days after the deposit of the fifth instrument with the Secretary-General of the United Nations.

2. For States and international organisations whose instruments of ratification or accession, or of formal confirmation, are deposited subsequent to the entry into force of this Instrument, it shall enter into force on the date of the deposit of their instruments of ratification, accession, or formal confirmation.

Article 12: Amendments

Any party to this instrument may propose amendments to the Instrument. Amendments shall enter into force for each party to the Instrument accepting the amendment upon their acceptance by a majority of the parties to the Instrument and thereafter, for each remaining party to the Instrument, on the date of acceptance by it.

Article 13: Reservations

No reservations may be made to this Instrument except as provided in Article 9.

Article 14: Review Clause

Ten years after the entry into force of this Instrument the question of the review of the Instrument shall be included in the provisional agenda of the United Nations General Assembly in order to consider, in the light of past application of the Instrument, whether it requires revision. However, at any time after the Instrument has been in force for five years, the Secretary-General of the United Nations, as depositary, shall at the request of one third of the parties to the Instrument and with the concurrence of the majority of the parties, convene a conference of the parties to review the Instrument.

Article 15: Withdrawal

Any party to the Instrument may give notice of its withdrawal from the Instrument one year after its entry into force by written notification to the Secretary-General of the United Nations. Such withdrawal will take effect one year from the date of receipt of this notification.

Article 16: Authentic Text

The original of this Instrument, of which the Arabic, Chinese, English, French, Russian, and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations, who shall send certified copies thereof to all signatory and acceding States and international organisations.

In witness thereof, the undersigned, being duly authorised by their governments, have signed this Instrument, opened for signature at the United Nations Headquarters in New York, on ...

NOTE: The Annex on Dispute Settlement is appended in conformity with Article 9, 2. (the text of this Annex is not included here, but is published in: Report of the Sixty-First Conference of the ILA in Paris 1984, p. 334 seq.)

Commentary Paper

Maureen Williams

The leitmotiv of this Session was the need for a more precise legal framework for the protection of the space environment from damage caused by activities in outer space. Even though the accent was put on prevention and the need to respect the precautionary principle, there was general agreement on the obscurity of the existing rules of international law applicable to this question, both in the 1967 Space Treaty and in the Liability and Registration Conventions. Some practical response is urgently called for in a field where mankind cannot afford further risks.

The pillars of Session 8 were basically three. The first was Dr. Perek's discussion paper entitled, as the Session, "Maintaining the Space Environment" . The second was the text, scope and implications of the International Instrument on the Protection of the Environment from Damage Caused by Space Debris (hereinafter referred to as the "International Instrument on Space Debris"), adopted by the International Law Association at its 66th Conference (Buenos Aires 1994). The third -and particularly enlightening- pillar was the series of lively comments from the floor where the interdisciplinary nature of this subject turned out to be a glaring example of international cooperation between space lawyers and scientists.

First, I shall briefly streamline the major points involved in Dr. Perek's very scholarly discussion paper and the ensuing remarks made by the appointed commentators, Dr. Lafferranderie, Professor Böckstiegel and the present writer. I shall then pause on some of the striking features and drafting history of the Buenos Aires International Instrument on Space Debris, a text which is kept under permanent review by the ILA Space Law Committee and which, to the best of our knowledge, is the first of its kind. This was the essence of the present writer's paper as commentator of Session 8 which, for practical reasons, forms part of the present Report.

A recurring note of the discussion paper -in a language reminiscent of the 1992 UN Earth Summit in Rio- was a question usually described as "intergenerational responsibility" which, in its application to outer space, should be read together with the need for the space environment to be "kept fit" (in the words of the author) for space activities of future generations. This issue was closely linked by Dr. Perek to the very legal topics of responsibility and liability over which, as experience has often shown, the lawyers and the scientists have argued for years on end and are only just managing to come to terms on some aspects, such as prevention and precaution.

Dr. Perek fully supported the work done so far by COPUOS, particularly by its Scientific and Technical Committee, and by other governmental and private bodies. All these studies and debates provide an appropriate background for assessing the problem in its proper light. In this sense, and as a starting point, the above-mentioned author supported the encouragement of technical solutions to prevent, to reduce, and even to remove, space debris.

