UNITED NATIONS
OFFICE FOR OUTER SPACE AFFAIRS

Meeting international responsibilities and addressing domestic needs

PROCEEDINGS

United Nations/Nigeria Workshop on Space Law

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UNITED NATIONS OFFICE AT VIENNA

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Foreword

The proceedings of the Workshop on Space Law "Meeting international responsibilities and addressing domestic needs" have been produced in printed and electronic format.

This printed version contains all papers submitted to the Office prior or immediately following the conclusion of the workshop. Due to reproduction limitations, power point presentations could not be incorporated.

The full proceedings of the workshop, including power point presentations, are available on this CD-ROM in pdf format and on the website of the Office for Outer Space Affairs at http://www.unoosa.org

Introduction

Given the growing number of benefits derived from the use of space applications, the conduct of space activities by States, intergovernmental and non-governmental organizations as well as the private sector continues to expand. These advances and the emphasis placed on the importance of the United Nations treaties and principles governing the activities of States in the exploration and use of outer space annually by the United Nations General Assembly and the Committee on the Peaceful Uses of Outer Space has made the development of space law and policy a priority for a growing number of countries.

In addition, the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), held in Vienna from 19-30 July 1999, called for action to promote the development of space law to meet the needs of the international community. The importance of the development of space law was re-affirmed by the Committee in its report to the General Assembly on the occasion of the General Assembly's review of the implementation of the recommendations of UNISPACE III, in 2004 (A/59/174), in which the Committee agreed that the Office for Outer Space Affairs should strengthen its capacity building activities in space law and should continue to organize the series of workshops on space law.

The successful implementation and application of the international legal framework governing space activities depends on the understanding and acceptance, by policy- and decision-makers, of the United Nations treaties and principles on outer space. The development of space law and policy in a country relies on the presence of suitable professionals able to disseminate information and knowledge on the existing legal framework governing activities in outer space. The availability of such professionals is determined by the availability of educational opportunities and institutions that address the subject of space law and policy.

In order to promote the ratification of the five United Nations treaties on outer space and to assist States, to build their capacity in space law, the United Nations Office for Outer Space Affairs, together with the Government of Nigeria, through its National Space Research and Development Agency, organized a Workshop on Space Law, in Abuja, Nigeria, from 21 to 24 November 2005 entitled "Meeting international responsibilities and addressing domestic needs".

The workshop, which was the fourth in the series of the United Nations Workshop on space law, provided an overview of the United Nations treaties and principles on outer space and addressed the development of national space laws and policies. The workshop also considered ways and means of enhancing the availability and development of university level studies/programmes in space law, particularly in the Africa region.

This multi-levelled approach to capacity building in space law seeks to increase knowledge and awareness of the international treaties and principles developed under the auspices of the United Nations relating to space activities and to provide a basis for their implementation on a practical level through the development and administration of domestic legislation and regulatory regimes.

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Opening Statement

R. A. Boroffice

Director-General/Chief Executive, National Space Research and Development Agency, Nigeria

Distinguished participants, Ladies and Gentlemen, it gives me great pleasure and honour to extend a heartfelt welcome to all the participants and guests gathered here in Abuja to participate in the fourth United Nations Workshop on Space Law. I would like to express my sincere thanks to Dr. Sergio Camacho-Lara, Director of the United Nations Office for Outer Space Affairs and his staff, for their support and cooperation, without which organizing this Workshop would not have been possible. My deep appreciation also goes to the many renowned speakers and discussants, who are present to share their knowledge and experience with us at the Workshop.

The benefits of space technology and its applications impact on various aspects of our daily lives. The five United Nations treaties on outer space and related United Nations General Assembly Resolutions provide the legal framework to deal with the various challenges that space activities pose. The conduct of space activities by States, intergovernmental and non-governmental organizations, as well as the private sector continues to expand. These new realities present unique legal issues.

We will recall that in 1958, the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) was mandated to, amongst other things, study the nature of legal problems that may arise from the exploration of outer space. It is of note that at present, COPUOS has a membership of 67 States, of which 15 are African. The Committee also remains the primary international forum for the development of laws and principles, codified in treaties and resolutions, governing outer space. New developments in space technology and the rapid growth of commercial space activities require us to revisit the current state of national and international law on outer space. I sincerely hope that this workshop will provide space-faring and non-space-faring nations alike with the opportunity to promote the understanding of outer space law and encourage the early ratification of the treaties.

In addition to the existence of treaties and resolutions, developed under the auspices of COPUOS and the United Nations General Assembly, the role of national laws in the development of international space law also warrants special mention. In the Nigerian context, of the various sub-committees established towards the fulfilment of the national geo-spatial data infrastructure policy, a Legal Sub-Committee has been constituted to, among other things, provide a mechanism for implementation of all legal aspects of the policy. Having acceded to four of the five United Nations outer space treaties, the Government of Nigeria is aware of the growing need to enact domestic implementing legislation. To this end, we find it timely to co-organize this Workshop to share experience and benefit from the expertise of other nations.

Ladies and gentlemen, may I also take this opportunity to mention that the National Space Research and Development Agency was established by the Government of Nigeria in 1999 with the mandate of consolidating all space science and technology related activities in order to make a greater impact on socio-economic development efforts in Nigeria. Since its inception, the Agency has launched an Earth observation satellite, NigeriaSat -1, on 23 September 2003. The Agency also plans the launch of Nigcomsat - 1, a hybrid geo-stationary communications satellite. In addition, the Agency has commenced preparations for the design, manufacture and launch of a second high resolution Earth observation satellite (NigeriaSat - 2). I would like to reaffirm my Government's full commitment to the collective efforts of the international community to achieve a solid and equitable legal regime applicable to activities in outer space that benefit all of humankind. I wish all of you an enjoyable stay in Abuja.

Thank you.

Natercia Rodrigues
United Nations Office for Outer Space Affairs, Vienna, Austria

Distinguished guests, ladies and gentlemen,

It is my privilege, on behalf of the United Nations Office for Outer Space Affairs, to welcome you here in Abuja today, to the Fourth United Nations Workshop on Space Law, which is being jointly organized with the Government of the Federal Republic of Nigeria.

I would like to extend my heartfelt gratitude and appreciation to the Government of Nigeria, which has provided essential assistance to the Office in making the Workshop happen by supporting the participation of a number of experts and participants from developing countries from the African region and for providing the excellent meeting facilities for the duration of this Workshop. In particular I would like to express my appreciation to Professor Turner Isoun, Honourable Minister of Science and Technology, to Mr. Olu Adeniji, Honourable Minister for External Affairs and to Mr. Robert Boroffice, Director-General/Chief Executive of the National Space Research and Development Agency of Nigeria. I would further like to express my sincere thanks to the team here in Nigeria who has made all the arrangements for the workshop and to my own team back in Vienna, who have been my backbone in the Office's preparations.

Finally, I would like to take this opportunity to sincerely thank our speakers and chairpersons, who have generously given us their time and expertise to ensure that participants enjoy the maximum benefits from this Workshop. Without their generosity, meeting the goals of this workshop would not be possible.

The United Nations/Nigeria Workshop on Space Law is the fourth in a series of workshops that the Office intends to continue organizing in the coming years to build capacity in space law. The series of workshops uses a multileveled approach that seeks to increase knowledge and awareness of the international treaties and principles on space law developed under the auspices of the United Nations, and to provide a basis for their implementation on a practical level through the development and administration of domestic legislation and regulatory regimes.

The Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), held in Vienna in 1999, called for action to promote the development of space law to meet the needs of the international community. The importance of the development of space law was re-affirmed by the United Nations Committee on the Peaceful Uses of Outer Space in its report to the General Assembly on the occasion of the Assembly's review of the implementation of UNISPACE III recommendations, last year. In its Plan of Action to further develop space capabilities to meet the development goals emphasized by UNISPACE III, the Committee agreed that the Office for Outer Space Affairs should strengthen its capacity building activities in space law and continue to organize the series of workshops on space law.

It is within this context that, together with the Federal Republic of Nigeria, we have organized this workshop to provide an overview of the United Nations treaties and principles on outer space, to examine various aspects of existing national space laws, and to consider ways of enhancing the availability education in space law in the Africa region.

Bearing this in mind, I would like to discuss briefly the aims of this workshop.

First, the Office hopes this workshop will promote understanding, acceptance and implementation of the United Nations treaties and principles on outer space, particularly in the Africa region, taking into consideration that a successful implementation and application of the international legal framework governing space activities depends on the understanding and acceptance of those legal treaties and principles, by policy-and-decision makers. Today it has become increasingly important to ensure that space law and policy, including the ratification of the United Nations Treaties on Outer Space, is considered a matter of priority by all countries involved in space activities.

As you may know, the Office serves as the Secretariat for the Committee on the Peaceful Uses of Outer Space, which reports to the General Assembly. This Committee has developed five United Nations treaties on outer space: the historic Outer Space Treaty of 1967; the Rescue Agreement, the Liability Convention, the Registration Convention and the Moon Agreement, which will be discussed in more detail during the workshop. Over the years, the General Assembly has urged States that have not yet become Party to those treaties to consider ratifying or acceding to them, as well as incorporating them in their national legislation.

Given the growing number of benefits derived from the use of space applications, the conduct of space activities by States, intergovernmental and non-governmental organizations, as well as the private sector, continues to expand. These advances, together with the emphasis placed annually by the General Assembly and the Committee on the Peaceful Uses of Outer Space on the importance of the United Nations treaties and principles governing the activities of States in the exploration and use of outer space, have made the development of space law and policy a priority for a growing number of countries.

A second objective of this workshop is to promote exchange of information on national space laws and policies, for the benefit of professionals involved in their development and implementation, bearing in mind that the development of space law and policy in a country relies on the presence of professionals able to disseminate information and knowledge on the existing legal framework governing activities in outer space.

Third, but not least, this workshop will also consider the development of university level studies and programmes in space law, with a view to promoting national expertise and capability in this field. The availability of such professionals is determined by the availability of educational opportunities and institutions that address the subject of space law and policy. In this regard, we are very fortunate to have here a number of experts who will be sharing their experience as educators with you over the next few days and who can become a valuable source for developing future educational programmes on space law worldwide.

The Office for Outer Space Affairs would like to ensure that this workshop is useful and relevant to your work after you return to your respective countries. We believe many of you are important sources of information on space law, and for this reason, several reference documents have been made available, either in the document packages distributed this morning or on the website of the Office.

A number of legal texts are also available on the web site of the Office for Outer Space Affairs. These include not only the texts of the United Nations treaties, legal principles developed by the United Nations and other General Assembly resolutions on outer space matters, but also texts of national space laws, bilateral and multilateral agreements, and legal studies prepared by the Office. You can find the Office's Web address on some of the information documents that we have handed out today.

The Office is continuously building up an information network for professionals interested or actively involved in the development of space law. We will be adding the names and contact details of all participants of this workshop to a mailing list of the Office, for the purpose of disseminating updated information on space law in the future.

We look forward to staying in touch with as many of you as possible, and will do our utmost to meet any requests for information in the years ahead.

There is a well-known African (Nigerian) proverb: A single tree cannot make a forest. And this is particularly true for our annual meetings which gather a collective power consisting of a wide-range of professionals from all over the World. Our common challenge is to capture and disseminate the experience from space law workshops. To do this, we need to preserve, and continuously seek to improve, the knowledge base we have, and to make that knowledge available in a readily usable form to all those who might need it. And I hope that meetings such as this can achieve concrete and practical results that further advance capacity building in space law worldwide.

I trust that you are looking forward to a particularly work-intensive and interesting session. Thank you for your attention; I look forward to fruitful discussions in the next few days. It is important we do this work – vital we make progress.

Thank you very much.

International Space Law

International legal regime on outer space: Outer Space Treaty, Rescue Agreement and the Moon Agreement

Vladimír Kopal
Chairman UNCOPUOS Legal Subcommittee 1999-2003, Czech Republic

Introduction

During the lifetime of our generations, new areas were opened for the performance of activities of humankind that became important theatres for the newly developing international relations. This evolution has been effected under the conditions prevailing in the today's world, which are characterized, from the viewpoint of international order, by the nonexistence of a centralized power structure that distinguishes the world community from the internal legal systems of individual States. International law has been described as "a horizontal system of law" that "operates in a different manner from a centralized state system and is based on principles of reciprocity and consensus rather than on command, obedience and enforcement".[1]

Moreover, States, as members of the present international community, are unequal in strength, though all of them are considered as sovereign and equal in law. What has just been said about the international community and its members in general is particularly valid with regard to their participation in the development of activities in newly opened areas that have become fields of a global concern in which all States, in spite of their unequal capacities, wish to play an adequate role.

The present areas of global concern are: Antarctica; outer space, including the Moon and other celestial bodies; end oceans, particularly the high seas, and the seabed and ocean floor. In addition, the Earth's environment belongs more and more to "the global commons", as it became evident at the United Nations Conferences on Environment held in Stockholm, 1972, Rio de Janeiro, 1992, Johannesburg, 2002, and during the further developments. All these areas, which are of common concern to all nations, have offered them vast opportunities but, at the same time, many new responsibilities have emerged. The opportunities and problems, however, are not identical in each of these areas and the world community therefore did not decide to cope with them jointly by attempting to establish one single legal regime that would be valid for all of them. Instead, specific legal systems have been developed for each particular area, though the necessity to do so emerged during the same historical period. In the process of establishing the individual regimes for "global commons" and in the current results of these efforts, it is possible to identify a number of similarities. It is also necessary, however, to observe some significant differences that do not allow mechanical transfer and application of the solutions of issues relating to one specific area to the others.

[1] See *Peter Malanczuk*, Akehurst's Modern Introduction to International Law, Seventh revised edition, Routledge, London and New York, 1997, p. 6

The purpose of this paper is to discuss the legal regime of one of the "global commons"- that on outer space as it has been developed by the United Nations. As it is usually recalled, the up-to-date results of this development are included in five international treaties and five sets of principles, and these United Nations instruments as a whole offer an impressive picture of achievements in this particular legal field. Under the scope of this contribution, three of these instruments will be dealt with, namely the 1967 Outer Space Treaty, the 1968 Rescue Agreement and the 1979 Moon Agreement. The other United Nations space law instruments are analyzed in other papers presented at this Workshop.

I. The Outer Space Treaty and its Fundamental Significance for the Legal Regime of Outer Space

The 1967 Outer Space Treaty (OST)[2] laid down the foundations of the legal regime for human activities in those parts of the Universe surrounding our planet that have had a significant impact on our lives. Moreover, unless otherwise agreed upon in future, the principles established by the OST shall also apply to missions extending human activities deeper into our solar system and beyond. It is generally accepted that the OST created a solid basis for the progressive development of space law and belongs to the important law—making treaties of the whole system of contemporary international law[3].

Through the OST, an attempt was made to find a balanced compromise between the common interests of all nations, the aims of mankind as a whole, and the interests of individual States as members of the word community and traditional subjects of international law. This compromise is particularly evident from the principles inserted in the first three Articles of the Treaty. It should be emphasized that the architects of the OST avoided making an explicit and perfect definition of the legal status of the new area. Instead, they agreed on the purpose and orientation of space activities by saying that "the exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind." It must be stressed that the phrase "and shall be the province of all mankind", as the whole leading principle of the OST, does not refer to outer space itself, including the Moon and other celestial bodies, but to its "exploration and use", which shall be carried out for the benefit and in the interests of all countries.

The second and third paragraphs of the same Article I declare two important freedoms that characterize the legal regime of outer space. One is the freedom of outer space, including the Moon and other celestial bodies, for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law. The other is the freedom of scientific investigation in this area, which shall be facilitated and encouraged by States through international cooperation.

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[2] See Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, in: United Nations Treaties and Principles on Outer Space, UN doc. ST/SPACE/11, United Nations, New York, 2002, pp. 3—8. As to the status of the OST in 2005 see UN doc. ST/SPACE/11/Add.1/Rev 2.

[3] In this connection, see the assessment by Ram Jakhu expressed at a symposium held to celebrate the 30th anniversary of the OST on the occasion of the 36th session of the Legal Subcommittee of COPUOS in Vienna, on 1 April 1997: "I would like to join those scholars from all of the world who have almost unanimously been declaring the 1967 Treaty a big success in creating an appropriate order in outer space." /See Jakhu, Pam, Application and Implementation of the 1967 Outer Space Treaty, in: Proceedings of the 1997 IISL/ECSL Symposium, UN doc. A/AC.105/C.2/1997/CRP. 6, 8 April 1997, p. 1.

It may be said in this respect that in establishing the legal regime for outer space, the OST followed the example of the legal regime of the high seas, which crystallized during centuries of struggles and has been characterized by a series of “freedoms of the seas”. And similar to the high seas, outer space, including the Moon and other celestial bodies, “is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means”. This principle is wide enough to cover not only outer space as a whole but also any part thereof, and national appropriation cannot be effected by any means whatsoever, A weak spot of these provisions, and after all of the whole OST, rests in the silence of the Treaty on the delimitation of outer space, which shall be protected against any attempts at and forms of national appropriation and other violations of the legal order valid in this area.

Article III of the OST also has a fundamental meaning for the legal regime of outer space and activities developed in this area. In this provision the imperative of international legality of activities in the exploration and use of outer space is spelled out, for space activities shall be carried on “in accordance with international law, including the Charter of the United Nations”. Moreover, the necessity of keeping the peaceful character of such activities is emphasized “in the interest of maintaining international peace and security and promoting international cooperation and understanding”. This provision should be read in conjunction with the preambular paragraph of the Treaty in which the States Parties to this Treaty express their desire “to contribute to broad international cooperation in the scientific as well as the legal aspects of the exploration and use of outer space for peaceful purposes”. The general principle that later became known as “maintaining outer space for peaceful purposes”, as spelled out in Article III of the OST, was accompanied by a number of measures for demilitarization of outer space that are stipulated in Article IV of the Treaty.

Other principles of the OST are also significant for characteristics of the legal regime of outer space. They include: assistance to astronauts, which are described as “envoys of mankind in outer space”, in the event of accident, distress, or emergency landing; international responsibility for national activities in outer space, whether they are carried on by governmental agencies or by non—governmental entities, and for ensuring that national activities are carried out in conformity with the OST; liability for damage caused by such activities to other States Parties to the Treaty or to their natural or juridical persons; registration of space objects and jurisdiction and control over such objects based on such registration; cooperation and mutual assistance in the exploration and use of outer space with a specific role for the United Nations and its Secretary—General in the development of such cooperation.

Finally, one more significant feature that characterizes the legal regime on outer space, as established by the OST and other United Nations space instruments, must be mentioned. While it was possible to create specialized organizations for administering other areas of international cooperation, such as the International Atomic Energy Agency (IAEA), the International Maritime Organization (IMO) and the International Seabed Authority, as well as the United Nations Environment Programme (UNEP) as a less formal body, in the field of space activities, no specialized organization of the United Nations system emerged. Instead, specific functions have been dispersed among several bodies and organizations with the focal role of COPUOS.

It may be said that the existing structure of international cooperation in space activities remains in harmony with the OST, which did not provide for establishing a specialized agency within the United Nations system that would deal with international cooperation in all relevant space matters. And it is probable that a more expanded structure in the form of a specialized agency will not emerge in the near future. There are, however, some issues of a global impact that deserve a deeper interest of the world community. These issues include: control and improvement of the Earth's environment by using space technology, protection of the space environment, exploration and exploitation of natural resources from the Moon and other celestial bodies, energy from outer space, search for extra-terrestrial life and eventual communication with extra-terrestrial intelligence. Though some of them are often labelled as remote, these problems knock at our door and should be eventually considered by the United Nations in the interest of all humanity.

The architects of the OST did not intend to work out a comprehensive legal instrument that would forecast and govern all possible aspects of the then ongoing and expected space activities. This is evident from the title of the Treaty, which was concluded only on principles governing such activities. And, of course, this character of the OST is also evident from its juridical content. The OST thus left the door open for a further development of space law by additional international agreements and sets of principles that were elaborated step—by—step and adopted during the three decades following the entry into force of the OST. All of them recall the OST as the basic legal document and reflect the desirability of maintaining a harmony between the concepts of the 1967 Outer Space Treaty and the subsequent instruments relating to outer space[4].

II. The Rescue Agreement

The first among the UN space instruments concluded after the OST was the 1968 Rescue Agreement. On 18 December 1967, the United Nations General Assembly adopted with unanimity its Resolution 2345 (XXII), which commended the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space. The governments of three powers: the United States of America, United Kingdom and the former Soviet Union were requested to open the Agreement for signature and ratification at the earliest possible date. On 22 April 1968, the representatives of 43 States signed the Agreement in Washington, the representatives of 25 States in Moscow and of 24 States in London, some of them having signed in all three cities, some others in one or two cities only. Signatures of other States as well as the first ratifications followed. By 2005, the Rescue Agreement collected 88 ratifications and 24 additional signatures of States, and also one international organization adhered to this Agreement[5].

Those who observed the lengthy negotiations that proceeded rather slowly, were somewhat surprised by the fact that the Agreement was adopted only one year after the conclusion of the OST. More reasons of different significance could be invoked to explain this sudden change. Without a doubt, that motion was expedited by the conclusion and early ratifications of the OST of 27 January 1967; for in its Article V, the States Parties to the Treaty already stipulated that they should "render to astronauts all possible assistance in the event of accident, distress, or emergency landing on the territory of another State Party or on the high seas". In the event of a landing, astronauts should be "safely and promptly returned to the State of registry of their space vehicles." Furthermore, the OST included in its Article VIII a principle concerning return of objects launched into outer space or their component parts, found beyond the

[4] For an evaluation of this process see N. Jasentuliyana, A Survey of Space Law as Developed by the United Nations, in: Perspectives on International Law, Ed. by Nandasiri Jasentuliyana, Foreword by Boutros Boutros—Ghali, Kluwer Law International, 1995, pp. 349—383.
[5] See the text of the Rescue Agreement in: United Nations Treaties and Principles on Outer Space, UN doc. ST/SPACE/1l, United Nations, New York, 2002, pp. 9—12. As to the statue of the Agreement in 2005 see UN doc. ST/SPACE/11/Add.1/Rev. 2.

limits of the State Party to the Treaty on whose registry they would be carried, to that State Party. Hence, after the Space Treaty had been concluded, drafters of the Rescue Agreement had only to elaborate the already adopted principles in a specific document.

Nevertheless, the work on the Rescue Agreement would not have probably been completed so quickly without a special stimulus — two tragic events that affected emotions in all nations and pushed the major space powers to end the lengthy discussion on the subject: on 27 January 1967, when the OST had to be solemnly signed, a fire burst out on Cape Kennedy in the space capsule Apollo and in a few seconds the three US astronauts selected as the first American crew for the planned Moon landing perished; and on 24 April 1967 a new Soviet spaceship, Soyuz I, met with an accident and its commander also perished. If the first accident occurred at a ground test in the space center, i.e. without any possibility of international cooperation in rescue operations and probably without any possibility of rescuing the astronauts at all, the second occurred at the end of a mission, in a situation that might require the need for such cooperation.

The structure of the Agreement is relatively simple. The first group of provisions, inserted in four Articles, deals with assistance to astronauts and their return. All those provisions are based on humanitarian considerations: Article I provides for notification of accidents; then the Agreement proceeds with rescue of and assistance to the personnel of a spacecraft which either landed on the territory of a contracting party (Article 2), or alighted on the high seas (Article 3); in Article 4 the safe and prompt return of the personnel is unconditionally stipulated.

The second group of provisions, concentrated in five paragraphs of Article 5, concerns recovery and return of space objects. It is based on a different approach than the foregoing stipulations, for it is derived from ownership of objects launched into outer space and requires indemnity for services rendered for their recovery and return.

Finally, Article 6 has a special significance: in explaining the term “launching authority”, this provision determines the position of international inter-governmental space organizations under the Agreement.

Articles 7 to 10 have a formal character. Although they include some interesting problems relating to the law of treaties, for purposes of this paper they may be left aside.

Returning to Articles 1 to 4, which deal with the personnel of a spacecraft, situations may occur in which rescue of and assistance to the personnel will be inseparable from the search and recovery of their spacecraft. Under such conditions, humanitarian reasons should prevail and the accomplishment of the action should be governed by provisions concerning assistance to and rescue of astronauts, in spite of the fact that States assumed the duty of an unconditional assistance and return with regard to astronauts only. If it may be possible to separate the assistance to astronauts from the rescue of the spacecraft the dividing point will very probably occur in the process of recovery of the spacecraft. Certainly the return of the personnel can be arranged separately and will be already governed by different provisions than the return of the spacecraft

As to assisting personnel on a spacecraft that landed in a territory under the jurisdiction of a Contracting Party, according to the stipulation inserted in Article 2, launching authorities assume the duty to cooperate with the territorial State. It is not sufficiently clear, however, whether such a duty becomes impending upon a request by the territorial State, whether the launching authority has not only a duty to offer but a right to require its participation in the accomplishment of search and rescue operations as well, or an agreement among them is expected. The general principle of sovereignty and the structure of the whole stipulation (first the duty of the territorial State to take all possible steps, second the information of the launching authority, third the duty of the launching authority to cooperate) and, in particular, the final clause of Article 2 (“subject to the direction and control of the Contracting Party, which shall act in close and continuing consultation with the launching authority”) speak in favour of the dominant position of the territorial State. On the other hand, the purposes of all assistance (“to help to effect a prompt rescue” and “to contribute substantially to the effectiveness of search and rescue operations”), as well as the principle of cooperation indicate that the territorial State is not completely free in its decisions.

As to assistance to the personnel of a spacecraft that landed outside the territory of a Contracting Party, the stipulation inserted in Article 3 seems to assume a priority of assistance of the launching authority concerned that will be primarily interested in the rescue and will regularly dispose of means and facilities for this purpose. Nevertheless, whenever the launching authority itself is unable to act, or would be too late, other contracting parties “which are in a Position to do so**”** shall assist the personnel concerned immediately. They will act without any request and according to their own judgment and decisions, their only duty being to inform the launching authority and the United Nations Secretary-General of their steps.

A similar effect would have insufficient rescue operations undertaken by the launching authority. In such a case, the other contracting parties remain obliged to assist, both under Article V of the Outer Space Treaty and Article 3 of the Rescue Agreement.

In practice, all parties involved should cooperate in good faith in order to avoid confusion and failure.

Article 4 includes a simple stipulation concerning return of the personnel of a spacecraft, be it astronauts who landed, “owing to accident, distress, emergency or unintended landing” in a territory under the jurisdiction of a Contracting Party or those that have been found on the high seas or elsewhere outside the jurisdiction of any State. In all such situations, “they shall be safely and promptly returned to representatives of the launching authority”. Although the wording of that provision was not quite adequate to the dignity of “envoys of mankind”, it should be stressed that it does not contain any conditions or quasi—reservations. Neither can any condition be derived from the principle included in Article V of the OST, which is recalled in the preamble of the Agreement.

The mandatory wording of Article 4 does not permit any delay in the return of astronauts, be it based on their doubtful mission or on a delict committed by them that should probably be punished by States of their nationality.

Now a few words on the recovery and return of space objects. The complex and fragile provisions dealing with the recovery and return of space objects, which are inserted in paragraphs 2 and 3 of Article 5, represent one of several compromises that paved the way to the adoption of the Agreement. The duty to return a recovered space object is a logical consequence of the principle inserted in Article VIII of the OST. According to it, ownership of objects launched into outer space and of their component parts is not affected by their presence in outer space or on a celestial body, or by their return to Earth. This principle, however, does not mean that the launching authority could not resign on its ownership and abandon a space object or its component part in the return of which it would no longer be interested. With regard to the practice of launching certain objects without publication of more precise data on their missions, the launching authority may face a dilemma, either to communicate identifying data prior to its request for return or not to insist on the return at all. On the other hand, the contracting party that recovered a space object or its parts and recognized their identity is not obliged to insist on the submission of identifying data and may be willing to return them without any condition.

A special significance belongs to the obligation of the launching authority under Article 5, paragraph 4, to take effective steps to eliminate possible dangers or harm from a space object of a hazardous or deleterious nature. The provision concerns eventualities, such as the use of fuel or instruments, that would be, in the case of an accident, dangerous to its environment.

The last paragraph of Article 5 deals with the problem of expenses incurred in fulfilling the obligations to recover and return a space object or its component parts, which shall be borne by the launching authority. Unlike rescue of astronauts, the recovery and return of space objects, though serving purposes recognized by the OST, will be mostly in favour of the launching authority and it is therefore only the expenses that will be borne by the launching authority alone. Such obligation is balanced by the benefit the launching authority will get by the carrying out the recovery and return. And since there is no specific procedure provided, an agreement between the parties concerned seems to be the expected method of fixing the amount of expenses to be paid by the launching authority.

The international character of the Rescue Agreement does not exclude any participation of private persons and means in such operations, so far as they may be useful (e.g. rescue by private vessels on the high sea, search and rescue by private aircraft in distant territories, etc.). Of course, such persons do not act as direct subjects of international rights and duties. Neither do they act as representatives of the respective State, unless explicitly authorized by it. That State will bear an indirect responsibility for their eventual wrongful acts or omissions.

Beside States, international intergovernmental organizations responsible for launching of space objects may become beneficiaries of rights and addressees of duties arising from the Agreement if they deliver a declaration of acceptance of the rights and obligations provided for in the Agreement and if the majority of the Member States of the organization are Contracting Parties to the Agreement and to the OST. By their declarations of acceptance, intergovernmental organizations are entitled to all rights and obliged to fulfill all duties arising from the Agreement, except those that remain connected with the territorial basis of individual States and with their position of Contracting Parties to the Agreements. Thus, the position of international intergovernmental organizations that would make the required declaration could be qualified as a kind of adhesion to a treaty[6].

The 1968 Rescue Agreement reflects the level of space flight technology, and practice of the period of its origin[7]. During the subsequent periods, new conditions and problems emerged, which had not been known during the earlier stages of space activities. While the fundamental principles governing assistance and rescue of astronauts, their return and the return of space objects remained to be valid, the need for additional appropriate legal rules emerged. Those rules should deal with assistance to and rescue of astronauts in the event of distress or emergency when

[6] To date only the European Space Agency (ESA) made such a declaration.

[7] For a contemporary assessment of the Rescue Agreement and its comparison with analogous instruments of maritime and air law see Vladimir Kopal, The Agreement on Rescue of Astronauts and Return of Space Objects, in: New Frontiers in Space Law, Ed. by Edward McWhinney and Martin A. Bradley, A.W. Sijthoff, Leyden, 1969, pp. 103—123. For the process of negotiations on that instrument, see Roy S.K. Lee, Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, in: Manual on Space Law, Vol. I, Compiled and edited by Nandasiri Jasentuliyana and Roy S.K. Lee, Oceana Publications, Inc. and Sijthoff and Noordhoff, 1979, pp. 53—81

they are still on board their spacecraft or if they entered the free space and cannot return safely without an appropriate cooperation. Assistance and rescue should also be internationally regulated in favour of the personnel of space stations in orbit, and on celestial bodies in the future. Under the present conditions of a growing commercialization of space activities, the participation of private persons, including space tourists, in space flights should also be considered and adequate rules for the new categories of space activities worked out. This is more or less a general problem of the further development of space law in our times.

III. The Moon Agreement

The drafters of the fifth UN legal instrument — the 1979 Moon Agreement[8] — also elaborated a number of principles of the 1967 Outer Space Treaty, particularly those relating to the Moon and other celestial bodies. The relevant principles of the OST had to be restated and completed in a new agreement for the purposes of building up a specific legal regime for the natural satellite of the Earth in light of the expected landing of human beings on its surface. Thus, for example, the provisions of the OST relating to the peaceful status of the Moon were amplified by a prohibition of "any threat or use of force or any other hostile act or threat of hostile act on the Moon".

Likewise, the Moon Agreement prohibited "to use the Moon in order to commit any such act or to engage in any such threat in relation to the Earth, the Moon, spacecraft, the personnel of spacecraft or man-made space objects."

Moreover, the 1979 Moon Agreement included a number of new elements, some of them quite significant. They concern different forms of international cooperation relating, for example, to mutual assistance in the exploration of the Moon, establishment of manned and unmanned stations on the Moon, safeguards of life end health of persons conducting space activities, and last but not least, preservation of the Moon environment.

But when negotiating the Moon Agreement, its drafters were not in a position to rely on the OST when dealing with the issue of economic activities on the Moon, because the OST remained mostly silent in this respect. An attempt to reach a generally acceptable compromise was made by joining the confirmation of the freedom of scientific investigation, and the exploration and use of the Moon as a right of all States, with the stipulation to establish an international regime governing the exploitation of the natural resources of the Moon, as such exploitation is about to become feasible. However, this solution has failed to attract so far the interest of many nations, as evident in the limited number of signatures and ratifications of the Moon Agreement to date.

The most controversial provisions of the Moon Agreement are included in its Article 11, in which the Moon and its natural resources are declared as "the common heritage of mankind". In paragraph 5 of the same Article, States Parties to this Agreement undertake "to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the Moon as such exploitation is about to become feasible". Furthermore, in paragraph 7 of Article 11, the main purposes of this international regime that is to be established are enumerated, including "an equitable sharing by all States Parties in the benefits derived from those resources, whereby the interests and needs of the developing countries, as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the

[8] See the text of the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, in: United Nations Treaties and Principles on Outer Space, UN doc. ST/SPACE/1l, United Nations, New York, 2002, pp. 28—36.

Moon, shall be given special consideration."

These provisions of the Moon Agreement reflected similar endeavours that resulted in the provisions of Part XI of the 1982 United Nations Convention on the Law of the Sea and its relevant annexes with regard to the area of the seabed and ocean floor beyond the limits of national jurisdiction. Though the 1979 Moon Agreement was finalized on the basis of consensus, and like the other United Nations treaties was adopted and commended by the United Nations General Assembly, a sharp opposition, perhaps more silent than loud, against that instrument emerged, mostly due to its provisions concerning the common heritage principle and the undertaking to establish an international regime to govern the exploitation of the natural resources of the Moon. As is known, only a limited number of States have become parties to the Moon Agreement to date[9].

It must be observed, however, that in comparison with the Sea Law Convention, which includes detailed rules and provides for the establishment of a fullscale international organization - the Seabed Authority - and also for a system of dispute settlement with a special international sea law tribunal, the 1979 Moon Agreement is a modest instrument. It has not yet established the promised international regime. States Parties to the Agreement only undertook that such a regime would be set up as its need becomes really impending. Its creation would depend on the adoption of amendments to the Agreement, which would enter into force only for States Parties accepting such amendments. Moreover, the undertaking to establish such a regime for the Moon refers only to the exploitation of the natural resources. Other provisions of the Moon Agreement explicitly guarantee the right to the exploration and use of the Moon as well as the freedom of scientific investigation of the Moon, the right to collect and remove from the Moon samples of its mineral and other substances, and the right to use these substances for the support of space missions[10].

It should also be recalled that the ratifications of the 1982 Sea Law Convention, in which a detailed implementation of the common heritage principle has been incorporated, including a complex system of prospecting, exploration and exploitation with a central role for the International Seabed Authority has also proceeded slowly for years. But the main obstacles that hindered this process were removed in 1994 by an Agreement relating to the implementation of Part XI of the Convention, in which the ways and means of how to place into effect the controversial part of the Sea Law Convention were found. Since then, most countries of the world, both developed and developing, adopted the 1982 Convention and the 1994 Agreement. Hopefully, other States may be expected to do so in future[11].

The methods, by which obstacles were removed to enable a wide acceptance of the United Nations Sea Law Convention, might be considered as an example of how to proceed with the issues pertaining to the 1979 Moon Agreement and, particularly, how to reach an agreement on the implementation of Article 11 of the Moon Agreement, which might be initiated by informal consultations at an appropriate time in the future. Such an attempt would be in accord

[9] As of 2005, 11 States have became parties to the 1979 Moon Agreement and 5 other States signed the Agreement but have not ratified it yet. See Status of International Agreements Relating to Activities in Outer Space as at 1 January 2005, UN doc. ST/SPACE/11/Add.1/Rev.2.
[10] See Article 11, para. 4 and Article 6, paras. 1 and 2 of the Moon Agreement.
[11] See the text of the United Nations Convention on the Law of the Sea and the 1994 Agreement, 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. For the status of the United Nations Convention on the Law of the Sea, which entered onto force on 16 November 1994, and the status of the Agreement adopted by the United Nations General Assembly on 28th July 1994, as at 31 March 2002, see Law of the Sea, Bulletin No. 48, United Nations, New York, 2002, p. 13 et seq.

with the repeated appeals of the United Nations General Assembly addressed to States that have not yet become parties to the international treaties governing the uses of outer space, to give consideration to ratifying or acceding to those treaties. The list of instruments referred to in these appeals also includes the 1979 Moon Agreement[12].

Let us also note in this context that an item on the agenda of the Legal Subcommittee of COPUOS, certified "Review of the status of the five international treaties governing outer space" has been discussed in the Subcommittee for several years. According to the sponsors of this item, its consideration should enable the Legal Subcommittee "to propose mechanisms towards achieving the fullest adherence to the five outer space treaties"[13]. As to the fifth treaty - the 1979 Moon Agreement - this aim is also important with regard to its possible application "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."[14]

Conclusions

The 1967 Outer Space Treaty laid down the cornerstones for the whole building of international space law. In spite of its general character, its main principles are valid and useful. This conclusion also relates to those provisions that established the legal regime of outer space, including the Moon and other celestial bodies, as a "global common". As such, the OST does not need any revision. At the same time, however, some provisions of the OST, and also those of the other United Nations space treaties, need clarification and their application should be adapted in the light of new phenomena and issues. And some basic principles of the OST should be supplemented by further instruments.

Taken as a whole, the present international law of outer space must be considered as a legal system that forms a part of contemporary international law. However, unlike the whole system of international law, which "may now properly be regarded as a complete system"[15], space law is not yet a complete system; more than any other branch of international law, space law has a progressively developing character. Notwithstanding that, the principles and norms included in the United Nations space treaties and other legally relevant documents have established a specific political and legal status of outer space and provided a special body of rules, the purpose of which is to govern different categories of all activities in this areas They represent a legal complex that is based on the 1967 Outer Space Treaty, to which other parts of the whole are linked, being at the same time all mutually interrelated.

Space law, as established by the United Nations, has become an important part of international law and a significant contribution to the rule of law in international relations. And its progressive development must continue during the years to come.

[12] See e.g. the General Assembly resolution 51/123 of 13 December 1996, paragraph 2 and Note 4.
[13] See Report of the Legal Subcommittee on the work of its Thirty-Sixth Session /1-8 April 1997/, UN doc. A/AC.105/674, 14 April 1997, pp. 10 and 22-23
[14] See Article 1, para. 1 of the 1979 Moon Agreement.
[15] See Oppenheim's International Law, Ninth Edition, Vol. I Peace, Introduction and Part I, Edited by Sir Robert Jennings and Sir Arthur Watts, Longman, England, 1992, p. 12.

International legal regime on outer space: Liability Convention and Registration Convention

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Introduction

International space law has undergone a deep evolution since it first began in the 1950s. Space activities and globalisation now underline a profoundly changed legal framework.

In the first stage, when the UNCOPUOS Legal Subcommittee (LSC) began its work, no binding instrument was in force within the international community for regulating the exploration and exploitation of outer space. The General Assembly felt it necessary to give some guidance to member States conducting space activities. A legal foundation for space activities was needed as a matter of urgency in order to avoid the development of practices dictated exclusively by national interests. This was realized thanks to Resolution 1962 (XVIII) adopted by the General Assembly on 13 December 1963, and containing the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space.

While the adoption of an instrument not binding *per se* was seen as a first step towards a new legal regime for outer space, the time seemed mature for entering into multilateral treaties for clarifying and to progressively develop the rules to be applied to space activities. The LSC become the most appropriate forum for reaching *consensus* on the major issues involved and transforming such *consensus* on mandatory norms of international law.

These were the origins of 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, generally called as the Outer Space Treaty (OST).

The OST became one of the outstanding law-making treaties of contemporary international law as a whole; it significantly contributed to the progressive development and codification of international space law. Through the OST, an attempt was made at finding a balanced compromise between the common interests of all nations, the aims of humankind as a whole, and the interests of individual States as members of the world community and subjects of international law. It was agreed that "the exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind."

The OST established once and for all significant principles, such as the non appropriation and denuclearisation of outer space and the use of the Moon and other celestial bodies exclusively for peaceful purposes.

Moreover, to introduce and better understand the Liability and Registration Conventions, it is necessary to look at some key Articles of the Outer Space Treaty, namely Articles VI, VII and VIII.

First, a special significance must be attached to the principle, embodied in Article VI, that State Parties "shall bear international responsibility for national activities in outer space …whether such activities are carried on by governmental agencies or by non-governmental entities", and for "assuring that national activities are carried out in conformity with the provisions" of the Treaty. This responsibility – continues Article VI – pertains to assuring that national activities are carried out in conformity with the provisions set forth in the OST.

Therefore, international responsibility according to Article VI, encompasses all the legal consequences of *national activities* in outer space. It covers not only the obligation of reparation in case of violations of international obligations by public or private entities, but also the obligation to compensate for damage according to the special regime set forth in Article VII. Beside, another important effect arising from the accountability provided for in Article VI is the recourse by a State to take legislative action at the national level in order to answer for private space activities and their legal consequences for which the State is internationally responsible.

The obligation to compensate for damage is detailed in Art. VII of the OST, following which each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air or in outer space, including the moon and other celestial bodies.

In its turn, Article VIII of the OST establishes that a State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body.

I. The 1972 Liability Convention

The general legal framework set up by the OST was complemented by the Convention on International Liability for Damage Caused by Space Objects, which depicts a victim-oriented discipline of absolute responsibility/strict liability for damages caused by space objects on the surface of the Earth or to aircraft in flight.