On this point the present writer is reminded of the thesis put forward by Dr. Perek -who is one of the scientific consultants, indeed a very active one, of the above-cited ILA Space Law Committee. Dr. Perek has always shown concern for the extreme flexibility of the system laid down by the 1975 Registration Convention and, with the aim of having more agile mechanisms, suggested the procedure described hereunder, which was outlined at the beginning of this last decade of the century. Let us briefly review this stand.

At the root of the question was the importance of protecting space objects provided this protection was in the mind of the launching country. To this end, Dr. Perek proposed the publication, by every launching state, of a list of all its active satellites and/or inactive space objects (in this case only those it really wanted to protect) and the declaration, by that state, that only the objects on that list should remain protected under the terms of article VIII of the 1967 Space Treaty. Any other space objects which had been launched by that state would, consequently, not be covered by article VIII. It was estimated -at the time of the drafting of the ILA International Instrument, early nineties- that the

total number of active satellites was in the region of 250-300 satellites.[10] Hence, one could safely assume that the combined list of all launching states would not go beyond a few hundreds of items. The removal of objects included on that list would be therefore considered free for any country having the technology. Naturally, these lists should be permanently updated by computers which meant a relatively simple task. This theory, of an essentially pragmatic nature, entails, of course, a reasonable degree of "space-policing" which would not be seen with favour by all countries.

On this question, the present rapporteur is equally reminded of Professor Malanczuk's reasoning[11] at the Symposium, organised in March 1995 in Vienna, by the IISL under the auspices of COPUOS. On this occasion an analogy was drawn from the rules applicable in the field of maritime law, which meant considering abandoned space objects as derelict and, consequently, the possibility of removing them unilaterally.

The Perek proposal was sometimes confronted with other suggestions such as, for example, the so-called "legal" ones. This would imply, in the mind of a number of international lawyers, imposing on a launching state the obligation to remove the satellite from orbit once it became inactive. For the legal world this possibility appears absolutely consistent with international law and the principles of justice and equity which inspired, inter alia, article XII of the Liability Convention. Yet, the political winds which blow in all direction within the framework of international intergovernmental organisations are responsible for this idea being left in abeyance. And there are legal and technical reasons as well.

By way of example, when Argentina recently invited to tender for the construction of its first domestic communications satellite to be launched into GEO, the possibility of imposing an "obligation to remove" as described in the previous paragraph was thoroughly discussed. However, during the drafting of the requirements and conditions it was perceived that an obligation of the kind would mean putting the operator at handicap with respect to other operators involved in similar space activities and not bound by any such obligation. To say the least, the first operator would have to resort to the last bit (stock) of fuel to de-orbit the satellite with the ensuing reduction of the real time of use of the satellite. It seems fair to say that obligations of this type should be based on rules of international law, binding for all, and where the "raison d'être" should be, first and foremost, the protection of the environment. This is insofar as legal reasons are concerned.

As to the technical reasons, it is common knowledge today that, because of the field of gravitation of the Earth, it is less costly to transfer abandoned satellites to LEO, or send them beyond GEO[12] than bring them back to Earth. In this case, space objects should already be prepared at the time of launching for any such orbital transfer.[13]

Dr Perek continued the trend of his most recent writings, particularly the paper submitted to the 40th Colloquium of the IISL, entitled "Outer Space Treaty in Perspective" (Torino 1997) where, with his usual clarity and without overlooking the interdisciplinary character of the topic, he provided further information on this question. In addition to stating that space debris amounts to a 95% of all the objects presently in outer space, Dr. Perek drew attention to the threat to active satellites which results from this situation, aggravated in the case of manned space missions. In the interest of precision, this author strongly advocated the need to have a uniform criterion to determine when a space object may be considered as debris. This is essential to avoid confusions which might lead to chaos. To this end, at the Vienna meeting Dr. Perek resumed his train of thought expressed at the Torino Colloquium when comparing the very few definitions given so far on this

[10] See Report of the 65th Conference of the ILA, Cairo 1992. Space Law Committee, p.144.

[11] See Malanczuk, P., "Technical and Policy Issues related to the Use of the Space Environment".

[12] See S.M.Williams, EL RIESGO AMBIENTAL Y SU REGULACION. DERECHO INTERNACIONAL Y COMPARADO. RESIDUOS ESPACIALES Y PROTECCION DE LA CAPA DE OZONO, Abeledo-Perrot, Buenos Aires 1998, p.51.

[13] Ibid. In note 10 reference is made to the 64th Report of the ILA (Queensland 1990), particularly Prof. Böckstiegel's participation in the debate chaired by Lady Fox, pp.174-180.

question by international institutions, such as the ILA in 1994 and the International Academy of Astronautics in 1993.[14] Space debris, he stated, is a global problem which calls for global solutions.

The discussion paper, enriched by its author's ex tempore comments from the podium, included a list of serious outstanding problems, such as spillover of radio waves, exhaust gases, liability aspects, the overall problem caused by inactive satellites and small particles (which are today almost impossible to track) and the role of NASA in this connection. Similarly, pollution of the night sky by light (space debris reflecting sunlight, for example) was listed as example of one of the most modern aspects of pollution today. On this point Dr. Perek recommended that the principle of preserving the dark night sky suitable for astronomical research should be duly taken into account when planning space missions. With the millennium celebrations approaching one may wonder how many complaints will arise on these grounds.

Finally, and in no uncertain terms, the author of the discussion paper called for concerted action leading to a code of behaviour, or set of principles, to provide a more precise framework for maintaining the space environment. The time appears propitious for the Legal Subcommittee of COPUOS to take up the subject. The ILA Instrument on Space Debris, the work carried out by the IISL, ESA, NASA and other private and governmental bodies constitute a useful and realistic background to pursue efforts in that direction.

Dr. G. Lafferranderie was the first commentator of the Session. This speaker centered his comments on the growing problems originated by space debris as commercial activities in outer space gain momentum. In full agreement with the previous speaker as to the need to define "space object", Dr. Lafferranderie was particularly concerned by the risk to the space environment arising from constellation satellites.

The French specialist reflected the general feeling of the meeting as to the vagueness of the existing rules of international law embodied in the Outer Space Treaties and which may be applicable to the protection of the space environment. Article IX of the Space Treaty was now, in this expert's view, far from satisfactory. Indeed -the present writer reflects in passing- it fails to go beyond the requirement of "states having reason to believe" that a certain activity may cause damage to the environment of the Earth. Furthermore, the Liability and Registration Conventions are no significant step forward on this question.[15]

To conclude, Dr. Lafferranderie recommended taking the ILA Instrument on Space Debris as basis for further studies leading to the adoption of a code of conduct along the lines of the UN Nuclear Power Sources Principles.

The next commentator was Professor K.H. Böckstiegel, who focused his remarks on the 1994 ILA Instrument on Space Debris (Buenos Aires, 1994) explaining that the ILA had decided to call it an "Instrument" and not a "Convention" in order to keep it flexible. This speaker outlined the structure of the Buenos Aires Instrument pausing on some of its key provisions and describing the exchange of views and discussions which took place within the ILA Space Law Committee which he chairs and of which the present writer is the rapporteur.

Like in the previous sessions of this Vienna Workshop, pride of place was given to the topic of dispute settlement and the advisability of counting with effective mechanisms to this end. The Revised Text of a Convention on Dispute Settlement related to Space Activities (adopted at the ILA 68th Conference, 1999) was brought to the attention of the meeting. Prof. Böckstiegel pointed out that disputes between private entities concerning space activities were duly covered by the present rules of international law, especially in the field of international commercial arbitration. However, there were more difficulties in connection

[14] See Perek's paper "Outer Space Treaty in Perspective", in Proceedings of the 40th Colloquium on the Law of Outer Space, Torino 1997 (publ. AIAA). Also, by the present writer,"The Development of Article IX of the 1967 Space Treaty", ibid.

[15] See the Reports of the present writer to the Queensland, Cairo, Buenos Aires, Helsinki and Taipei ILA Conferences in REPORTS... etc.

with disputes arising between private entities and subjects of public law, i.e. sovereign states and international intergovernmental organisations.