The Convention was adopted, after over a decade of negotiations, by the General Assembly in 1972. It contains the fundamental elements sought by the UN through its proposals, while some less fundamental proposals were excluded in the interest of reaching a compromise. It gives the maximum assurance that a launching State, which has ratified the Convention, will pay a just claim and encourages space powers to deal equitably with justified damage claims from claimant States. In some way, Space States' responsibility and liability are a counterpart for the freedom of exploration and exploitation of outer space. Activities in outer space are in fact ultra hazardous activities, because they take place in a very special environment from a technical point of view. Indeed the fundamental aim of the Liability Convention is mainly to regulate the liability for damage to "innocent" victims not taking part in space activities.

Let me now address the main principles and features of the Liability Convention.

First of all, the Convention applies to *damage* caused by a space object, as defined in Article 1: “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 organizations”. In that respect, it does not apply to damage to the space environment or even to the Earth’s environment as such. The Liability Convention applies to *space objects*, including component parts of a space object as well as its launch vehicle and parts thereof. In this vein, *space debris* are to be considered as space objects.

The Liability Convention introduces the concept of a *launching State* defined by Article I as: i) A State which launches or procures the launching of a space object or (ii) A State from whose territory or facility a space object is launched. The rationale of this definition, which identifies four possible launching States, is to safeguard the interest of the victim to find a State, which has to compensate in case of damage. From the time the Convention was adopted, the notion of launching State has retained the attention of the legal space community, mainly with reference to the evolving practice of launches and the involvement of the private sector in them. Moreover, it is clear from the above definition that it is possible to have more than one launching State for each space object or its component parts. This is why the Convention imposes, always in the interest of the victim, joint and several liabilities on the multiple launching States and each launching State may present claims for indemnity from other launching States or to appropriation their liability by agreement.

In 2004, a draft resolution on the application of the concept of the “launching State” was adopted by the LSC and approved by General Assembly Resolution 59/155 of December 10, 2004 with the title “Application of the Concept of the Launching State”. The resolution reminds us that it does not constitute an authoritative interpretation nor an amendment to the Liability and Registration Conventions, but it is helpful in better understanding the main problems raised by the application of the Convention over the years. It mainly recommends that States consider enacting national legislation on authorization and supervision of space activities by private entities and the conclusion of agreements with respect to joint-launches.

The Convention provides two categories of liability: on the one hand, objective/absolute liability and, on the other hand, liability by fault.

First, according to Article II, 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 flight. So, the liability for victims on the Earth, is objective; no fault has to be proven. The liability is unlimited in amount and in time. The liability is also absolute. Only “*gross negligence*” or “*an act or omission done with intent to cause damage*” may be exonerating, but no exoneration whatever shall be granted in cases where the damage has resulted from illegal activities conducted by a launching State (Article VI), namely activities which are not in conformity with international law including, in particular, the Charter of the United Nations and the OST.

The launching State liability applies to the whole activity, from the launch of the rocket, during the travel to orbit, to the space object’s life in orbit, and to the stay in orbit until deorbit.

If the liability mechanism is very efficient toward victims on Earth or to aircrafts in flight, the Convention regulates differently the liability by fault, when the damage is caused to other space objects in space. In this case, the launching State will be liable, but only if its fault may be proven. In the case of damage to persons or properties on board another space object, the liability rule considers the *launching State*. If the fault has not been committed by a launching State but by another State, the Liability Convention does not apply.

As I have said, when there is more than one launching State (Article V) or when two space objects are involved (Article IV) the launching States are jointly and severally liable. These norms mean that the State of the victim can ask for the whole compensation from any one of the launching States. Afterwards, the launching States will share the burden of compensation according to Articles IV or V respectively.

In the first case, whenever two or more States jointly launch a space object, they are jointly and severally liable for any damage caused. At the same time, a launching State, which has paid compensation for damage, shall have the right to present a claim for indemnification to other participants in the joint launching. The participants in a joint launching may conclude agreements regarding the apportioning among themselves of the financial obligation in respect of which they are jointly and severally liable. Such agreements shall be without prejudice to the right of a State sustaining damage to seek the entire compensation due under this Convention from any or all of the launching States, which are jointly and severally liable. Finally, a State from whose territory or facility a space object is launched shall be regarded as a participant in a joint launching.

In the second case, in the event of damage being caused elsewhere, than on the surface of the Earth, to a space object of one launching State or to persons or property on board such a space object by a space object of another launching State, and of damage thereby being caused to a third State or to its natural or juridical persons, the first two States shall be jointly and severally liable to the third State. If the damage has been caused to the third State on the surface of the Earth or to aircraft in flight, their liability to the third State shall be absolute; if the damage has been caused to a space object of the third State or to persons or property on board that space object elsewhere than on the surface of the Earth, their liability to the third State shall be based on the fault of either of the first two States or on the fault of persons for whom either is responsible. Finally, in all cases of joint and several liability of this nature, the burden of compensation for the damage is to be apportioned between the States concerned in accordance with the extent to which they were at fault; if the extent of the fault of each of these States cannot be established, the burden of compensation is to be apportioned equally between them. Such apportionment is without prejudice to the right of the third State to seek the entire compensation due under this Convention from any or all of the launching States, which are jointly and severally liable.

It is also clear from the abovementioned Articles of the Liability Convention that the apportionment among the launching States of their financial obligations is to be solved by special agreements among them. In this respect, a good example of this practice are the agreements concerning the legal regime of the *Ariane* launcher from the Kourou Space Facility in the French Guyana, involving France, the European Space Agency (ESA) and the States having accepted the *Ariane* Declaration. The Declaration by Certain Governments on the *Ariane* Launcher Production Phase in force, called the “Production Declaration”, was opened for accession on 14 January 1980, entered into force on 14 April 1980 and was renewed on 21 May 1992 and 7 June 2001. It applies up to the end of 2006.

The Liability Convention does not apply to damage caused to the launching State’s nationals taking part in the launch (Article VII). It does not apply either to foreign nationals involved in the launching operations. This exclusion confirms that the Liability Convention is especially set to protect “innocent” victims not taking part in this dangerous activity.

Another important part of the Convention deals with the procedures for obtaining compensation. Article VIII, para. 1, gives to a State which suffers damage, or whose national or juridical persons suffer damage, the *faculty* to present to the liable State a claim for compensation for such damage. Thus, the Convention establishes a *discretionary power* of the concerned State and, for that reason, the natural and juridical persons that suffer the damage, do not have an enforceable right to pretend that this State should present an international claim to the launching State. But, as a further guarantee for the victim, if the State of nationality has not presented a claim, another State may, in respect of damage sustained in its territory by any natural or juridical person, present a claim to a launching State, or, if neither the State of nationality nor the State in whose territory the damage was sustained has presented a claim or notified its intention of presenting a claim, another State may, in respect of damage sustained by its permanent residents, present a claim to a launching State.

Finally, Article IX establishes that a claim for compensation for damage must be presented to a launching State through diplomatic channels. If a State does not maintain diplomatic relations with the launching State concerned, it may request another State to present its claim to that launching State or otherwise represent its interests under the Convention. It may also present its claim through the Secretary-General of the United Nations, provided the claimant State and the launching State are both Members of the Organization.

In this perspective, it can be said that the 1972 Convention is at least partially inspired by the same rationale as the so-called *diplomatic protection* under general international law. Diplomatic protection is the procedure employed by the State of nationality of the injured person to secure protection of that person and to obtain reparation for an internationally wrongful act inflicted.

According to the traditional notion of diplomatic protection as stated by the Permanent Court of International Justice in the *Mavrommatis Palestine Concessions case* (Greece v. UK): "By taking up the case of one of its subjects and by resorting to diplomatic protection or international judicial proceedings on his behalf a State is in reality asserting its own right – its right to ensure, in the persons of its subjects, respect for the rules of international law".

The analogy must of course be taken *mutatis mutandis*, the main differences being that, in the case of the 1972 Convention, it is not a question of responsibility deriving from violations of international obligations, illicit acts or wrongful behaviours, but of absolute liability arising from the mere fact that a damage caused by a space object has occurred. Besides, only the State of nationality can bring a claim in diplomatic protection, while other States can, as I have mentioned, present a claim for damage caused by space objects.

The analogy is relevant mainly from the standpoint of the *discretionary power* of a State to present a claim for compensation. In both cases, diplomatic protection and 1972 Convention, a State has the right to protect the entitled individuals (nationals and/or non nationals) but is under no obligation to do so, and the individuals concerned have no right to be protected under general international law and the 1972 Convention.

As far as diplomatic protection is concerned, in the *Barcelona Traction Light and Power Company* case, the International Court of Justice reaffirmed this principle: "The State must be viewed as the sole judge to decide whether its protection will be granted, and to what extent…It retains in this respect a discretionary power". Apart from certain new trends that are emerging in this particular field of international law, as evidenced by the works on diplomatic protection of the International Law Commission and of the International Law Association, mainly on the loosening of the nationality of claims requirement and the protection of individuals affected by gross violations of international law[1], it can happen that the discretion in the governmental

[1] See Report of the ILC, 54th session, 2002, p. 168 seq. and Orrego Vicuna, Interim Report on "The Changing Law of Nationality of Claims", in ILA Committee on Diplomatic Protection of Persons and Properties, First Report, London, 2000, p. 30 seq

decision to spouse a claim, can be subjected to certain conditions within the internal law of each State. In the same vein, nothing can prevent the internal legislation of a State to convert the faculty given by Article VIII, para. 1, of the Liability Convention to the State whose natural or juridical persons suffer damage to present a claim for compensation for such damage, into an obligation toward the individuals concerned.

This is the case of Italian Law n. 23 of 25 January 1983, enacted for implementing the 1972 Liability Convention, in relation to claims for damage suffered by nationals and covered by the 1972 Convention. If the general principle, applicable to nationals and non-nationals, limits in fact the individual right to obtain compensation only if, and to the extent which, the Italian State has presented a (discretionary) claim and obtained reparation, Article 3 of the Law broadens the scope of the Liability Convention enlarging in two ways the protection of the victims of Italian nationality.

It gives them a right to be compensated even though the Italian State has not obtained compensation, for one reason or another, from the liable launching State under the Convention. Italian natural and juridical persons are also entitled to receive compensation if the Italian State has presented no claim for compensation, provided, in this case, that a claim has not been presented to the liable State by the State on whose territory the damage was sustained or by the State of which the persons concerned are permanent residents.

In fact, Article VIII, paragraphs 2 and 3, of the Liability Convention, allows States to present a claim in respect of damage sustained in its territory by foreign natural or juridical persons whose State of nationality has not presented a claim or by foreign permanent residents when neither the State of nationality nor the State on whose territory the damage was sustained have presented a claim or notified (in the second case) its intention of presenting a claim.

As to the identification of the moment in which the claim presented by the a State has to be considered as unsatisfied by the launching State, the 1972 Convention does not contain any indication in this respect. We can argue that the launching State satisfies the claim when it agrees on compensation for the requested amount or for an amount that is accepted by the claimant State.

A claim may be presented under the 1972 Convention no later than one year following the date of the occurrence of the damage of the identification of the launching State which is liable. If, however, a State does not know of the occurrence of the damage or has not been able to identify the launching State which is liable, it may present a claim within one year following the date on which it learned of the aforementioned facts; however, this period shall in no event exceed one year following the date on which the State could reasonably be expected to have learned of the facts through the exercise of due diligence. The time-limits specified in paragraphs 1 and 2 of this Article apply even if the full extent of the damage may not be known. In this event, however, the claimant State is entitled to revise the claim and submit additional documentation after the expiration of such time-limits until one year after the full extent of the damage is known.

Finally, the compensation which the launching State shall be liable to pay for damage under this Convention is to be determined in accordance with international law and the principles of justice and equity, in order to provide such reparation in respect of the damage as will restore the person, natural or juridical, State or international organization on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred.

This regime relies upon the agreement between the concerned States. But, what happens if no agreement is reached? We have to refer to the Claims Commissions mechanism, set out by

Article XIV of the Liability Convention, which States the following: “If no settlement of a claim is arrived at through diplomatic negotiations, within one year from the date on which the claimant State notifies the launching State that it has submitted the documentation of its claim, the parties concerned shall establish a Claims Commission at the request of either party”. So, each State party to the dispute concerning compensation can unilaterally request the establishment of such a third-party mechanism, composed of three members: one appointed by the claimant State, one appointed by the launching State and the third member, the Chairman, to be chosen by both parties jointly.

The Claims Commission decides the merits of the claim for compensation and determines the amount of compensation payable, if any; its decision is final and binding if the parties have so agreed; otherwise the Commission shall render a final and recommendatory award, which the parties shall consider in good faith. This obviously constitutes a point of weakness of the entire legal regime set out by the Liability Convention. The Claims Commissions decisions are mandatory only if the parties so agree, if not, they are only recommendatory. This is why the General Assembly Resolution 2777 (XXVI), para. 3, of 29 November 1971, requested States to consider, when becoming parties to the Convention, to accept as *binding* the decisions of the Claims Commission over future disputes in relation to any other State accepting the same obligation. So far out of 80 States which are parties to the Liability Convention only 9 have made such declarations. We can hope that this number will increase soon. In fact, making the decisions of the Claims Commissions binding on a base of reciprocity would be in keeping with more recent development in international law.

So said, it is useful to remind that nothing in the Convention prevents a State, or natural or juridical persons it might represent, from pursuing a claim in the courts or administrative tribunals or agencies of a launching State. However, this norm continues by stating that a State is not entitled to present a claim under the Convention in respect of the same damage for which a claim is being pursued in the courts or administrative tribunals or agencies of a launching State or under another international agreement which is binding on the State concerned. Thus, the 1972 Convention, on the one hand, does not impose the *exhaustion of the local remedies* which may be available to a claimant State or to natural and juridical persons it represents as a previous requirement for presenting a claim to the liable State (Article XI, para. 1, of the Convention), but, on the other hand, it sets out the principle of *electa una via non dat recursus ad alteram*, in order to avoid the institution of parallel proceedings under the Convention and under national, or other international binding procedures.

II. The Registration Convention

The second important milestone of the international legal regime of outer space is constituted by the 1975 Convention on the Registration of space objects. In this respect, it must be said that a first step was reached in 1961, when the General Assembly adopted Resolution 1721(XVI) that requested the Secretary-General of the UN to maintain a *public registry* of launchings based on the information supplied by States launching objects into orbit or beyond. It calls upon States launching objects into outer space to furnish information promptly to the COPUOS, through the Secretary-General, for the registration of launchings. This Resolution is still applicable to the States that have not yet ratified the 1975 Convention on Registration of space objects. Therefore, they may register their space objects within the United Nations on a voluntary basis following the Resolution.

After resolution 1721 (XVI), the OST was concluded in 1967. Article VIII provides that “A State party to the Treaty on whose registry an object launched into outer space is carried out shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body". In this sense, the 1967 Treaty contains three important principles on registration: a) It assumes that all space objects are to be registered at the national level; b) It sets out that these objects are under the jurisdiction and control of the State of registry; c) It provides that stray space objects shall be returned to the State of registry.

However, while the Treaty assumes that space objects will be registered, it makes no provision for their registration, and it is also silent to which State exercises jurisdiction and control over unregistered space objects. The Convention on Registration of Objects Launched into Outer Space was concluded in 1975 just in order to fill these gaps.

The Convention, which contains 12 Articles, was adopted by the General Assembly in Resolution 3235 (XXIX) on 12 November 1974, opened for signature on 14 January 1975 in New York and entered into force on 15 September 1976. Up to now, there are 47 ratifications. Italy joined the Convention in January 2006.

The main requirements of the Convention are three.

In the first place, it requires States launching objects into outer space to provide for inclusion in a United Nations Register information on those objects. This "identification" purpose of the Registration Convention is reflected in the preamble of the Convention itself, respectively as follows:

> "Desiring, in the light of the [Space Treaty, Rescue Agreement and Liability Convention], to make provision for registration by launching States of space objects launched into outer space with a view, *inter alia*, to providing States with additional means and procedures to assist in the identification of space objects, ..."; "Believing that a *mandatory* system of registering objects launched into outer space would, in particular, assist in their identification...".

Secondly, States are also required to maintain a National Registry of all space objects launched by them into Earth orbit or beyond.

Thirdly, the Convention sets down a procedure to identify objects that caused damage to a State Party or its nationals or juridical persons or which may be of a hazardous or deleterious nature.

Within this general framework, it is necessary to make a further reflection on the concept of *jurisdiction and control* that the State of Registry has to maintain over its space objects when on outer space or beyond. In practice jurisdiction is not a single concept. A State's jurisdiction may take various forms and the extent of the State jurisdiction may differ in each contexts.

Under international law, a State's title to exercise jurisdiction rests primarily in its sovereignty. When the exercise of jurisdiction impinges upon the interests of other States, the overlapping claims to jurisdiction have to be coordinated. Generally speaking, however, there is some tendency now towards a broad principle according to which the right to exercise jurisdiction depends on there being between the subject matter and the State exercising authority a sufficiently *close connection* to justify that State in regulating the matter.

Let us think about jurisdiction at sea or in the air. Although the high seas are not part of the territory of any State and are thus not within the scope of its jurisdiction, States do have certain rights of jurisdiction over persons and things on the high sea. The legal order on the high seas is based primarily on the rule of international law that requires every vessel sailing the high seas to possess the nationality of, and to fly the flag of, one State; by this means a vessel, and persons and things aboard, are subjected to the law of the State of the flag, and in general subject to its exclusive jurisdiction. It is for each State to fix the conditions for the grant of nationality and of registration within its territory, and for the right of vessels to fly its flag. It must exist a genuine link between the State and the ship.

Somehow, different considerations apply in respect of air space. Although that part of the airspace which is above the high seas is, like the high seas, not within the territorial jurisdiction of any State, that part which is above a State's territory falls within its territorial jurisdiction. Accordingly in a long distance flight, an aircraft, with its crew and passengers, may pass through the territorial jurisdiction of several States as well as being for a time outside the territorial jurisdiction of any State.

The State in which the aircraft is registered and the nationality of which the aircraft is for most purposes regarded as having, will also have a claim to jurisdiction. Under the Chicago Convention of 1944 and agreements (mainly the International Air Transport Agreement), the enjoyment of privileges secured by them is not to aircraft in general, but to aircraft of contracting Sates. Aircraft, as ships, have a nationality, with its connotations of rights of jurisdiction and protection. Article 17 of the Chicago Convention establishes that aircrafts have the nationality of the State in which they are registered and the conditions for registration are a matter for the municipal law of the State concerned. Further, an aircraft cannot be validly registered in more than one State. Every aircraft engaged in international aviation is required to bear its appropriate nationality and registration markings.

The Registration Convention shows that there are clear differences between the registration of space objects and the registration of ships and aircrafts, due to the fact that the registration of space objects does not confer the *nationality* of the registering State. However, the registration of a space object implies that the registered object is carrying out an activity, which can be identified as a *national activity* of the registering State in outer space within the meaning of Article VI of the OST.

Coming back to the duty to register established by the Convention, the fact that the definition of "Launching State" is the same as the one used in the Liability Convention creates a comparable choice in case two or more States are involved in the launch and the definition makes them all "launching States". This is why, under the Registration Convention, the two or more launching States "shall jointly determine which one of them shall register the object" in its national registry. The State so chosen thus becomes the "State of registry", which has to provide the United Nations Register with the required information and is supposed to retain jurisdiction and control over the registered space object.

The sharing of the same definition of "launching State" by the two Conventions raises also the question of the effect of a change in ownership of the space object, such as a satellite, which has been launched and registered, on the application of the respective Convention. In this respect, it has been observed that there is an element of unfairness in the rule that the launching State is held liable for damage caused by its space object even years after that State has transferred ownership of – and thus jurisdiction and actual control over - the satellite to a third party.

The Convention requires the State of registry to furnish information concerning its space object “as soon as practicable”. In other words, it is left to the State of registry to determine how soon after the launch the information will be provided to the United Nations Secretariat. Although the practice of States is highly variable, the information which the State of registry has to provide to the United Nations, is listed in Article 4 of the Convention: name of the launching State(s): designator or registration number of the space object; date and territory or location of the launch; basic orbital parameters and general function of the space object. This seems to be the minimal information to assist in the identification of the launching State with respect to the space object concerned.

Missing from the Registration Convention is the obligation found for other modes of transport, such as aircrafts or ships, i.e. a registration mark on the body of the vehicle. However, if a State decides to put a mark on the object, the United Nations Register should be informed accordingly.

In practice, a more important aspect affects the completeness and reliability of the registration system of the Convention, i.e. the fact that States feel free not to register satellites with highly sensitive national security tasks/functions. Although the Convention makes no distinction based on - civil or military - purposes, Article 2, para. 3 provides that “the contents of each registry and the conditions under which it is maintained shall be determined by the State of registry concerned”. This latter provision could possibly be used to leave certain space objects out of the national registry.

Another aspect is that the Registration Convention was not meant to *prevent* accidents. That does not mean that it should not or cannot be used for that purpose. However, the preamble leaves sufficient room for focusing on the need to provide data in sufficient detail and at a sufficient early stage to prevent collisions and interference between satellites or to avoid a damaging re-entry of a space object on the surface of the Earth. In this respect, States should carefully consider the opportunity to provide the Secretary General of the United Nations and the potentially affected States additional information concerning space objects carried on their respective registries which are no longer in Earth orbit and to develop best practices for the application of Article IV, paragraphs 2 and 3, of the Registration Convention.

From 2004, under a three-year-work plan, the LSC is considering the practice of States and international organizations in registering space objects that seems to show the existence of relevant *lacunae* in the Convention, mainly due to the commercial uses of outer space as well as to the privatisation of space activities. Moreover, the assessment of current international practice reveals some disparities regarding information concerning the territory of launch, the basic orbital parameters and the general function of a spacecraft; it shows also that there are still several unregistered space objects or registered by more than one State. The debate is now open on how to fill these gaps and to obtain a more uniform application of the Registration Convention.

In conclusion, both the Liability and the Registration Conventions are of fundamental importance for space law. They are the cradle where the basic principles and concepts of space law have been enshrined. They still serve as the main tools for ensuring the best development of space activities in the interest of the international community as a whole.

United Nations Principles on Outer Space

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Introduction

In addition to five major international space treaties[1], the fundamental principles relating to outer space are in several resolutions adopted through the United Nations General Assembly. The principles that were agreed upon prior to the adoption of the 1967 Outer Space Treaty have been largely incorporated in the Treaty, as well as in other UN agreements on outer space. In this presentation, I intend to briefly describe only those principles that have not been included in these treaties. Some of them are:

- The principles governing the use of satellites for international television broadcast;
- The principle of universal access to satellite telecommunication services;
- The principles governing satellite remote sensing activities;
- The principles relevant to the use of nuclear power sources in outer space;
- The principles relating to international cooperation in the exploration and use of outer space for the benefit and in the interest of all States;
- The principles relating to the prevention of an arms race in outer space (PAROS); and

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[1] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (hereinafter referred to as the Outer Space Treaty); opened for signature on 27 January 1967, entered into force on 10 October 1967; 98 ratifications and 27 signatures (as of 1 January 2005), 610 UNTS 205; The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (the “Rescue Agreement,” adopted by the General Assembly in its resolution 2345 (XXII)), opened for signature on 22 April 1968, entered into force on 3 December 1968; 88 ratifications, 25 signatures and 1 acceptance of rights and obligations (as of 1 January 2005), 672 UNTS 119; The Convention on International Liability for Damage Caused by Space Objects (the “Liability Convention,” adopted by the General Assembly in its resolution 2777 (XXVI)), opened for signature on 29 March 1972, entered into force on 1 September 1972; 82 ratifications, 25 signatures and 2 acceptances of rights and obligations (as of 1 January 2005), 961 UNTS 187; The Convention on Registration of Objects Launched into Outer Space (the “Registration Convention,” adopted by the General Assembly in its resolution 3235 (XXIX)), opened for signature on 14 January 1975, entered into force on 15 September 1976; 45 ratifications, 4 signatures and 2 acceptances of rights and obligations (as of 1 January 2005), 1023 UNTS 15; and The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (the “Moon Agreement,” adopted by the General Assembly in its resolution 34/68), opened for signature on 18 December 1979, entered into force on 11 July 1984; 11 ratifications and 5 signatures (as of 1 January 2005), 1363 UNTS 3.

- The principle condemning propaganda for threat or breach of international peace.

These principles are described here with a view to assess their importance and role in regulating the international behaviour of States in the conduct of their respective outer space activities.

I. The principles governing the use of satellites for international TV broadcast

The control of flow of information has always been highly political both nationally and internationally. From the dawn of the space age, direct broadcasting by satellite (DBS), has been controversial as the ‘have not’ States and others feared that this technology would possibly erode their cultures and economies. They favoured the requirement of agreements between the transmitting and receiving States prior to the start of a DBS service. This approach has been dubbed as the ‘prior consent’ argument, which has essentially been based on the principle of State sovereignty under which a State has exclusive right to control the flow of information on its territory. On the other hand, some States have been arguing that there should not be any requirement of ‘prior consent’, because the freedom of broadcasting has been well-recognized. This view has been primarily based on the 1948 Universal Declaration of Human Rights and other human rights conventions[2].

In 1982, the United Nations General Assembly adopted a Resolution on Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting[3]. The most important and relevant principles of the Resolution are included in its following paragraphs:

> “13. A State which intends to establish or authorize the establishment of an international direct television broadcasting satellite service shall without delay notify the proposed receiving State or States of such intention and shall promptly enter into consultation with any of those States which so requests.
> 14. An international direct television broadcasting satellite service shall only be established after the conditions set forth in paragraph 13 above have been met and on the basis of agreements and/or arrangements in conformity with the relevant instruments of the International Telecommunication Union and in accordance with these principles.
> 15. With respect to the unavoidable over-spill of the radiation of the satellite signal, the relevant instruments of the International Telecommunication Union shall be exclusively applicable.”

These principles tend to support the ‘prior consent’ argument. However, the following two points need to be noted:

(1) This Resolution was adopted after over two decades of discussions in the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), which could not resolve the issue on a consensus basis and the final decision had to be made by

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[2] Article 19 of the 1948 Universal Declaration of Human Rights, specifies that “Everyone has the right to freedom of opinion and expression: this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any means and regardless of frontiers”. The essential elements of this Article have been adopted in Article 19 of the 1966 International Covenant on Civil and Political Rights and Article 10 of the 1954 European Convention on Human Rights.

[3] United Nations General Assembly Resolution 37/92, adopted by 107 votes to 13, with 13 abstentions, on 10 December 1982; UN Document A/37/PV.100 of 17 December 1982.

the United Nations General Assembly by a majority vote[4]. Most of the Western countries either voted against or abstained from voting; and

(2) Normally, all resolutions of the United Nations General Assembly, except for internal purposes, are considered non-binding instruments; however, when adopted unanimously they could become a basis for the development of customary international law.

A number of States have been making declarations, in and outside COPUOS, expressing the limitations on the freedom of satellite broadcasting and their sovereign right to control foreign satellite broadcasts. Thus, there has not been any acquiescence or tacit agreement on the freedom of broadcasting by foreign satellite. This position is supported by the 1972 United Nations Educational, Scientific and Cultural Organization (UNESCO) Declaration on Satellite Broadcasting[5] and the International Telecommunication Union (ITU) Frequency Allotment Plans for DBS[6] More importantly, the ITU Radio Regulations have the effect that no international DBS service could be started without the consent of the receiving State. For example, Radio Regulation no. 2674, which was originally adopted in 1971, specifies that:

> "In devising the characteristics of a space station in the broadcasting-satellite service, all technical means available shall be used to reduce, to the maximum the radiation over the territory of other countries unless an agreement has been previously reached with such countries."

Therefore, it can be said that the 1982 UN Resolution though not *per se*, but with the corroboration by the ITU Regulations, entitles each State, if it chooses to exercise it, the right to object to any unwanted foreign satellite broadcasts beamed to its territory without its consent.

Recently, several satellite operators have started using medium-powered telecommunication satellites for TV transmissions to foreign States and thus defeating the original aim of 'prior consent' for direct satellite broadcasting. In my opinion, the use of 'medium powered telecommunication satellites for TV transmissions' is not only contrary to the 1982 UN Resolution on direct television satellite broadcasting but is also illegal as it violates international radio regulations, which require that radio frequencies notified to and registered with ITU must be used only for the notified purpose (service)[7].

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[4] Ibid.

[5] Article IX of the 1972 UNESCO Declaration of Guiding Principles on the Use of Satellite Broadcasting for the Free Flow of Information, the Spread of Education and Greater Cultural Exchange States that : "In order to further the objectives set out in the preceding Articles, it is necessary that States, taking into account the principle of freedom of information, reach or promote prior agreements concerning DBS to the population of countries other than the country of origin of the transmission....., with respect to commercial advertising, its transmissions shall be subject to special agreement between the originating and the receiving States."

[6] The 1977 and 1983 ITU Frequency Allotment Plans (international treaties included in ITU Radio Regulations, Appendixes 30A and 30 B) allow the use of 12 GHz band of radio frequencies for DBS for national coverage only. Such frequencies could be used for international services only on the bases of prior agreement between the transmitting and receiving States and only after following procedures for the modification of relevant Plans.

[7] Article 5 of the ITU Radio Regulations contains a Table of Frequency Allocations specifying the bands of radio frequencies that have been allocated to the enumerated radio services. All ITU Member States are obliged to assign radio frequencies to their satellites (space stations) "in accordance with the Table of Frequency Allocations and other provisions of these Regulations" (ITU Radio Regulations Articles 4.2 and 4.3.). Moreover, the Regulations emphasize that "Member States shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations or the other provisions of these Regulations"

II. The principle of universal access to satellite telecommunication services

The principle of universal access to satellite telecommunication services was adopted as early as 1961. The United Nations General Assembly, in its Resolution 1721 (D), unanimously declared 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"[8]. The first implementation of the principle was effected through INTELSAT Agreements[9]. After reiterating this principle in its Preamble, the INTELSAT Agreement specified that "satellite telecommunications should be organized in such a way as to permit all peoples to have access to the global satellite system". Moreover, INTELSAT's prime objective had been designed to provide "international public telecommunications services of high quality and reliability to be available on a non-discriminatory basis to all areas of the world."[10] Similarly, provisions had been made in the INMARSAT Convention with respect to a global and non-discriminatory access to its space segment[11] and non-discriminatory nature of charges for its services[12]. In fact, the principle of universal access to telecommunications services resulted in providing services to almost all countries of the world, and has been particularly beneficial to developing countries that did not have the need, nor the means to establish their own satellite systems.

However, the principle of non-discriminatory universal access to satellite telecommunication services has been recently compromised by privatizing both INTELSAT and INMARSAT organizations. Francis Lyall correctly pointed out that, the privatization of INTELSAT, especially the way it has been achieved, is "an unwelcome development and indeed arguably contrary to Article I of the Outer Space Treaty" as well as UN Resolution 1721 (D)[13]. The privatized INTELSAT and INMARSAT are not under any legal obligation to provide non-discriminatory universal access to their services and also could now be subjected to national legal and policy actions like sanctions against certain counties; thus deny services to these countries. Therefore, as a result of privatization of INTELSAT and INMARSAT, countries that generate low telecommunication traffic might not be served by these entities because of economic reasons and thus they would not have access to satellite telecommunication services on a non-discriminatory and universal basis.

(ITU Radio Regulations Articles 4.4). Therefore, radio frequencies that have been allocated to Fixed Satellite Service (telecommunication satellites) cannot be legally assigned by an ITU Member State to its satellite that would provide a broadcasting satellite service, including direct to home satellite television broadcasting.

[8] United Nations General Assembly Resolution 1721 (XVI) (D) (1961).

[9] *Agreement Relating to the International Telecommunications Satellite Organization* (INTELSAT), 23 UST 3813.T1AS 7532; (1971) 101 LM 1909.

[10] Article III of the Agreement Relating to the International Telecommunications Satellite Organization (INTELSAT), 23 UST 3813, TIAS 7532; (1971) 10 ILM 1909.

[11] Article 7(1), Convention Establishing International Maritime Satellite Organization (INMARSAT), *Final Acts of International Conference on the Establishment of an International Maritime Satellite System*. Inter-Governmental Maritime Consultative Organization, London, 1976, pp. 25-47.

[12] Ibid, Article 19.

[13] "On the Privatization of INTELSAT", 28, *Journal of Space Law*, 2000, pp. 101-19. Also see, Jakhu, Ram, "Safeguarding the Concept of Public Service and the Global Public Interest in Telecommunications", 5(1) *Singapore Journal of International and Comparative Law*, 2001, pp. 71 *et seq*.

III. The principles governing satellite remote sensing activities[14]

Political and legal issues related to remote sensing by satellite are similar to the ones for direct television satellite broadcasting. The international principles that specifically govern remote sensing satellites and access to satellite imagery were discussed in the Legal Subcommittee of COPUOS for about two decades. There were two opposing views: the first view was presented by the States (i.e. the US and some other developed countries) that advocated unrestricted use of satellites for remote sensing and freedom of distribution of satellite imagery. The second view, advanced by the developing, socialist and some developed countries, stressed that the acquisition and distribution of the satellite imagery must be governed by the principle of State sovereignty. Thus, they advocated the need of prior consent of the sensed State for acquisition and distribution of satellite imagery.

Since outer space has been declared free for exploration and use by all States, the use of satellites for remote sensing has not been seriously questioned. It is important to note that there is a general consensus that the freedom of remote sensing by satellite has been well recognized and has also become a principle of international customary law. It can be said that no prior consent is legally required for launching and operating remote sensing satellites. However, the reception, processing and distribution of the data acquired by remote sensing are essentially Earth-based activities; thus the main focus of the discussion has been on the distribution of remote sensing data.

In 1986, a compromise was achieved when the United Nations General Assembly unanimously adopted a Resolution containing the Principles Relating to Remote Sensing of the Earth from Outer Space[15]. Under this Resolution, as Stated in Principle XII[16], the developing countries (and several socialist and developed countries) gave up their demand for prior consent in exchange for the recognition of the right of the sensed State to have access to the primary data[17] and the processed data[18] concerning its territory "on a non-discriminatory basis and on reasonable cost terms". The sensed State has also been entitled to have access to the available analyzed information[19] concerning its territory "on the same basis and terms, taking particularly into account the needs and interests of the developing countries."[20] The Resolution clearly establishes a balance of interests of both the sensing and sensed States.

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[14] For details, see Jakhu, Ram, "International Law Regarding the Acquisition and Dissemination of Satellite Imagery", Vol. 29 (No. 1 &2), *Journal of Space Law*, 2003, pp. 65 *et seq*.
[15] United Nations General Assembly Resolution 41/65, adopted without vote on 3 December 1986.
[16] Principle XII of the Resolution provides that: "As soon as the primary data and the processed data concerning the territory under its jurisdiction are produced, the sensed State shall have access to them on a non-discriminatory basis and on reasonable cost terms. The sensed State shall also have access to the available analyzed information concerning the territory under its jurisdiction in the possession of any State participating in remote sensing activities on the same basis and terms, taking particularly into account the needs and interests of the developing countries."
[17] Ibid. Principle 1, the term "primary data" means "the raw data that are acquired by remote sensors borne by a space object and that are transmitted or delivered to the ground from space by telemetry in the form of electromagnetic signals, by photographic film, magnetic tape or any other means."
[18] Ibid, the term "processed data" means "the products resulting from the processing of the primary data, needed to make such data usable."
[19] Ibid, the term "analyzed information" means "the information resulting from the interpretation of processed data, inputs of data and knowledge from other sources."
[20] Ibid, Principle XII.

Principle XII, with its mandatory wording, clearly recognizes the legal right of the sensed State to seek from the sensing State satellite imagery of its own territory. The principle is considered by several well-known publicists as to have become a part of customary international law.[21] It is therefore expected of the sensing State(s) to positively respond to the requests by the sensed States for satellite imagery of their respective territories. A denial of such a request would be considered contrary to the provisions of the 1986 Resolution, particularly its Principle XII.

Unfortunately, some States have started imposing extensive national prohibitions on the collection and distribution of remote sensing imagery. For example, under the U.S. law a licensee of a private Earth remote sensing satellite system is obliged to make available to any sensed State only un-enhanced data;[22] however, no data are to "be provided to the sensed State if such release is contrary to U.S. national security concerns, foreign policy or international obligations or is otherwise prohibited by law, e.g. where transactions with the sensed State are prohibited by the laws of the United States."[23] This law has extraterritorial application with respect to the distribution of satellite imagery by all foreign operators that have a link with the U.S.[24] Similarly, Canada is already committed to follow the American approach. On 5th October 2005, the House of Commons of the Canadian Parliament passed[25] a Bill known as An Act Governing the Operation of Remote Sensing Space Systems.[26] Once passed by the Canadian Senate and proclaimed as an Act, it will have the effects similar to those under the American law. The Canadian Minister of Foreign Affairs may issue a license, renew or amend a license, but may impose conditions that the Minister considers appropriate.[27] One of the specified conditions States that raw data and remote sensing products from the remote sensing satellite system about the territory of any country be made available to the government of that country within a reasonable

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[21] See Jakhu, Ram, "International Law Regarding the Acquisition and Dissemination of Satellite Imagery", Vol. 29 (No. 1 &2), *Journal of Space Law*, 2003, footnote 63.

[22] National Oceanic and Atmospheric Administration (NOAA) of the US Department of Commerce, Interim Final Regulations relating to the Licensing of Private Land Remote-Sensing Space Systems, 15 C.F.R. Part 960, (issued on 31 July 2000 under the Land Remote Sensing Policy Act of 1992; 15 U.S.C. 5601 et seq.; Public Law 102-555, 106 Stat. 4163) regulates private remote sensing satellite systems. Section 960.03 of these Regulations defines "Unenhanced data" as "remote sensing signals or imagery products that are unprocessed or subject only to data preprocessing. Data preprocessing may include rectification of system and sensor distortions in remote sensing data as it is received directly from the satellite; registration of such data with respect to features of the Earth; and calibration of spectral response with respect to such data. It docs not include conclusions, manipulations, or calculations derived from such data, or a combination of such data with other data. It also excludes phase history data for synthetic aperture radar systems or other space-based radar systems."

[23] Ibid, Sec. 960.11(10).

[24] Jakhu, Ram, "International Law Regarding the Acquisition and Dissemination of Satellite Imagery", Vol. 29 (No. 1 &2), *Journal of Space Law*, 2003, pp. 65 *et seq*.

[25] http://www.parl.gc.ca/38/1/parlbus/ chambus/house/bills/government/C-25/C-25_3/C-25_cover-E.html (accessed 10 October 2005).

[26] Available at http://www.parl.gc.ca/common/Bills_House_Government.asp?Language=E&Parl=38&Ses=1 (accessed 20 July 2005). (hereinafter referred to as Remote Sensing Space Systems Act,) See also, Government of Canada, Department of Foreign Affairs and International Trade, CANADA TABLES LEGISLATION REGULATING REMOTE SENSING SPACE SYSTEMS, News Release (No. 136, 23 November 2004) available at http://w01.international.gc.ca/minpub/Publication.asp?Language=E&publication_id=381804 (accessed 20 July 2005). For legislative history of the Act, see http://www.parl.gc.ca/common/Bills_ls.asp?lang=E&Parl=38&Ses=1&ls=C25&source=Bills_House_Government (accessed 10 October 2005).

[27] Remote Sensing Space Systems Act, subsection 8(1).

time and on reasonable terms, but subject to any conditions relating to national security and foreign affairs interests of Canada.[28]

I believe that the above-mentioned unilateral application of restrictions purely on the basis of exclusive national interests is contrary to the principles of the 1986 UN Resolution on remote sensing and thus would impede non-discriminatory access to any satellite imagery.

IV. The principles relevant to the use of nuclear power sources in outer space

It is well accepted that for "some missions in outer space nuclear power sources are particularly suited or even essential for owing to their compactness, long life and other attributes."[29] But it is considered important that the use of nuclear power sources in outer space should "be based on a thorough safety assessment, including probabilistic risk analysis" and be "reducing the risk of accidental exposure of the public to harmful radiation or radioactive material."[30] Therefore, the United Nations General Assembly adopted in 1992 a resolution[31] containing a set of principles, goals and guidelines to ensure the safe use of nuclear power sources in outer space, particular for the generation of electric power on board space objects for non-propulsive purposes.

The use of nuclear power sources in outer space must be restricted to those space missions that cannot be operated by non-nuclear energy sources in a reasonable way.[32] States launching[33] space objects with nuclear power sources on board are obliged to protect individuals, populations and the biosphere against radiological hazards. Nuclear reactors may be operated (i) on interplanetary missions, (ii) in sufficiently high orbits[34] and (iii) in low-Earth orbits if they are stored in sufficiently high orbits after the operational part of their mission. Nuclear reactors must use only highly enriched uranium 235 as fuel.