Prof. Böckstiegel referred to the option, contemplated in the ILA Instrument on Space Debris, which provides a choice between binding and non-binding methods for dispute settlement. This speaker observed that the idea of the ILA Space Law Committee was to start at a low level of compulsion -so as to gain the widest possible support from all circles- and then move slowly up the scale. Another important feature of the ILA Instrument was a review clause designed to keep pace with technological advancement.

To conclude, and following the tenor of statements made at the COPUOS in the past years, Prof. Böckstiegel made a renewed plea for the topic of space debris to be included on the agenda of the COPUOS Legal Subcommittee.

The present writer was the third appointed commentator for Session 8 where she highlighted what were considered to be the most important provisions of the ILA International Instrument on Space Debris, underlining the interdisciplinary approach of the work of the ILA Space Law Committee on this subject. Following the initial terms of reference stemming from the 62nd Conference (Seul 1986) the present writer was asked to lay down the "Pillars of the Future ILA Instrument on Space Debris" for consideration of the Committee members and of the forthcoming Conferences (Queensland, Cairo and Buenos Aires). In describing her experience, Professor Williams referred to the confronted views of lawyers and scientists (particularly the technical consultants of the ILA Space Law Committee) on the question of responsibility and liabitity. Whereas the former firmly advocated the inclusion of rules on the matter, the latter suggested their deletion on the grounds that liability rules were hardly relevant because the typical example of collision originates when a large space object (active or otherwise) is hit by a small object (usually second generation debris) which is frequently non-trackable and may render the large object defunct (Prof. Rex).[16] Another reason advanced by technical experts was that the accent should be on the prevention of space debris and only then would we be ready to move on to liability questions (Prof. Ricciardi).[17]

In the end, as the present writer observed, the ILA Space Law Committee decided to keep the rules on liability within the International Instrument. This course of action was based on an ILA Resolution (Cairo Conference 1992), but it was also adopted for practical reasons. In fact, at a later stage it would prove far easier to delete these provisions -if necessary- than to try including them.

Concerning definitions Prof. Williams pointed out, inter alia, that for the purposes of the Instrument it had been decided to consider the terms "pollution" and "contamination" as synonyms. She then commented on the different terms included under such heading which followed the anglo-saxon treaty-drafting style. The present writer then went on to explain the nature of the obligations laid down in the Instrument, including a "general obligation to cooperate" (following the drafting of the 1989 Ottawa Declaration of Principles on the Protection of the Environment) and the more specific obligations to prevent, inform, consult and negotiate in good faith. The latter was to be interpreted as not only an obligation to hold talks but to pursue those talks with the main objective of reaching a solution and where any unjustified breach of the talks is seen as bad faith. In Prof. Cocca's (Argentina) view, in some cases this could amount to a breach of international law, and so would a refusal to hold consultations.[18]

Following the present writer's presentation the floor was open for comments. Professor Machisio (Italy) expressed his support for the ILA Buenos Aires Instrument and then referred to various aspects of the concept of "sustainable development" stemming from the 1992 Earth Summit in Rio. On this question,

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[16] See REPORT OF THE 66th CONFERENCE OF THE ILA, Buenos Aires, 1994, P.311.
[17] Ibid., p. 12.
[18] See Cocca, A.A., in his comments to the Rapporteur's Draft, in REPORT OF THE 66th CONFERENCE (Buenos Aires 1994), pp.305-321.

Principle 21 of the UN Stockholm Declaration, which was frequently quoted at the Rio Conference, should be taken fully into account. The same should be said about the principles of precaution and "polluter pays" in the implementation of which international cooperation -or, shall we say, the "general obligation to cooperate"- has an essential role to play. The speaker reminded the audience of a number of environmental law texts which were proving effective, such as, for example, the 1985 Vienna Convention on the Protection of the Ozone Layer, and related instruments where the international community showed a true and timely sense of responsibility by accepting obligations and restrictions on the production and use of halocarbons which would have seemed unthinkable a few years before. As to the Climate Convention, Prof. Machisio believed it deserved wider support. Finally, this speaker considered that the UN General Assembly should encourage the Legal Subcommittee of COPUOS to take up the subject of space debris.