A launching State is obliged to ensure that a thorough and comprehensive safety assessment is conducted. The results of such assessment must be made publicly available prior to each launch.[35] Similarly, some specified critical information must be made public in a timely fashion, particularly in the event the space object is malfunctioning with a risk of re-entry of radioactive materials to the Earth. The launching State must also communicate such information to the Secretary-General of the United Nations.[36]

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[28] Ibid, subsection 8(4).
[29] Preamble to *Principles Relevant to the Use of Nuclear Power Sources In Outer Space*, United Nations General Assembly Resolution 47/68, adopted without vote on 14 December 1992.
[30] Ibid.
[31] *Principles Relevant to the Use of Nuclear Power Sources In Outer Space*, United Nations General Assembly Resolution 47/68, adopted without vote on 14 December 1992.
[32] Ibid, Principle 3. Guidelines and criteria for safe use.
[33] Ibid, Principle 2 (1) 1 defines the terms “State launching” and "launching State" as “the State which exercises jurisdiction and control over a space object with nuclear power sources on board at a given point in time relevant to the principle concerned.”
[34] Ibid, Principle 1 (2) (b) defines the term “sufficiently high orbit” as the “one in which the orbital lifetime is long enough to allow for a sufficient decay of the fission products to approximately the activity of the actinides. The sufficiently high orbit must be such that the risks to existing and future outer space missions and of collision with other space objects are kept to a minimum. The necessity for the parts of a destroyed reactor also to attain the required decay time before re-entering the Earth's atmosphere shall be considered in determining the sufficiently high orbit altitude.”
[35] Ibid, Principle 4: Safety assessment.
[36] Ibid, Principle 5: Notification of re-entry.

After re-entry into the Earth's atmosphere of a space object containing a nuclear power source on board and its components, the launching States are obliged to promptly offer and, if requested by the affected State, provide promptly the necessary assistance to eliminate actual and possible harmful effects. In providing the assistance, the special needs of developing countries shall be taken into account.[37]

These Principles are required to be reopened for revision by COPOUS.[38] Pursuant to this requirement, the Committee has been deliberating various issues related to those principles.[39]

The principles seem to have been consistently complied with. For example, the U.S. notified the UN about the launch of Cassini – the spacecraft powered by 33 kilograms of plutonium.[40] Cassini, a joint endeavour of National Aeronautics and Space Administration (NASA), the European Space Agency (ESA) and the Italian Space Agency (ASI), was launched to study Saturn and its magnetic and radiation environment.

V. The principles relating to international cooperation in the exploration and use of outer space for the benefit and in the interest of all States[41]

Particularly with the desire of "facilitating the application of the principle that the exploration and use of outer space, shall be carried out for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development," the United Nations General Assembly, adopted 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.[42] The key points of the principles included in this Declaration are:

> "All States, particularly those with relevant space capabilities and with programmes for the exploration and use of outer space, should contribute to promoting and fostering international cooperation on an equitable and mutually acceptable basis. In this context, particular attention should be given to the benefit and the interests of developing countries and countries with incipient space programmes stemming from such international cooperation conducted with countries with more advanced space capabilities."[43]

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[37] Ibid, Principle 7: Assistance to States.
[38] Ibid, Principle 11: Review and Revision.
[39] *Report of the Scientific and Technical Subcommittee on the Work of its Thirty-first Session*, UN Committee on the Peaceful Uses of Outer Space, UN Document A/AC.105/571 of 10 March 1994, paragraphs 53 *et seq*. Also see Report *of the Scientific and Technical Subcommittee* (of UN Committee on the Peaceful Uses of Outer Space) on its Forty-second Session, held in Vienna from 21 February to 4 March 2005, UN Document A/AC.105/848 of 25 February 2005, paragraphs 108 *et seq*.
[40] *Note verbale dated 2 June 1997 from the Permanent Mission of the United States of America to the United Nations (Vienna) addressed to the Secretary-General*, UN Document A/AC.105/677 of 4 June 1997. Also see, *Cassini Skirts Earth with 33kgs of Plutonium*, available at http://www.spacedaily.com/news/cassini-99c.html (accessed 18 August 1999).
[41] For detailed discussion of this principle, see Thaker, J., "The Development of the Outer Space Benefit Declaration", *Annals of Air and Space Law*, 1997, pp. 537 *et seq.*
[42] 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 without vote as United Nations General Assembly Resolution A/RES/51/122 on 13 December 1996.
[43] Ibid, Principle 3.

"International cooperation, while taking into particular account the needs of developing countries, should aim, *inter alia*, at the following goals, considering their need for technical assistance and rational and efficient allocation of financial and technical resources:

(a) Promoting the development of space science and technology and of its applications;
(b) Fostering the development of relevant and appropriate space capabilities in interested States;
(c) Facilitating the exchange of expertise and technology among States on a mutually acceptable basis."[44]

The principles included in the 1996 Declaration are mere reiterations and some elaborations of the provisions of the Outer Space Treaty, particularly its Article I, para. 1. The language used in the Declaration is such that it does not seem to create any new norm for international cooperation. They do not create an implementable duty to cooperate nor to transfer space technology. States remain "free to determine all aspects of their participation in international cooperation in the exploration and use of outer space."[45] More importantly, the contractual terms of such cooperative ventures need to be fair, reasonable, and respectful to "the legitimate rights and interests of the parties concerned, as, for example, with intellectual property rights."[46] It is, therefore, believed that these principles would unfortunately remain ineffective and un-implemented, at least in the near future.

VI. The principles relating to the prevention of an arms race in outer space (PAROS)

Article IV of the Outer Space Treaty contains a specific prohibition against "placing in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction."[47] However, the Article does not prohibit the military use of outer space *per se*. Neither does it ban anti-satellite (ASAT) or space-based ballistic missile defence (BMD) systems, provided they do not carry 'nuclear weapons' or 'weapons of mass destruction' (WMD). Thus, Article IV is limited in its coverage of nuclear weapons and other WMD in outer space and this gap needs to be filled by a new agreement supplementing the Outer Space Treaty.

The object of the Outer Space Treaty is to assure peaceful uses of outer space for the benefit of all. Excessive militarization that would damage the peaceful utilization of outer space is contrary to the provisions of the Outer Space Treaty. Also, excessive militarization as well as the deployment of space weapons of any kind, would in all likelihood lead to an arms race in outer

[44] Ibid, Principle 5.
[45] Ibid, Principle 2.
[46] Ibid, Principle 2.
[47] Article IV of the Outer Space Treaty provides that: "States Parties to the Treaty undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner. The Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the Moon and other celestial bodies shall also not be prohibited."

space and thus would be contrary to Article III of the Outer Space Treaty as such an arms race would threaten international peace and security as well as international cooperation.[48]

The probability of a space arms race is real; therefore, since 1982, a series of United Nations General Assembly Resolutions on PAROS have been adopted every year. In 2004, member States of the international community overwhelmingly reaffirmed the provisions of Articles III and IV of the Treaty and urged all States to strive to prevent an arms race in outer space, to maintain international peace and security and to promote international cooperation.[49] The Resolution recognized that "prevention of an arms race in outer space would avert a grave danger for international peace and security."[50] The United Nations General Assembly called upon "all States, in particular those with major space capabilities, to contribute actively to the objective of the peaceful use of outer space and of the prevention of an arms race in outer space and to refrain from actions contrary to that objective and to the relevant existing treaties in the interest of maintaining international peace and security and promoting international cooperation."[51] In 2004, the representative of Sri Lanka to the First Committee of the United Nations General Assembly Stated that, "the annual presentation of the PAROS resolution in the First Committee and the almost universal endorsement of its principles... has had the salutary effect of according to these objectives the status of customary law."[52]

The standard annual PAROS Resolution was again presented in November 2005 in the First Committee of the United Nations General Assembly.[53] The Resolution has been adopted and the result of voting indicated 160 States in favour, with Israel abstaining (as it has done every year) and the U.S. voting against it.[54]

Currently, as far as is known, there are no weapons in outer space. However, one State seems to be determined to develop and possibly use space weapons. Thus, the principles included in the PAROS resolutions would obviously remain unimplemented and ineffective, unless all States refrain from deploying all kinds of weapons in outer space.

VII. The principle condemning propaganda for threat or breach of international peace

The last but not the least principle is the one that condemns propaganda for threat or breach of international peace. The United Nations General Assembly in its Resolution 110 (II) of 3 November 1947, condemned propaganda designed or likely to provoke or encourage any threat to the peace, breach of the peace or act of aggression. This resolution has been referred to in the Preamble of the Outer Space Treaty and is considered applicable to outer space.

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[48] Article III of the Outer Space Treaty provides that "States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding."

[49] United Nations General Assembly, Prevention of an arms race in outer space, resolution A/RES/59/65 adopted on 17 December 2004 by 178 votes in favour, none against and with 4 abstentions (i.e., Haiti, Israel, Palau and the United States).

[50] United Nations General Assembly, Prevention of an arms race in outer space, resolution A/RES/59/65 adopted on 17 December 2004 by 178 votes in favour, none against and with 4 abstentions (i.e., Haiti, Israel, Palau and the United States).

[51] Ibid.

[52] Cited from http://www.reachingcriticalwill.org/political/1com/FCM05/week5.html#4 (accessed 17 November 2005).

[53] United Nations General Assembly, First Committee, sixtieth session, Agenda item 96, Prevention of an arms race in outer space, UN Document A/C.1/60/L-27 of 12 October 2005.

[54] http://www.reachingcriticalwill.org/political/1com/FCM05/week5.html#4 (accessed 17 November 2005).

Similar provisions of international law are contained in the 1936 Broadcasting Convention.[55] Article 1 of the Treaty provides that:

> "The High Contracting Parties mutually undertake to prohibit and, if occasion arises, to stop without delay the broadcasting within their respective territories of any transmission which to the detriment of good international understanding is of such a character as to incite the population of any territory to acts incompatible with the internal order or the security of a territory of a High Contracting Party."

In addition, Article 2 of the Treaty prohibits broadcasting, which constitutes, or is likely to lead to, an incitement to war against another Contracting State.

Currently there are only about 60 States Parties to the Convention. While the People's Republic of China and the U.S. never became Parties to the Convention, France and the United Kingdom withdrew from this treaty in the early 1980s. If such is the position on an international treaty of the four permanent members States of the UN Security Council, it should not be difficult to imagine their passive or even negative attitude towards the principle that condemns propaganda for threat or breach of international peace as specified in the UN Resolution 110 (II).

Concluding remarks

This brief description of some of the most relevant UN principles on outer space indicates that they have generally been based on the concept of fair balance of interests of all the negotiating States. However, they have mostly been drafted in broad terms and without any specific commitments. Wherever one finds in these principles precise obligations, unfortunately some States do not fully respect them, even those that are considered to have become customary international law. Unilateral and exclusive space policies pursued and activities undertaken by such States are being rationalized with unfettered freedom of use, without due regard to the corresponding interests of other States, and thus undermining the importance and value of several important UN principles on outer space.

The need and process of negotiating principles through the UN should not be considered totally unnecessary. I believe that they provide useful avenues and tools for exchanging views and coming to consensus on important issues. However, what is required is sincere allegiance on the part of the States to fulfil their commitments under the UN Resolutions in good faith. They should also consider such commitments as foundations to be transformed into international treaties in order to further develop and strengthen the legal order of outer space. More importantly, if member States of COPUOS believe that some other States have been acting contrary to the UN principles on outer space, they must consistently voice their concerns so that the actions of the latter are not considered to have gained approval by acquiescence or silence on the part of the former.

[55] *International Convention concerning the Use of Broadcasting in the Cause of Peace*, signed in Geneva on 23 September 1936, entered into force on 2 April 1938. The text of the Treaty and list of Parties are available at http://untreaty.un.org/ENGLISH/bible/englishinternetbible/partII/treaty-1.asp (accessed 10 March 2005).

United Nations Principles on Outer Space

by

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Introduction

In addition to five major international treaties, the fundamental principles relating to outer space can be found in several resolutions adopted through the United Nations General Assembly. In this presentation, I intend to briefly describe only those principles that have not been included in these treaties. Some of them are:

- The principles governing the use of satellites for international TV broadcast,
- The principle of universal access to satellite telecommunication services,
- The principles governing satellite remote sensing activities,
- The principles relevant to use of nuclear power sources in outer space,
- The principles relating to international cooperation in the exploration and use of outer space for the benefit and in the interest of all states,
- The principles relating to the prevention of an arms race in outer space (PAROS), and
- The principle condemning propaganda for threat or breach of international peace.

These principles are described here with a view to assess their importance and role in regulating the international behavior of States in the conduct of their respective outer space activities.

1. The principles governing the use of satellites for international TV broadcast

- Control of flow of information has always been highly political

- Direct broadcasting by satellite (DBS), has been controversial as the 'have not' States and others feared that this technology would possibly erode their cultures and economies.

- The 'prior consent' argument has essentially been based on the principle of State sovereignty under which a State has exclusive right to control the flow of information on its territory.

- On the other hand, some States have been arguing that there should not be any requirement of 'prior consent', because the principle of freedom of broadcasting has been well-recognized globally. This principle, in their view, is based on the 1948 Universal Declaration of Human Rights and other human rights conventions.

- In 1982, the UN General Assembly adopted a Resolution on Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting.

- The most important and relevant principles of the Resolution are included in its following paragraphs:

- “13. A State which intends to establish or authorize the establishment of an international direct television broadcasting satellite service shall without delay notify the proposed receiving State or States of such intention and shall promptly enter into consultation with any of those States which so requests.

- 14. An international direct television broadcasting satellite service shall only be established after the conditions set forth in paragraph 13 above have been met and on the basis of agreements and/or arrangements in conformity with the relevant instruments of the International Telecommunication Union and in accordance with these principles.

- 15. With respect to the unavoidable over-spill of the radiation of the satellite signal, the relevant instruments of the International Telecommunication Union shall be exclusively applicable.”

The Resolution tends to support the requirement of prior consent. However, the following two points need to be noted; i.e.:

- **(1) This Resolution was a result of over two decades of discussions in the COPUOS, which could not resolve the issue on a consensus basis and the final decision had to be made by the UNGA by a majority vote. Most of the Western countries either voted against or abstained from voting; and**

- **(2) Normally, all resolutions of the UN General Assembly, except for internal purposes, are considered non-binding instruments; though when adopted unanimously they could become a basis for the development of customary international law.**

- **There has not been any acquiescence or tacit agreement on the freedom of broadcasting by satellite. This position is supported by the 1972 UNESCO Declaration Satellite Broadcasting and the ITU Frequency Allotment Plans for DBS. More importantly, the ITU Radio Regulations have the effect that no international DBS service could be started without the consent of the receiving State. For example, Radio Regulation no. 2674, which was adopted in 1971, specifies that:**

- “In devising the characteristics of a space station in the broadcasting-satellite service, all technical means available shall be used to reduce, to the maximum the radiation over the territory of other countries unless an agreement has been previously reached with such countries."

- Therefore, it can be said that the 1982 Resolution though not *per se*, but with the support of the ITU Regulations, entitles each State, if it chooses to exercise, the right to object to any unwanted foreign satellite broadcasts beamed to its territory without its consent.

- Recently, several satellite operators have stated using medium-powered telecommunication satellites for TV transmissions and thus defeating the original aim of ‘prior consent’ for direct television satellite broadcasting.

- In my opinion, the use of ‘medium powered telecommunication satellites for TV transmissions’ is not only contrary to the 1982 UN Resolution on direct television satellite broadcasting but also is illegal as it violates international Radio Regulations. Thus, the objecting State is entitled to take any peaceful action, which it considers appropriate, against the State of registration of such a satellite.

2. The principle of universal access to satellite telecommunication services

- In 1961, the UN General Assembly under its Resolution 1721 (D) unanimously declared 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”. Its first implementation was effected through INTELSAT Agreements. After reiterating the UNGA Resolution 1721(D) in its Preamble, the INTELSAT Agreement specified that “satellite telecommunications should be organized in such a way as to permit all peoples to have access to the global satellite system”. Moreover, INTELSAT’s prime objective had been designed to provide “international public telecommunications services of high quality and reliability to be available on a non-discriminatory basis to all areas of the world.”

- Similar provisions had been made in the INMARSAT Convention with respect to a global and non-discriminatory access to its space segment and non-discriminatory nature of charges for its services.

- In fact, this principle of universal access to telecommunications services resulted in providing services to almost all countries of the world, and has been particularly beneficial to developing countries that did not have the need or means to establish their own satellite systems.

- However, non-discriminatory universal access to space for telecommunication services has been recently compromised by privatizing both INTELSAT and INMARSAT. Francis Lyall correctly pointed out that, the privatization of INTELSAT, especially the way it has been achieved, is “an unwelcome development and indeed arguably contrary to Article I of the Outer Space Treaty” as well as UN Resolution 1721 (D).

- The privatized INTELSAT is not under any legal obligation to provide non-discriminatory universal access to its services and now could be subjected to occasional national legal and policy actions like sanctions against certain counties; thus deny services to them.

- Therefore, as a result of privatization of INTELSAT, a good number of countries, especially in the third world, would not have access to satellite telecommunications on a non-discriminatory and universal basis.

3. The principles governing satellite remote sensing activities

- There were two opposing views:
- the first view was presented by the States (i.e. the US and some other developed countries) that advocated unrestricted use of satellites for remote sensing and freedom of distribution of satellite imagery.
- The second view, advanced by the developing, socialist and some developed countries, stressed that the acquisition and distribution of the satellite imagery must be governed by the principle of State sovereignty. Thus, they advocated the need of prior consent of the sensed State for acquisition and distribution of satellite imagery.
- Since outer space has been declared free for exploration and use by all States, the use of satellites for remote sensing has not been seriously questioned. It can be said that no prior consent is legally required to carry out remote sensing activities.
- However, the reception, processing and distribution of the data acquired by remote sensing are essentially earth-based activities; thus main focus of the discussion has been on the distribution of data.

- In 1986, a compromise was achieved when the UN General Assembly adopted unanimously a Resolution containing the Principles Relating to Remote Sensing of the Earth from Outer Space. Under this Resolution, as stated in Principle XII, the developing countries (and several socialist and developed countries) gave up their demand for prior consent in exchange for the recognition of the right of the sensed State to have access to the primary data and the processed data concerning its territory "on a non-discriminatory basis and on reasonable cost terms". The sensed State has also been entitled to have access to the available analyzed information concerning its territory "on the same basis and terms, taking particularly into account the needs and interests of the developing countries." The Resolution clearly establishes a balance of interests.

- Principle XII, with its mandatory wording, clearly recognizes the legal right of the sensed State to seek from the sensing State satellite imagery of its own territory. It is expected of the sensing State(s) to positively respond to the requests by the sensed States for satellite imagery of their respective territories. A denial of such a request would be considered contrary to the provisions of the 1986 Resolution, particularly its Principle XII.

- Unfortunately, the States, which had advocated the freedom of acquisition and non-discriminatory dissemination of satellite imagery, have started imposing detailed, complex and extensive national legal prohibitions on the collection and distribution of such imagery. For example, under the U.S. law a licensee of a private Earth remote sensing satellite system is obliged to make available to any sensed Stated only un-enhanced data and that too subject to the "US national security concerns, foreign policy or international obligations".

- The U.S. Law will have an extensive extraterritorial application with respect to the distribution of satellite imagery by all foreign operators that have any link with the U.S. Moreover, other States could also be expected to follow a similar approach in the future.

- Canada is already committed to follow the American. On 5th October 2005, the House of Commons of the Canadian Parliament passed a Bill known as An Act Governing the Operation of Remote Sensing Space Systems. Once passed by the Canadian Senate and proclaimed as an Act, it will have the effects similar to those under the American law. The Minister of Foreign Affairs may issue a license, renew or amend a license, but may impose conditions that the Minister considers appropriate. One of these conditions, as specified in the Act, may include that raw data and remote sensing products from the system about the territory of any country be made available to the government of that country within a reasonable time and on reasonable terms, but subject to any conditions relating to national security and foreign affairs interests of Canada.

- I believe that any unilateral application of arbitrary restrictions purely on the basis of exclusive national interests is contrary to the principles of the 1986 UN Resolution on Remote Sensing and will seriously impede non-discriminatory access to any satellite imagery.

4. The principles relevant to use of nuclear power sources in outer space

- It is well-recognized that "some missions in outer space nuclear power sources are particularly suited or even essential owing to their compactness, long life and other attributes." But it was considered important that the use of nuclear power sources in outer space should "be based on a thorough safety assessment, including probabilistic risk analysis" and be "reducing the risk of accidental exposure of the public to harmful radiation or radioactive material." Therefore, the UN General Assembly adopted in 1992 a Resolution containing a set of principles, goals and guidelines to ensure the safe use of nuclear power sources in outer space, particular for the generation of electric power on board space objects for non-propulsive purposes.

- The use of nuclear power sources in outer space must be restricted to those space missions which cannot be operated by non-nuclear energy sources in a reasonable way. States launching space objects with nuclear power sources on board is obliged to protect individuals, populations and the biosphere against radiological hazards. Nuclear reactors may be operated (i) on interplanetary missions, (ii) in sufficiently high orbits, and (iii) in low-Earth orbits if they are stored in sufficiently high orbits after the operational part of their mission. Nuclear reactors must use only highly enriched uranium 235 as fuel.

- A launching State is obliged to ensure that a thorough and comprehensive safety assessment is conducted. The results of such assessment must be made publicly available prior to each launch. Similarly, critical information must be made public, particularly in the event the space object is malfunctioning with a risk of re-entry to the Earth. The launching State must also send such information to the UN Secretary-General.

- After re-entry into the Earth's atmosphere of a space object with a nuclear power source, the launching States are obliged to promptly offer and provide promptly the necessary assistance to eliminate harmful effects. In providing the assistance, the special needs of developing countries must be taken into account.

- These Principles are required to be reopened for revision by the COPOUS. Pursuant to this requirement, the Committee has been deliberating various issues related to these principles.

- These principles seem to have been consistently complied with. For example, the U.S. notified the UN about the launch of Cassini – the spacecraft powered by 33 kilograms of plutonium.

5. <u>The principles relating to international cooperation in the exploration and use of outer space for the benefit and in the interest of all states</u>

- Particularly with the desire of “facilitating the application of the principle that the exploration and use of outer space,….. shall be carried out for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development,” the UN General Assembly, adopted the <u>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</u>. The key points of the principles included in this Declaration are:

- “All States, particularly those with relevant space capabilities and with programmes for the exploration and use of outer space, should contribute to promoting and fostering international cooperation on an equitable and mutually acceptable basis. In this context, particular attention should be given to the benefit and the interests of developing countries and countries with incipient space programmes stemming from such international cooperation conducted with countries with more advanced space capabilities.”

- “International cooperation, while taking into particular account the needs of developing countries, should aim, *inter alia*, at the following goals, considering their need for technical assistance and rational and efficient allocation of financial and technical resources:

(a) Promoting the development of space science and technology and of its applications;

(b) Fostering the development of relevant and appropriate space capabilities in interested States;

(c) Facilitating the exchange of expertise and technology among States on a mutually acceptable basis.”

- The principles included in the 1996 Declaration are mere reiterations and some elaborations of the provisions of the Outer Space Treaty, particularly its Article I, para. 1. The language used in the Declaration is such that it does not seem to create any new norm for international cooperation. They do not create an implementable duty to cooperate nor to transfer space technology. States remain “free to determine all aspects of their participation in international cooperation in the exploration and use of outer space.” More importantly, the contractual terms of such cooperative ventures need to be fair and reasonable and respectful to “the legitimate rights and interests of the parties concerned, as, for example, with intellectual property rights.” It is not difficult to imagine that these principles would remain ineffective and un-implemental.

6. The principles relating to the prevention of an arms race in outer space (PAROS)

- Article IV of the Outer Space Treaty contains a specific prohibition against “placing in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction.” However, the Article does not prohibit the military use of outer space per se. Neither does it ban anti-satellite (ASAT) or space-based ballistic missile defense (BMD) systems, provided they do not carry ‘nuclear weapons’ or ‘weapons of mass destruction.’

- Article IV was designed to be limited in its coverage of nuclear weapons and other WMD in outer space and thus its lacunae need to be filled by a new agreement to supplement the Outer Space Treaty. At the same time the object of the Treaty has been to assure peaceful uses of outer space for the benefit of all and extreme militarization that would damage the peaceful utilization of outer space is contrary to the provisions of the Outer Space Treaty. Also, excessive militarization as well as the deployment of space weapons of any kind, would in all likelihood lead to an arms race in outer space and thus would be contrary to Article III of the Outer Space Treaty as such an arms race would threaten international peace and security as well as international cooperation.

- The probability of a space arms race is real and imminent. The development and eventual deployment of an American BMD system or offensive space weapons would create more international tensions because it is highly unlikely that the two major space powers that the U.S. sees as its principal potential adversaries, Russia and China, will let American space 'dominance' develop unchallenged. Therefore, since 1982, a series of UN General Assembly Resolutions on PAROS have been adopted every year. In 2004, member States of the international community overwhelmingly reaffirmed the provisions of Articles III and IV of the Treaty and urged all States to strive to prevent an arms race in outer space, to maintain international peace and security and to promote international cooperation. The Resolution recognized that "prevention of an arms race in outer space would avert a grave danger for international peace and security." The General Assembly called upon "all States, in particular those with major space capabilities, to contribute actively to the objective of the peaceful use of outer space and of the prevention of an arms race in outer space and to refrain from actions contrary to that objective and to the relevant existing treaties in the interest of maintaining international peace and security and promoting international cooperation."

- The standard PAROS Resolution was again presented this month in the First Committee of the UN General Assembly. It is learned that a few days ago the Resolution has been adopted and the result of voting indicated 160 States in favor, with Israel abstaining (as it has done every year) and the U.S. voting against it.

- Currently, as far as is known, there are no weapons in outer space. However, the current American Government is of the opinion that international law contains no prohibition against using conventional weapons in space or applying force from space. The U.S. therefore seems determined to develop and use weapons in and from outer space for fighting earthly wars, dominance, and control. Thus the principles included in the PAROS Resolutions would obviously remain unimplemented and ineffective.

7. The principle condemning propaganda for threat or breach of international peace

- The last but not the least principle is the one which condemns propaganda for threat or breach of international peace. The UN General Assembly in its Resolution 110 (II) of 3 November 1947, condemned propaganda designed or likely to provoke or encourage any threat to the peace, breach of the peace or act of aggression. This Resolution has been referred to in the Preamble of the Outer Space Treaty and is considered applicable to outer space.

- Similar provisions of international law are contained in the 1936 Broadcasting Convention. Article 1 of the Treaty provides that:

- "The High Contracting Parties mutually undertake to prohibit and, if occasion arises, to stop without delay the broadcasting within their respective territories of any transmission which to the detriment of good international understanding is of such a character as to incite the population of any territory to acts incompatible with the internal order or the security of a territory of a High Contracting Party."

- Similarly Article 2 of the Treaty prohibits broadcasting, which constitutes, or is likely to lead to, an incitement to war against another Contracting State.

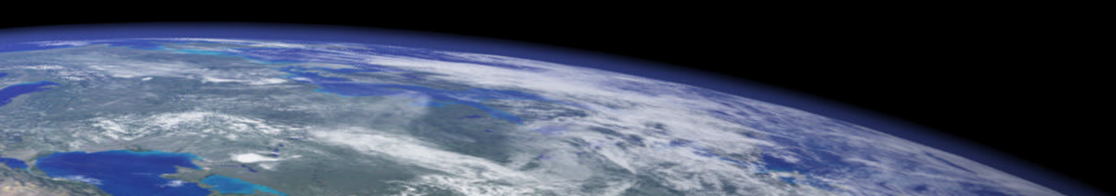
- Currently there are only about 60 States Parties to the Convention. While the Peoples' Republic of China and the U.S. never became Parties to the Convention, France and the United Kingdom have withdrawn from this treaty in early 1980s. If such is the position on an international treaty of the four permanent members of the UN Security Council, it should not be difficult to imagine their passive or even negative attitude towards the principle that condemns propaganda for threat or breach of international peace as specified in the UN Resolution 110 (II).

Concluding remarks

- This brief description of some of the most relevant UN principles on outer space indicates that they are based on fair balance of interests all negotiating States. However, generally they have been drafted in broad terms and without any specific commitments. Wherever one finds in these principles precise obligations, unfortunately some States do not fully respected them. This should not be surprising as we witness now-a-days that some States behave in such a manner as if they are either above or outside the law. If such States do not fully respect their obligations under the binding international treaties, how can one expect them to fulfill their commitments under the UN Resolutions? Unilateral and exclusive space policies pursued and activities undertaken by such States are being rationalized with unfettered freedom of use, without due regard to the corresponding interests of other States.

- However, the need and process of negotiating principles though the UN should not be considered totally unnecessary. I believe that they provide useful avenue and tools for exchanging views and coming to consensus on important issues. But what is required is sincere allegiance on the part of the respective States to fulfill their commitments under the UN Resolutions in good faith. They should also consider such commitments as foundations to be transformed into international treaties in order to further develop legal order of outer space. More importantly, the States Members of the COPUOS that believe that some others States have been acting contrary to the UN principles on outer space must consistently voice their concerns in as strong as possible terms so the actions of the latter are considered to have gained approval by acquiesce or silence on the part of the former.

Overview of the work of the Legal Subcommittee and the United Nations Register on Objects Launched into Outer Space



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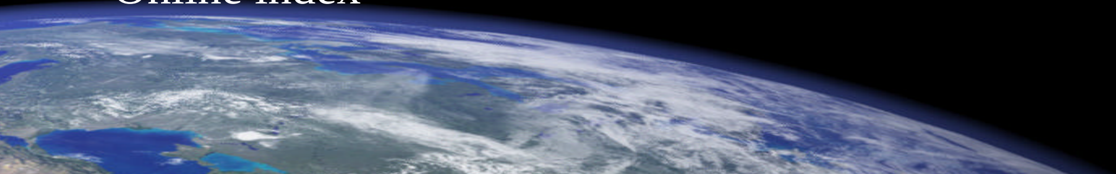

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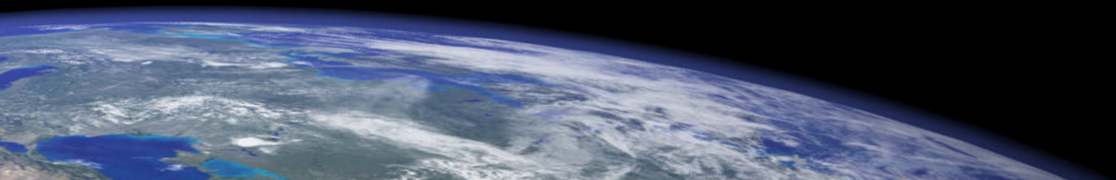

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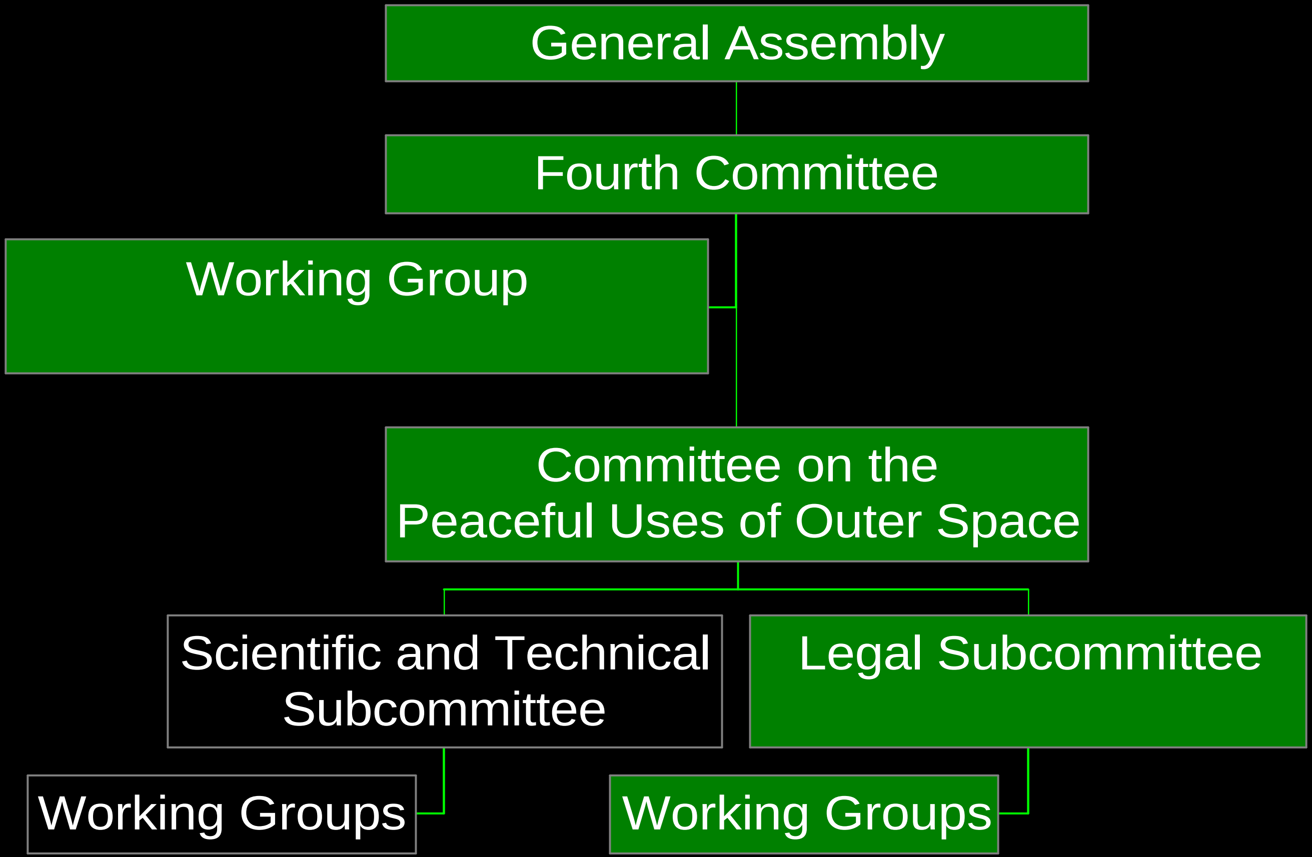
Establishment of Legal Subcommittee

- 1962
- To consider many specific proposals and suggestions concerning ….legal studies made by members of the Committee for the development of international cooperation in the field of space exploration for peaceful purposes

Introduction (cont.)
Reporting Channels



Introduction (cont.)
Reports and Documents

Document Series

- General Distribution
  - (A/AC.105/xxx)
- Limited Distribution (working papers, draft documents)
  - (A/AC.105/C.2/L.xxx)
- Conference Room Papers
  - (A/AC.105/C.2/2005/CRP.xx)

Report Terminology

Agreement of 1978

✓ "View was expressed", "Some delegations expressed the view", "Other delegations"

✗ "few", "a number", " certain", "several", "many", "most"

Legal Subcommittee
Basic facts

Chairman

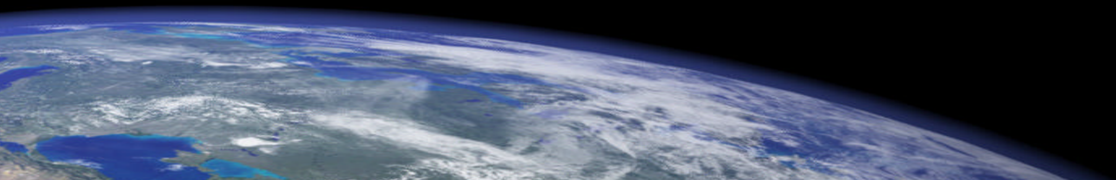
- 2004-2005 Sergio Marchisio (Italy)
- 2006-2007 Raimundo Gonzalez Aninat (Chile)
- 2008-2009 Group of Eastern European States

Last meeting

- 4-15 April 2005
- Forty-fourth session

Next meeting

- 3-13 April 2006
- Forty-fifth session



Agenda Structure of the Legal Subcommittee

- 1999 Agreement
  - Regular items
  - Single issue/items for discussion
  - Work Plans
  - New agenda items

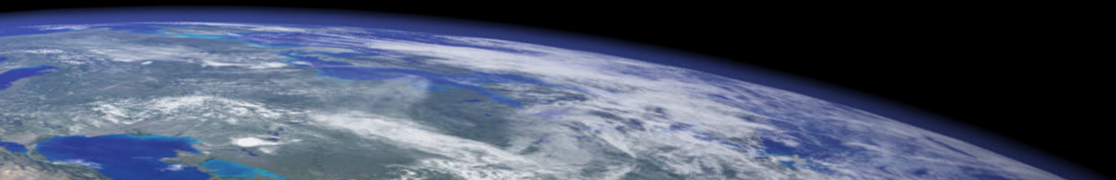
Work of the Legal Subcommittee in 2005
Regular items

- **Regular items**
  - Status and application of treaties
  - Space law activities of international organizations
  - Definition & delimitation of outer space & geostationary orbit
    - Working Group only on definition and delimitation of outer space

Work of the Legal Subcommittee in 2005
Single issue/items for discussion

- Revision Nuclear Power Principles
  - Monitoring the work being conducted under Scientific and Technical Subcommittee

- Space Assets Protocol
  - Supervisory authority
  - relationship between the terms of the future protocol and the rights and obligations of States under the legal regime applicable to outer space



Work of the Legal Subcommittee in 2005
Work Plans

- **Registration Practice of States and International Organizations**
  - **4 year work plan (2004-2007)**
  - New working group established in 2005
  - Working Group expected to to identify common practices and drafting of recommendations for enhancing adherence to the Registration Convention
    - In that context expected to discuss the following issues:

      (a) Harmonization of practices (administrative and practical)

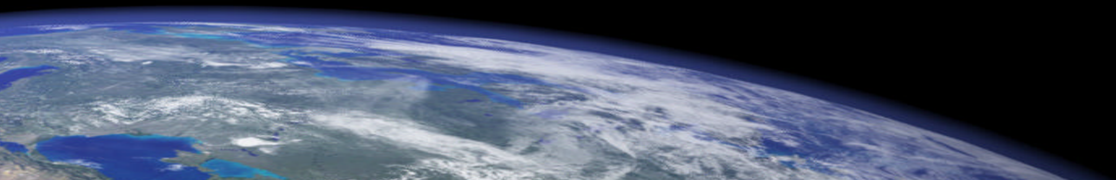
      (b) Non-registration of space objects

      (c) Practice with regard to transfer of ownership of space objects in orbit

      (d) Practice with regard to registration/non-registration of “foreign” space objects

Work of the Legal Subcommittee in 2005
New agenda items

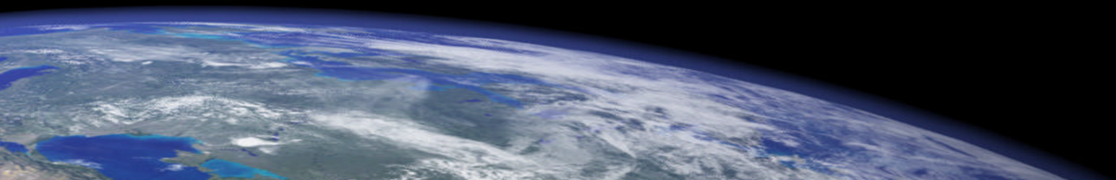
- No consensus on inclusion of new agenda items
- Consensus agreement to reformulate the title of the item relating the space assets protocol to “Examination and review of the development concerning the draft protocol on matters specific to space assets”



Work of the Legal Subcommittee in 2006

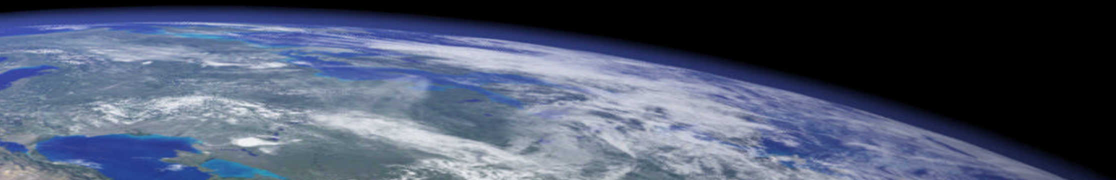
- **Regular items**
  - Status and application of treaties
  - Space law activities of international organizations
  - Definition & delimitation of outer space & geostationary orbit
- **Single issue/items for discussion**
  - Revision Nuclear Power Principles
  - Examination and review of the development concerning the draft protocol on matters specific to space assets
- **Work Plans**
  - **Registration Practice of States and International Organizations**
- **New agenda items**

The United Nations Register of Objects Launched into Outer Space



Introduction

- Two separate, yet complementary registers on objects launched into outer space
  - Register established in accordance with Resolution 1721 B (XVI)
    - Established in 1961
  - Register established in accordance with the United Nations Register of Objects Launched into Outer Space
    - Established in 1976
    - Supersedes the resolution 1721 B (XVI) Register

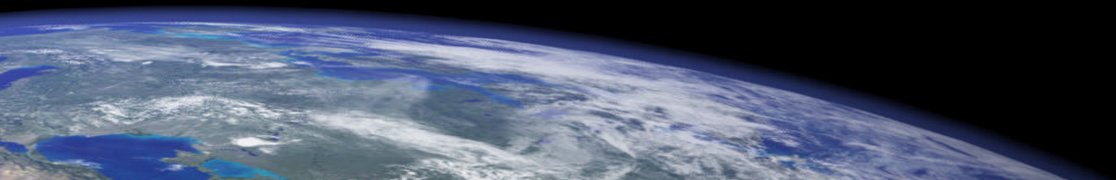


Resolution 1721 B (XVI) Register
Basic facts

- Still used to disseminate information received from Member States who are not party to the Registration Convention.