Johannes Andersen, Secretary-General of the International Astronautical Union, and Dr. Sylvia Ospina, both agreed on the advisability of having an internet data-base, particularly in connection with constellation satellites and flight-plans of registered satellites. The latter proposed the transfer of registration fees to a central fund in order to support studies on debris mitigation, for example.

Dr. Karrest pointed out the differences between "limitation" of debris and "mitigation" thereof, emphasising the importance of the liability aspects and the duty "to prevent". This expert considered the adoption of rules of conduct for the protection of the space environment to be an urgent matter. Ambassador Finch, for his part, made a number of subtle remarks concerning the legal aspects of space debris, focusing on the question of definitions and dispute settlement. Dr. Lafferranderie believed that private enterprises should be incentivated to this end and that the question of insurance should be carefully studied. Indeed, this is a field where a great deal of legal thought is required.

Commentary Paper

Armel Kerrest
Professor of International Law at the
University of Western Brittany (France)

After the very interesting and so dynamic intervention of Dr. Perek and other commentators, I would like to make two remarks and two proposals.

The first remark deals with the prevention, or more realistically the mitigation of space debris. It is the first and for the time being the only possibility. Given the cost of such mitigation either in construction cost or in satellite lifetime, no private entity is ready to accept them if its competitors do not. National rules should be made compulsory and, as entrepreneur may change their nationality, international regulations must be accepted.

I draw your attention to the fact that whatever the preventive measures may be, they will just have the capacity to lower the increase of space debris. If we consider on the one hand the time needed by the Copuos to discuss and adopt rules and on the other hand the necessity to begin now to prevent creating new space debris, we must recognise that time is up to consider the legal issues within the Copuos. During its last meeting the technical sub-committee transmitted its report on space debris. It was proposed to begin the discussion within the legal sub-committee. Unfortunately this proposal could not reach a consensus. It should be good not to play Ping-Pong between the main committee and the technical sub-committee and to enter into legal discussions in the legal sub-committee.

Summary Report

- Keep outer space clean for further space activities

- Support of work done so far by COPUOS and other UN bodies
- Encourage technical solutions for de-orbiting of spacecraft as it is in the best interest of all users of operational orbits
- Identification that the present rules are too vague and general. Art. IX Outer Space Treaty is not sufficient.
- Registration Convention to be more effective, better implementation:
- increase the number of States and international organisations actively adhering to this Convention
- need for COPUOS to request the Office of Outer Space Affairs to obtain required information on space objects and to maintain a comprehensive and fully updated register on its websites.
- Establish an international regulatory framework in order to ensure safe and efficient services for an international action, refer to ILA Conferences
- International legal provisions should be investigated to enable providers of collision warning and mitigation services to be responsible for coordinating with the parties involved in close approaches, and to assure the awareness of satellite operators of the situation.
- Take over a flight plan for satellite which is already known from aviation.
- The service provider concept should be reviewed and refined by an international body or committee which includes representatives of both industry and government. Service provider concepts including governmental, commercial, multiple entity, and consortia should be evaluated.
- Definition of "space object" is necessary; additionally definition of some other terms.
- Study liability aspects; the IISL is requested to study the issue of liability and to initiate appropriate further steps.
- Code of conduct along the lines of NPS principles.
- Supporting the principle of reserving necessary frequency bands for future research of distant natural sources of radio signals, and to their protection from spill-over.
- The principle of preserving the dark astronomical sky suitable for astronomic research should be taken into account in planning space missions (see last conference "Preserving the Astronomical Sky" held from 12 to 16 July 1999).

Annex I

THIRD UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE (UNISPACE III)

Vienna, 19-30 July 1999

Workshop on Space Law in the 21st Century

Programme

Workshop Chair:	Dr. Nandasiri Jasentuliyana (President, International Institute of Space Law)
Workshop Coordinator:	Dr. Stephen E. Doyle (International Institute of Space Law)
Workshop Assistant Coordinator:	Ms. Masami Onoda (United Nations)

Session 1: Tuesday, 20 July, 1999, 09:00–12:00
Existing UN Space Treaties: Strengths and Needs