- As at 1 November 2005
  - 411 documents have been issued
  - Contains registration data on nearly 6,000 space objects

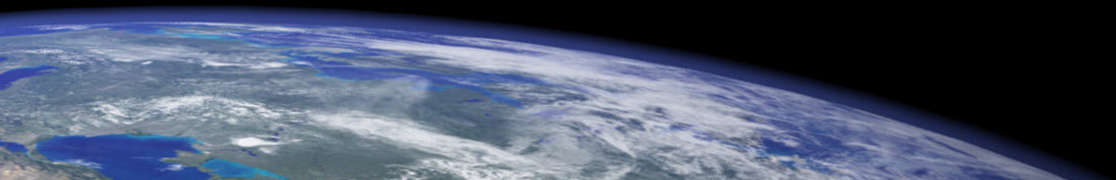
- Voluntary registration information has been provided by Algeria, Brazil, Israel, Italy, Luxembourg, Malaysia, Nigeria, the Philippines, and Turkey



Convention Register
Basic facts

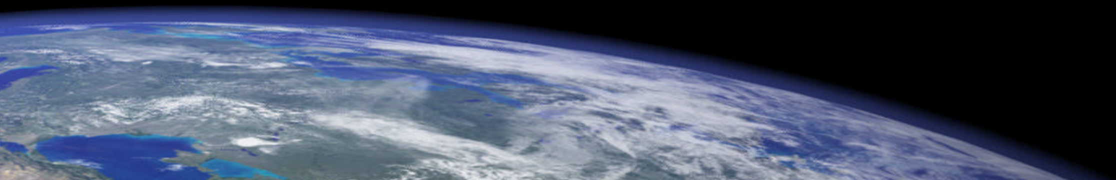
- Established at the Office for Outer Space Affairs on behalf of the Secretary General
  - first document ST/SG/SER.E/1 issued on 14 April 1977.

- As at 1 November 2005
  - 482 documents have been issued
  - Contains registration data on over 7,250 space objects under the Registration Convention.



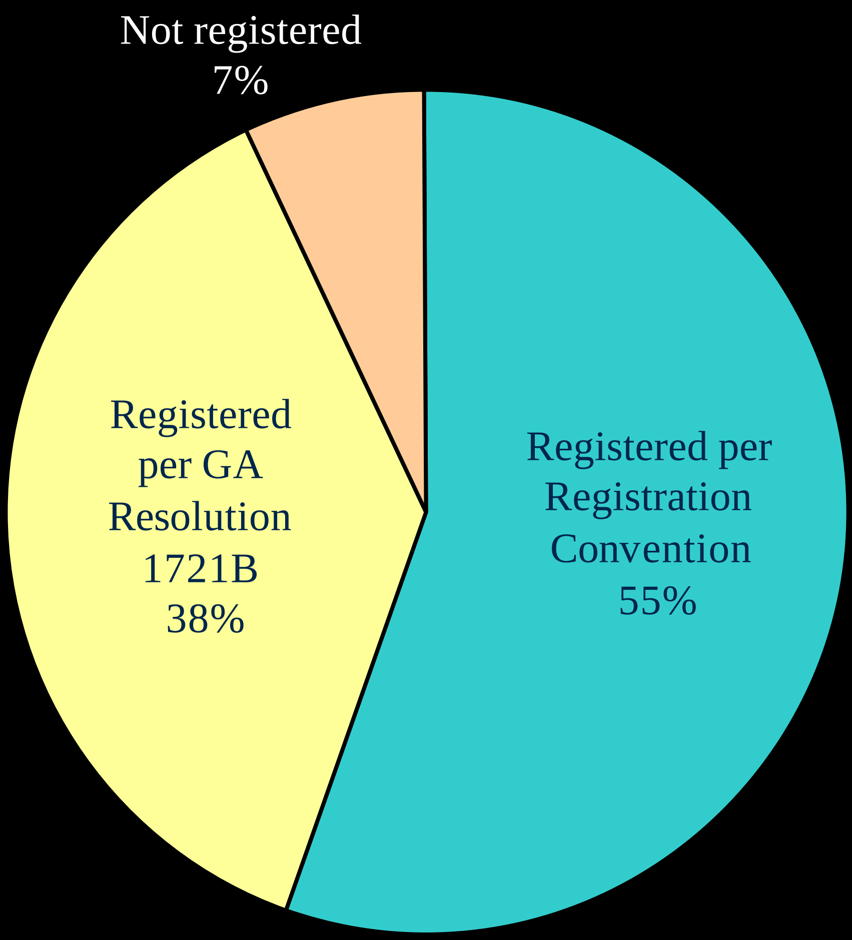
Registration of Objects Launched into Outer Space
Basic overall facts

- All registration information received (under both registers) is maintained by the Office
  - in printed form
    - INF series (for voluntary registration under resolution 1721 B)
    - SER series (for registration in accordance with Convention)
  - electronic form
    - Online index
- Updated on a regular basis
- Total number of space objects recorded in the Registers as at 1 November 2005
  - Approximately 12,300 (figure includes duplicate registrations and functional and non-functional objects)
  - About 6,000 are still orbiting around the Earth



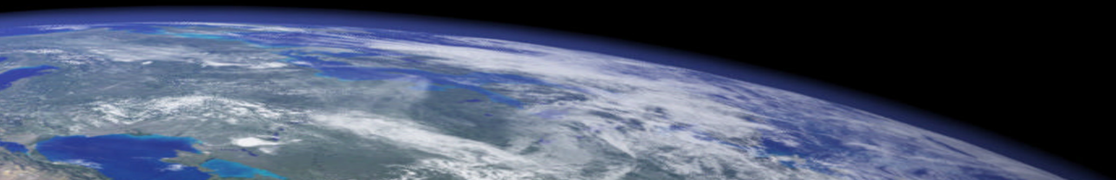
Registration of Objects Launched into Outer Space
Basic overall facts

Between the two registers, 93% of all functional space objects have been registered.



Box-score of functional and non-functional objects registered in accordance with the Registration Convention and GA resolution 1721B (as of 1 November 2005)

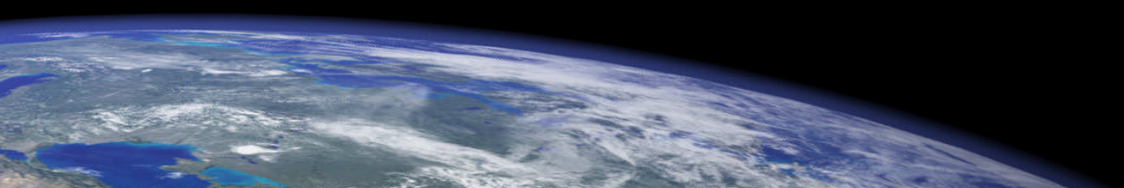
State of Registry	Number of registered space objects	State of Registry	Number of registered space objects
Algeria (voluntary registration)	1	Japan	95
Argentina	5	Korea, Republic of	8
Australia	7	Luxembourg (voluntary registration)	8
Brazil (voluntary registration)	2	Malaysia (voluntary registration)	3
Canada	11	Mexico	2
Chile	1	Nigeria (voluntary registration)	1
China	85	Pakistan	1
Czech Republic (incl. Czechoslovakia)	6	Philippines (voluntary registration)	1



Box-score of functional and non-functional objects registered in accordance with the Registration Convention and GA resolution 1721B (as of 1 November 2005)

State of Registry	Number of registered space objects	State of Registry	Number of registered space objects
ESA	45	Russian Federation (including USSR)	3,176
EUMETSAT	2	Spain	6
France*	535	Sweden	10
Germany	28	Turkey (voluntary registration)	1
Greece	1	Ukraine	3
India*	45	United Arab Emirates	2
Israel (voluntary registration)	2	United Kingdom	29
Italy (voluntary registration)	11	United States of America*	8,134

*** Parties who provide registration data on non-functional objects**



Convention Register
Main Functions

- "make provision for the national registration by launching States of objects launched into outer space"
- serve as a "central register" of objects launched into outer space
- "provide for State parties additional means and procedures to assist in the identification of space objects"

Convention Register
Required information

- Information to be furnished to the United Nations by parties to the Registration Convention (Article IV para.2):
    - (a) name of launching State or States;
    - (b) an appropriate designator of the space object or its registration number;
    - (c) date and territory or location of launch;
    - (d) basic orbital parameters, including:
        - (i) nodal period;
        - (ii) inclination;
        - (iii) apogee;
        - (iv) perigee;
    - (e) general function of the space object

Convention Register
Required information (cont.)

- Article IV, para.3 requires
  - "[e]ach State of registry shall notify the Secretary-General of the United Nations, to the greatest extent feasible and as soon as practicable, of space objects concerning which it has previously transmitted information, and which have been but no longer are in earth orbit"

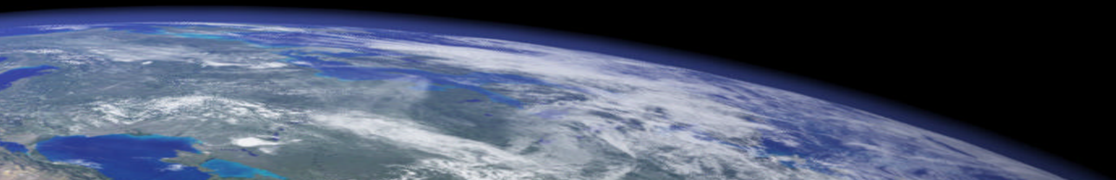
Convention Register
Additional information

Some Parties to the Convention also provide the following additional information

- GSO location (where appropriate)
- Date of decay/reentry of the space object
- Lifetime expectancy of space object
- Notification that the object is no longer functional or has been placed in a disposal orbit (usually applies to GSO satellites)

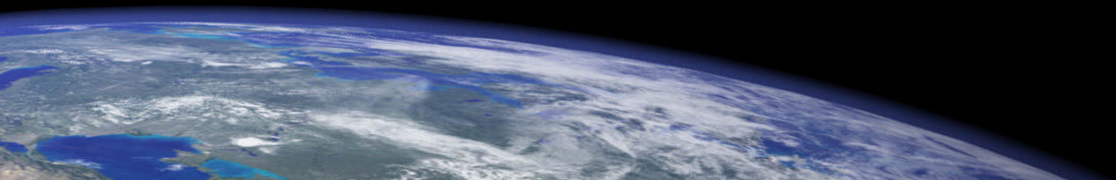
Convention Register
Mechanism for submitting registration information

- Through your Government's Permanent Missions accredited to the UN
  - How?
    - Note Verbale or Letter addressed to the Secretary-General
    - In addition Office welcomes submission of information in electronic format to facilitate processing (ie. MS Word file)
  - Information received is disseminated as a document in the ST/SG/SER.E/ series.



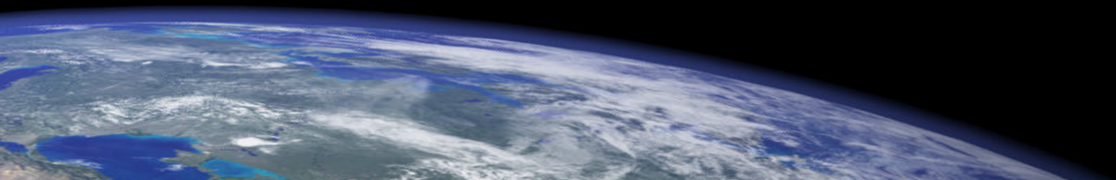
Online Index of Objects Launched into Outer Space

- Web-database containing information received from Member States and also complementary information collected from external sources on all functional objects launched into outer space since 1957.
- Space debris and non-functional objects are not included.
- Search could be performed using different parameters (name, international designator, launching State, date of launch, orbital status, etc.)
- Provides links between space objects and their relevant documents of registration. This way, every user can download and print any registration document.
- Also provides links to additional information transmitted to the UN
  - (ie. Information provided under NPS Principles)
- Can be access through the UNOOSA website: http://www.unoosa.org/oosa/osoindex.html



More information available on:

www.unoosa.org



Benefits of becoming party to the Treaties and conducting activities in accordance with the Principles

Panel Discussion

Maurice N. Andem
Professor
Director, Institute of Air and Space Law, University of Lapland, Rovaniemi, Finland

The 1967 Outer Space Treaty: A Brief Reflection

Introduction

With regard to the theme of this United Nations/Nigeria Space Law Workshop and of this session, I will focus my comments on the 1967 Outer Space Treaty (1967 OST). However, considering that a lot has been written on the 1967 Space Treaty, I will try to be very brief in my reflection. [1]

I. Outer Space Treaties

International treaties are the most important sources of contemporary international law, including all its various branches. They are the most important forms of expressing the concurrent and compromising will (consent) of the subjects of international law (States and international organizations) in the course of their co-operative efforts and mutual intercourse in international relations. [2] Furthermore, they are the most effective and efficient legal instruments by which States and other subjects of international law acquire rights and enter into obligations in their mutual relations, either bilaterally or multilaterally. Thus, it is the principal method or technique in the progressive development of international law and its codification.

The first international treaty of general application concerning outer space, besides the UN Charter, is the 1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water (NTBT). It was opened for signature in Moscow on 5 August 1963 and entered into legal force on 10 October 1963.[3] The NTBT attempts to demilitarise outer space, including the Moon and other celestial bodies - thus making this domain of mankind's activities a zone of peace and international co-operation. It is, moreover, encouraging to note that its

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[1] See, for example, Proceedings of the Fortieth Colloquium on the Law of Outer Space, Turin (1997), pp.291-419; Zhukov, G., and Kolosov, Y., International Space Law, Praeger Publishers, New York (1984), pp. 33-84; Diederiks-Vereschoor, I. H. Ph., An Introduction To Space Law, 2nd Revised Edition, Kluwer Law Internation, The Hague (1999), pp. 26-33; Cheng, Bin, Studies In International Space Law, Clarendon Press, Oxford (1997), pp. 215-264; Christol, Carl Q., The Modern International Law of Outer Space, Pergamon Press, New York (1982), pp.20-58; Andem, Maurice N., "United Nations Institutional Functioning with respect to space activities" in PROCEEDINGS "THIRD ECSL SUMMER COURSE ON SPACE LAW AND POLICY", University of Granada, Spain, September 5-September 15, 1994, pp. 29-72.

[2] Article 2, 1(a) of the 1969 Vienna Convention on the Law of Treaties (VCLT) defines a treaty as:"an international agreement concluded between States in written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation."

[3] See UNTS, Vol. 480, p. 43 et seq.

provisions have further been elaborated in the 1996 Comprehensive Nuclear-Test-Ban Treaty (CTBT).

Furthermore, it should be borne in mind that from 1958 to 1966, before the adoption of the 1967 Outer Space Treaty, resolutions and declarations adopted by the United Nations General Assembly had been the only legal instruments available in the process of progressive development and codification of this new branch of contemporary international law - the law of outer space or international space law. For example, resolutions 1721 (XVI) A of 20 December 1961 and 1962 (XVIII) on Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space of 13 December 1963, laid the legal framework or foundation for the preparation and elaboration of the comprehensive text of legal principles on outer space, which are now embodied in the provisions of the first international treaty on space law - the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

II. 1967 Outer Space Treaty: Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies

The 1967 Outer Space Treaty is the fundamental legal instrument, *the Magna Carta* or Outer Space Code. When analyzing the legal nature of the 1967 Outer Space Treaty, it is necessary to take into consideration the international political environment and the attitudes of the State parties during the law-making process. In this regard, it would be recalled that the beginning of the space age, following the successful launching of Sputnik-1 into orbit around the Earth on 4 October 1957 by the former Soviet Union and the Explorer-1 satellite on 31 January 1958 by the USA, coincided with the intensification of the Cold War.

The legal and political realms criss-cross at virtually every point, any separation between them must necessarily be artificial. The problems of law are in important ways the subject areas for international control; the problem of international control is in a sense the application of legal principles through international agreements.[4] Thus, the 1967 Outer Space Treaty is not only the *Magna Carta* of space law, but it is also an international legal policy code of conduct governing the activities of States in the exploration and use of outer space, including the Moon and other celestial bodies. Moreover, it should be remembered that its provisions have been elaborated and consolidated in four other legal instruments, viz., 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, 1972 Convention on International Liability for Damage Caused by Space Objects, 1975 Convention on Registration of Objects Launched into Outer Space and 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies.

Bearing in mind the foregoing, let me continue with my reflection on some of the provisions of the 1967 Outer Space Treaty.

The 1967 Outer Space Treaty was adopted by the United Nations General Assembly in resolution 2222 (XXI) of 19 December 1966 and opened for signature on 27 January 1967 in London, Moscow and Washington, D.C. It entered into force on 27 October 1967. It consists of a Preamble and 17 Articles. As of 1 January 2005, 98 States have ratified and an additional 27 have signed the 1967 Outer Space Treaty.

[4] Bloomfield, Lincoln P., "The Quest for Law and Order", in OUTER SPACE Prospect for Man and Society, Revised Edition, edited by Lincoln P. Bloomfield, Frederick A. Praeger Publishers, New York (1962), p. 115.

It is interesting to note that the Preamble of the 1967 Space Treaty reaffirms the provisions of the preambles of earlier resolutions adopted by the General Assembly, namely, resolutions 1962 (XVIII) of 13 December 1963, 1884 (XVIII) of 17 October 1963 and 110 (II) of 3 November 1947. It is important to emphasize that the provisions of resolution 110 (II) of 3 November 1947, which was adopted by the General Assembly immediately after World War II, are applicable in outer space. In that resolution, the General Assembly condemned propaganda designed or likely to provoke or encourage any threat to the peace, breach of the peace or act of aggression.

The 1967 Outer Space Treaty confirmed the legal status and regime of outer space, including the Moon and other celestial bodies, prior to the landing of the first man on the Moon 36 years ago, on 20 July 1969. It embodies in its provisions nine fundamental principles, which are mandatory for all States in all their activities in outer space, including the Moon and other celestial bodies.

The legal status and regime of the new domain of humankinds' activities are clearly stipulated in the provisions of Articles I and II. Article I, for example, provides as follows:

> "The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.
> Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.
> There shall be freedom of scientific investigation in outer space, including the Moon and other celestial bodies, and States shall facilitate and encourage international cooperation in such investigation."

The scientific and technological developments and advances made in the exploration and use of outer space, including the Moon and other celestial bodies, have provided the human race with more information about its Earthly environment and beyond. Nevertheless, it should be emphasized that the freedoms embodied in Article I are not absolute or unlimited.

Therefore, States that are actively carrying out activities in the new domain, which is now designated as the province of mankind, are obliged: (i) to ensure that those activities are for the benefit and common interests of all countries; (ii) to respect the rights and interests of other States and their peoples; (iii) to share the products and results of all scientific and technological advances and developments with other States, on the basis of equality and in accordance with international law.

Moreover, it should be borne in mind that the new domain, pursuant to the provisions of the above Article, is construed to be a zone of peace, solidarity and international cooperation between States and peoples of the world. Thus, the conduct of military activities in outer space, including the Moon and other celestial bodies, is illegal and a gross violation of the legal status and regime of the new domain.

Article II further consolidates the provisions of Article I. According to this Article, outer space, the Moon and other celestial bodies are not subject to national appropriation by claim of sovereignty, by means of use or occupation or by any other means.

The first two Articles of the 1967 Outer Space Treaty, as the core of the legal status and regime of outer space, the Moon and other celestial bodies, have been elaborated and consolidated in the provisions of Articles 4, 5. 6 and 11 of the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979 Moon Agreement). Article 4 (1), for example, provides that:

> "The exploration and use of the Moon shall be the province of all mankind and shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development. Due regard shall be paid to the interests of present and future generations as well as to the need to promote higher standards of living and conditions of economic and social progress and development in accordance with the Charter of the United Nations."

Furthermore, Article 11, paragraphs (1) and (2), provides that: (i) the Moon and its natural resources are the common heritage of mankind (CHM) and (ii) the Moon is not subject to national appropriation by claim of sovereignty, by means of occupation, or by any other means. It should be emphasized, at this juncture, that mankind or humanity comprising of all races and peoples of the world, should be the principal beneficiary of fruits derived from the peaceful exploration and uses of outer space, the Moon and other celestial bodies.

The principles enshrined in the provisions of Articles I and II of the 1967 Outer Space Treaty, and 4-6 and 11 of the 1979 Moon Agreement, are mandatory and binding on all States, including their nationals. Therefore, the sale of plots of land on the Moon by certain companies is an international fraud and those involved should be punished by the authorities of the States of their domicile or nationality. For example, in the local paper published in Finland on 21 October 2005, it was reported that a US company called Lunar Embassy was selling plots of land on the Moon to Chinese nationals.[5] Similar observations on the appropriation of outer space was made by the Working Group on the "Ethics of Outer Space" set up by the UNESCO World Commission on the Ethics of Scientific Knowledge and Technology (COMEST).[6]

This is a serious threat by individuals to undermine the legal status of the new domain. It should not be taken lightly at all. Therefore, it is the duty of all States and peoples of the world, as represented in the United Nations, to adopt strict measures against those involved in these illegal sales of plots of land on the Moon. Outer space, the Moon and other celestial bodies must and should remain the province of all mankind or humanity.

Moreover, in order to strengthen the legal status and regime of the new domain, I would like to submit that those States who have not ratified the 1967 Outer Space Treaty and the 1979 Moon Agreement should do so as a matter of priority. The international community should not allow those means, which were used by the colonial powers for territorial acquisitions in Africa, Asia and Latin America to be used in the new domain of activities of the human race. The fact that Article II does not define the precise boundary between outer space and airspace of sovereign States should not serve as a reason for the private individuals and entities to infringe on the established legal status and regime.