Chair:	Dr. Eilene Galloway (United States of America)
Coordinator/Rapporteur:	Dr. Kai-Uwe Schrogl (Germany)
Commentators:	Prof. Y. Kolosov (Russian Federation) Dr. Frans von der Dunk (The Netherlands) Prof. S. Bhatt (India)
Discussion Paper Author:	Prof. Dr. Vladimír Kopal (Czech Republic)

Session 2: Tuesday, 20 July 1999, 14:30–17:30
Expanding Global Launch Services

Chair:	Prof. E. Back Impallomeni (Italy)
Coordinator/Rapporteur:	Dr. Frans von der Dunk (The Netherlands)
Commentators:	Ms. Catherine Baudin (European Space Agency) Mr. John B. Gantt (United States of America) Mr. Monserrat Filho (Brazil)
Discussion Paper Author:	Dr. Peter van Fenema (The Netherlands)

Session 3: Wednesday, 21 July, 1999, 09:00–12:00
Expanding Global Communications Services

Chair:	Prof. V.S. Mani (India)
Coordinator/Rapporteur:	Dr. Ram Jakhu (Canada)
Commentators:	Mr. Alfons Noll (Switzerland) Prof. Jonathan F. Galloway (United States of America) Dr. Ram Jakhu (Canada)
Discussion Paper Author:	Prof. Francis Lyall (United Kingdom)

Session 4: Wednesday, 21 July, 1999, 14:30–17:30
Expanding Global Remote Sensing Services

Chair:	Dr. Ernst Fasan (Austria)
Coordinator/Rapporteur:	Dr. Marietta Benko (Germany)
Commentators:	Mr. Carlos Hernando Rebellon Betancourt (Colombia) Mr. Alexander V. Yakovenko (Russian Federation) Dr. M.G. Chandrasekhar (India)
Discussion Paper Author:	Prof. J.L. Gabrynowicz (United States of America)

Session 5: Thursday, 22 July, 1999, 09:00–12:00
The Roles of International Organisations in Privatization and Commercial Use of Outer Space

Chair:	Mr. G. Lafferranderie (European Space Agency)
Coordinator/Rapporteur:	Dr. B. Schmidt-Tedd (Germany)
Commentators:	Mr. David Sagar (Inmarsat) Mr. V. S. Veshchunov (Intersputnik) Mr. Leonard S. Dooley (INTELSAT) Mr. P. Hulsroj (EUMETSAT)
Discussion Paper Author:	Mr. Christian Roisse (EUTELSAT)

Session 6: Thursday, 22 July, 1999, 14:30–17:30
Expanding Global Navigation Services

Chair:	Mr. David Sagar (Inmarsat)
Coordinator/Rapporteur:	Mr. Marco Ferrazzani (European Space Agency/Italy)
Commentators:	Mr. Jiefang Huang (ICAO) Dr. B.D.K. Henaku (Ghana) Mr. V.B. Reddy (India)
Discussion Paper Author:	Prof. Paul B. Larsen (United States of America)

Session 7: Friday, 23 July, 1999, 09:00–12:00
Possible International Regulatory Frameworks, Including Legal Conflict Resolution in Expanding Space Commercialization

Chair:	Prof. Karl-Heinz Bockstiegel (Germany)
Coordinator/Rapporteur:	Ms. Anna Marie Balsano (European Space Agency)
Commentators:	Prof. V.S. Mani (India) Prof. K. Tatsuzawa (Japan) Mr. René Oosterlinck (European Space Agency)
Discussion Paper Author:	Prof. Dr. Peter Malanczuk (The Netherlands)

Session 8: Friday, 23 July, 1999, 14:30–17:30
Maintaining the Space Environment

Chair:	Amb. Qizhi He (China)
Coordinator/Rapporteur:	Prof. Maureen Williams (Argentina)
Commentators:	Mr. G. Lafferranderie (European Space Agency) Prof. Dr. Karl-Heinz Böckstiegel (Germany) Prof. Maureen Williams (Argentina)
Discussion Paper Author:	Dr. Luboš Perek (Czech Republic)

Executive Committee Session, Saturday, 24 July, 1999, 09:00-12:00
Workshop Summary: under supervision of N. Jasentuliyana, IISL President

Annex II

THIRD UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE (UNISPACE III)

Vienna, 19-30 July 1999

List of Participants and Speakers in the IISL Workshop

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