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[5] For more details, see, ETELÄ -SANOMAT, Friday 21 October 2005, page 20.
[6] Pompidou, Alain, THE ETHICS OF SPACE POLICY, UNESCO /ESA (2000), p. 20.

Article III of the 1967 Outer Space Treaty stipulates the applicable law. It provides that States Parties are obliged to carry on all space activities in the exploration and use of outer space, the Moon and other celestial bodies in accordance with international law, including the UN Charter, in the interest of maintaining international peace and security and promoting international cooperation and understanding. It is interesting to note that similar provisions are embodied in resolutions 1721 (XVI) A of 20 December 1961 and 1962 (XVIII) of 13 December 1963.

The United Nations Charter is the fundamental and primary source of contemporary international law and international relations between States. Its provisions are binding on Member States in all their international relations and intercourse. Thus, reference to international law and the United Nations Charter in the provisions of Article III, is a further consolidation that all the principles of international law as enshrined in the Charter and in resolution 2625 (XXV) of 24 October 1970 on Declaration of Principles of International Law concerning Friendly Relations and Co-operation among States, including those embodied in other international legal instruments, are applicable in the new domain - outer space, the Moon and other celestial bodies. For example, any threat or the use of force in whatever manner in outer space, the Moon and other celestial bodies is inconsistent with the purposes and principles of the United Nations Charter. With the commercialization and privatization of outer space activities, it is the duty of all States to ensure that the provisions of international legal instruments, including national legislation, are strictly observed and complied with by their nationals who are actively engaged in outer space activities. The maintenance of international peace, security, law and order must be ensured and strengthened at all times in the new domain. Cooperation, mutual understanding and trust, not competition and profiteering, should be encouraged by all the actors in the new domain.

The principle of partial demilitarization of outer space and total demilitarization of the Moon and other celestial bodies is embodied in the provisions of Article IV of the 1967 Outer Space Treaty and Article 3 of the 1979 Moon Treaty. Article IV provides that: "States Parties to the Treaty undertake not to place around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner. The Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the Moon and other celestial bodies shall not be prohibited."

During the past 38 years, the interpretation of the provisions of Article IV of the 1967 Outer Space Treaty has been the subject of extensive discussions in various international forums by eminent experts and scholars in space law. A lot has already been written on these provisions.[7]

[7] For more details, see, for example, Maintaining Outer Space for Peaceful Uses, Proceedings of a Symposium Held in The Hague, March 1984, Edited by Jansentuliyana, Nandasiri, The United Nations University (1984); Christol, Carl Q., (1982), op. cit., pp. 25-37; Cheng, Bing, (1997), op. cit. pp. 244-252; Andem, Maurice N., INTERNATIONAL LEGAL PROBLEMS IN THE PEACEFUL EXPLORATION AND USE OF OUTER SPACE, University of Lapland Publications in Law, Rovaniemi (1992), pp. 185-234; Lachs Manfred, THE LAW OF OUTER SPACE, Sijhoff, Leiden (1972), pp. 105-112; Andem, Maurice N., "Implementation of Article IV of the Outer Space Treaty of 1967 During the 21st Century", in PROCEEDINGS OF THE FORTIETH COLLOQUIUM ON THE LAW OF OUTER SPACE, October 6-

At this juncture, it should be borne in mind that the Charter of the United Nations is the primary and principal source of contemporary international law. Therefore, in interpreting the provisions of the 1967 Outer Space Treaty and the 1979 Moon Agreement, it is always necessary to take into consideration the purposes and principles of the United Nations Charter.

Throughout the 60 years of its existence, the United Nations has done a lot in the implementation and realization of the purposes for which it was created. The maintenance of international peace and security and the strengthening of international co-operation were of primary importance to the UN and its specialized agencies at the very beginning of the nuclear-space era. It is also necessary to bear in mind that this era coincided with the disarmament efforts of the United Nations to control the arms race between the super powers. In resolution 1722 (XVI) of 20 December 1961, for example, the General Assembly noted with concern that "the continuing arms race is a heavy burden for humanity and it is fraught with dangers for the cause of world peace."

This concern is being expressed in the preambles of the 1967 Outer Space Treaty, the 1979 Moon Agreement and resolutions adopted by the United Nations General Assembly on international co-operation in the peaceful uses of outer space. For example, in the preamble of the first resolution 1348 (XIII) on the question of the peaceful use of outer space of 13 December 1958, the General Assembly recognized the common interest of mankind in outer space and that it was the common aim that outer space should be used for peaceful purposes only. It also expressed the wish to avoid the extension of national rivalries into the new domain.

Furthermore, in the Preamble of the 1967 Outer Space Treaty, the States Parties recognize the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes. Reference was also made to resolution 1884 (XVIII) of 17 October 1963 on Question of General and Complete Disarmament. In the preamble of this resolution, the General Assembly expressed the determination to take steps to prevent the spread of an arms race in outer space. It welcomed the expressions of the former Soviet Union and the USA of their intention not to station in outer space any object carrying nuclear weapons or other kinds of weapons of mass destruction. It solemnly called on all States: (a) to refrain from placing in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, installing such weapons on celestial bodies or stationing such weapons in outer space in any other manner and (b) to refrain from causing, encouraging or in any way participating in the conduct of foregoing activities.

It could be seen from the foregoing that the provisions of resolution 1884 (XVIII) of 17 October 1963 have been elaborated and consolidated in Article IV of the 1967 Outer Space Treaty. Thus, pursuant to the principle of *pacta sunt servanda* as stipulated in the provisions of Article 26 of the 1969 Vienna Convention on the Law of Treaties (VCLT), the provisions of Article IV of the 1967 Outer Space Treaty are binding on all States.

Moreover, as regards the definition of the term "any other kinds of weapons of mass destruction", I would like to submit that semantics should not be used to derogate or undermine the legal status and regime of the new domain, as stipulated in the provisions of Articles I, II, III and IV of the 1967 Outer Space Treaty. In this regard, I would like to refer to my paper presented during the Fortieth IISL Colloquium on the Law of Outer Space. In it, I strongly emphasized that

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10., 1997, Turin, Italy, pp. 338-351; ILA: Report of the 62nd Conference, Seoul (1986), pp. 385-408; ILA: Report of the 63rd Conference, Warsaw (1988), pp. 282-380.

"any other kinds of weapons of mass destruction" should be construed in the context of total disarmament, to mean all existing weapons and their delivery systems (e.g., ASAT, etc.), including future ones that may be developed for military purposes.[8] Furthermore, I would like to submit that the interpretation of the 1967 Outer Space Treaty should be in accordance with the provisions of Article 31 of the 1969 VCLT.

It is very sad and disheartening to observe that the intensification of the militarization and weaponization of outer space by some States has been gathering momentum since the beginning of the 21st century. New types of weapon systems and sophisticated weapons of mass destruction, costing billions and billions of US dollars, are being developed, tested and deployed all the time, while billions of people are in dire need of food, clothing, shelter and basic medical care.[9] It seems to me that 60 years after Hiroshima and Nagasaki the policy-makers and political leaders of major industrialized countries, particularly those currently engaged in creating new weapon systems in outer space, are still to be reminded that all humanity want to live in peace here on Earth and that outer space should be free from all types of weapons in general.

I had promised in the introduction to be very brief in my reflection on the 1967 Outer Space Treaty. Thus, I would like to conclude my comment on the provisions of Article IV with The Houston Declaration for Peace in Space:

> "Forty years ago a peaceful vision of space was embraced by the world. It was a hopeful vision, inspired by cooperation, courage and exploration."

Today, that vision is threatened. Certain governments are planning and testing space weapons. This endangers the precious peace of space, and demands a response from people of the world.

Putting weapons in space will provoke an arms race above our heads. It is destabilizing, unnecessary, immoral and will pollute the space environment.

Space beckons us to a new future, a future that is not dictated by our past. Space is the place where humankind could leave its weapons behind. To those who say this vision is unrealistic, we respond that it is the path to a better world.

On this historic anniversary, we rededicate ourselves to this vision, and call upon our governments to take immediate action to keep space free from weapons.[10] I am very happy that the members States of the Space Generation Advisory Council are very much aware of the danger of extending an arms race into outer space. They are protesting on behalf of the voiceless majority of the peoples of the world. It is the duty of all peace loving people in the world to render their support to this organization.

Concluding remarks and observations

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[8] Proceedings of the Fortieth Colloquium on the Law of Outer Space, 6-10 October 1997, Turin, Italy pp. 343-344

[9] For more details, see, e.g., AVIATION WEEK & SPACE TECHNOLOGY, April 12, 2004; August 16, pp. 49-51; September 5, 2005, pp. 50-59; September 26, 2005, pp. 56-64; October 3, 2005, pp. 48-56; October 24, 2005, pp. 48-55.

[10] It was adopted by the Space Generation Advisory Council during the World Space Congress, Houston, Texas, 2002

In the foregoing paragraphs, I have tried to briefly reflect on some of the provisions of the 1967 Outer Space Treaty. As mentioned earlier, it is the *Magna Carta* and legal policy code of international space law or the law of outer space. It also embodies ethical rules in its provisions. Its observance and implementation by all members States will greatly strengthen the United Nations in making this world more peaceful, safer and free from fear of another world war throughout the 21st century and beyond.

Space law or the law of outer space should also be seen as a developing common law for all humanity, which embodies and expresses the hopes and aspirations of the present and future generations. As a branch of contemporary international law, its function as embodied in the provisions of its main source - the 1967 Outer Space Treaty, is to further the purposes and principles of the United Nations Charter in outer space - the province of all mankind.

It is the sacred duty of all States to support the efforts of the United Nations in consolidating and strengthening the rule of law in the new domain- outer space. Thus, may I seize this opportunity, with due respect, to call upon the Governments of African States that have not ratified all the five outer space treaties to do so as a matter of priority.

José Monserrat Filho
Professor [**]
Associação Brasileira de Direito Aeronáutico e Espacial, Brazil,

Introduction

My intention here is to briefly present you some general thoughts on the benefits of becoming a party to international treaties today, including the treaties related to outer space and space activities.

I would like to invite you to not only keep in mind the specific ities of space law, but also to see this new branch of law as an integral part of the contemporary general international law – a cultural achievement of mankind, which in the present time of the history of our planet must be defended, preserved and developed with the best resources of our intelligence.

In my view**,** there are at least three great benefits of becoming a party to treaties, in particular multilateral ones.

I. First Benefit: International Rule of law

- To contribute to the establishment and consolidation of a rule of law in international relations, including those related to the dissemination and access to the most important science and technology advancements;
- In the today's world we can note a strong and harmful tendency to the relativization of social, cultural, ethical and legal values, confusing and weakening them. The rule of law is a suitable way to place the most important values at the appropriate and deserved level of respectability;
- In our time the rule of law is much more effective inside countries than in international sphere;
- We all know very well the alternatives to rule of law: disorder, chaos, fear, uncertainty, insecurity, iniquity, injustice and dominance of the stronger;
- The rule of law is a strong safeguard against arbitrary rulings and actions in all areas, including outer space and internal space activities;
- It means clarity and transparency of rights and obligations;
- The rule of law is an essential component of civilization, peaceful and friendship relations and constructive understanding among countries, peoples and individuals;
- It is fundamental to cultivate and strengthen a really open society and a democratic political regime, according to the best national and international values; and
- The rule of law is indispensable in all stages of the international cooperation.

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II. Second benefit: Predictability

- All States and all peoples can clearly know in advance the rules of the game; the possible, probable and permitted developments; and the expected point of arrival;
- No surprises, no deviations, no coups, no suspicions, no misgivings and no stress;
- Transparency, certainty, security, reliability, safety, sound and constructive environment, tranquility, better conditions of working and negotiations;
- Best stimulus for accurate and responsible planning and decision-making process;
- Best stimulus for developing, improving and increasing plans, programmes, and projects; and
- Best stimulus for social and economic, political, cultural and legal development, and general progress.

III. Third benefit: pursuit of justice and order

On the basis of the rule of law, all parties:

- Can defend their legitimate rights and interests in better conditions;
- Can take a legal action in a suitable form;
- Can fight for the equality of parties before the law, as well as for an equitable application of it;
- Can evaluate the effectiveness of the existing treaties and principles and propose their reviewing, updating and/or renewal; and
- Can propose new agreements, instruments, declarations and legislation to regulate new areas or activities; the use of new technologies.

Conclusions

Let me remind you of the words of one of the greatest jurists of our time, Judge Manfred Lachs, former Chairman of the International Court of Justice and the International Institute of Space Law (IISL), who presided over the difficult and historic process of elaboration and approval, at the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), about the 1967 Treaty on Principal Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, the cornerstone of all the building of international space law:

> "If all activities connected with outer space are to be conducted for the benefit of all and to the detriment of none, international cooperation is essential, and if all the possibilities opened up are to be used in a responsible manner, the conduct of States in regard to outer space must be submitted to the rule of law." (Manfred Lachs, The Law of Outer Space: An Experience in Contemporary Law Making, 1972)

United Nations/Nigeria Workshop on Space Law
21-24 November 2005, Abuja, Nigeria

Benefits of becoming party to Treaties and conducting space activities in accordance with the Principles

José Monserrat Filho
Brazilian Association of Air and Space Law (SBDA)
Brazilian Association for Advancement of Science (SBPC)

First and major Benefit: International Rule of Law

- It is a great benefit to participate actively in the establishment and consolidation of a Rule of Law in space activities;
- Alternatives to Rule of Law: disorder, chaos, fear, uncertainty, insecurity, iniquity, injustice, dominance of the stronger;
- Safeguard against arbitrary rulings and actions in outer space and in space activities;

- Rule of Law means clarity and transparency of rights and obligations;
- Development of confident practica and customs;
- Rule of Law is essential component of civilization, peaceful and friendship relations and constructive understanding among countries, peoples and individuals;
- Can bring strategic stability;
- Rule of Law is indispensable in all stages of the international cooperation, which is more and more important in space activities;

Second Benefit: Predictability

- All States and all peoples can clearly know in advance the rules of the game; the possible, probable and allowed developments;
- They also can know the expected point of arrival;
- No surprises, no deviations, no coups, no suspicions, no misgivings, no stress;
- Certainty, security, reliability, safety, tranquility;
- Possibility of accurate and responsible planning and making decisions;
- Possibility of and stimulus for improving and increasing plans, programs and projects;
- Possibility of and stimulus for social and economic development and progress;
- This sound environment may open the way to best chances, best performance, best results.

Third Benefit:
Pursuing of Justice and Order

- As Parties of the treaties all States and organizations can better protect and defend their legitimate rights and interests;
- Can take legal actions in a suitable and fair way;
- Can fight for the equality of parties before the law, as well as for the equitable application of the law;
- Can evaluate the effectiveness of the existing treaties and principles and propose their amendment, clarification, revision, updating and renewal;
- Can propose new agreements, instruments, declarations and legislation to regulate new areas or activities, including the use of new technologies;
- The construction of a new and better world is not only a political construction, but also a legal one.

- *“If all activities connected with outer space are to be conducted for the benefit of all and to the detriment of none, international co-operation is essential, and if all the possibilities opened up are to be used in a responsible manner, the conduct of States in regard to outer space must be submitted to the rule of law.”*

Manfred Lachs

The Law of Outer Space: An Experience in Contemporary Law Making, 1972

- CBERS program seems to be in full accordance with the 1986 Remote Sensing Principles;
- It is clearly committed to be carried out for the benefit and in the interests of all countries and to take into particular considerations the needs of the developing countries;
- It is founded on International Law, including the UM Charter, and the 1967 Outer Space Treaty;
- CBERS Data Policy is in accordance with the Principle IV, specially the respect for the full and permanent sovereignty of all States and peoples over their own wealth and natural resources;

- That is because the central CBERS concept is to distribute images made on the territory of a country only to that country;
- The images distributed within the distributor’s national market may not be exported abroad;
- CBERS is in accordance with the Principle XII, as it establishes that the sensed State will have easy and full access to data concerned to the territory under its jurisdiction;
- CBERS is in accordance with Principles V, VI, VII and XIII, as Brazil and China are committed to develop CBERS application system infrastructure in other countries and to intensify international cooperation, specially with developing countries;

- CBERS Program is in accordance with the 1996 “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”, as it fulfils all its main points:

  1) Common benefit clause;

  2) Cooperation based on free determination and equitable and mutually acceptable conditions;

  3) Particular attention to developing countries and countries with incipient space programs;

  4) Cooperation considered most effective and appropriate by the countries concerned;

5) Promoting the development of space technology and of its applications; fostering the development of relevant and appropriate space capabilities in interested States; facilitating the exchange of expertise and technology among States on a mutually acceptable basis;

6) Appropriate use of space applications and international cooperation for reaching development goal in each country;

7) Brazil and China fully support the Committee on the Peaceful Uses of Outer Space (COPUOS), as a forum committed to stimulate as much as possible the international space cooperation.

Sergio Marchisio
Chairman UNCOPUOS Legal Subcommittee 2004-2005, Italy

The Convention on International Liability for Damage Caused by Space Objects (Liability Convention) was adopted by the General Assembly on 29 November 1971 by Resolution 2777 (XXVI), and opened for signature on 29 March 1972 in London, Moscow and Washington, D.C. It entered into force on 1 September 1972. Depositaries are the Russian Federation, the United Kingdom of Great Britain and Northern Ireland and the United States of America. As at 1 January 2005, 82 States are parties to it and two Intergovernmental Organizations made a declaration of acceptance of rights and obligations deriving from the Convention.

It is true indeed that the international community remains far from general acceptance of the Liability Convention, as well as of other United Nations space treaties, namely the 1975 Registration Convention. Many non-space faring States have not yet accepted the key treaties, including some members of COPUOS. This is the reason why one of the main functions of the Legal Subcommittee is broadening the universal acceptance of the core space law treaties, inviting States to consider the reasons why their ratification and implementation should be considered highly beneficial. At the same time, the LSC should also encourage States that have accepted these conventions to look at the sufficiency of their national laws to implement them.

The benefits to, and rights and obligations of, parties to the United Nations treaties on outer space are multiple. The first and foremost benefit is that space activities must be carried out freely but, at the same time, within a well established legal framework, generally accepted by the large majority of States, in order to avoid any temptation of unilateral practices from space faring Nations.

We all know that this general legal framework was set out by the 1967 Outer Space Treaty (OST), which establishes several fundamental and peremptory principles:

- The exploration and use of outer space shall be carried out for the benefit and in the interests of all mankind;
- Outer space and celestial bodies are free for exploration and use by all States on the basis of equality and in accordance with international law; and
- In the exploration and use of outer space, States shall be guided by the principle of cooperation and mutual assistance, and conduct all their activities in outer space with due regard for the corresponding interests of other States.

The legal frame was complemented and substantially detailed by the subsequent Conventions, foremost among which is the 1972 Liability Convention.

From this point of view, adherence of a State to the United Nations treaties on outer space, especially to the Convention on Liability, will increase its attractiveness to potential foreign partners seeking international cooperation in the exploration and use of outer space and increase its involvement in international cooperation mechanisms and, as a consequence, improve its access to scientific, meteorological and other space related data. It will also increase its confidence in the safety of space activities as the OST require States to bear international responsibility for national activities in outer space and to provide the necessary authorization and supervision of such activities in line with the principles set forth in the treaties.

In particular, adherence to the Liability Convention provides international rules and procedures for the peaceful settlement of disputes and for claiming compensation. It guarantees the protection of the interests of States and their nationals who fall victim to damage caused by space objects. It is well known that the Liability Convention was adopted to give the maximum assurance that a launching State, which has ratified the Convention, will pay a just claim and to encourage space powers to deal equitably with justified damage claims from claimant States. In some way, Space States' responsibility and liability are a counterpart for the freedom of exploration and exploitation of outer space. Activities in outer space are in fact ultra hazardous activities, because they take place in a very special environment from a technical point of view.

The Convention depicts a victim-oriented discipline of absolute responsibility/strict liability for damages caused by space objects on the surface of the Earth or to aircraft in flight. Indeed the fundamental aim of the Liability Convention is mainly to regulate the liability for damage to "innocent" victims not taking part in space activities. This is why the Convention imposes, always in the interest of the victim, joint and several liabilities on the multiple launching States and each launching State may present claims for indemnity from other launching States or to appropriation their liability by agreement.

Another important benefit deriving from becoming party to the Convention is that only States parties to it can resort to the procedures and mechanisms for obtaining compensation in case of damage. Article VIII, para. 1, gives to a State which suffers damage, or whose national or juridical persons suffer damage, the possibility to present to the liable launching State a claim for compensation for such damage. The claim can be presented not only by the State of nationality of the victim, but also, as a further guarantee for the victim, by the State in whose territory the damage was sustained or by the State of which the victim is permanent resident.

Thus, only a State party to the Convention can present a claim for compensation for damage to a launching State through diplomatic channels. If no direct agreement is reached, only States parties to the Convention can refer to the Claims Commission mechanism. Each State party to the Convention and party to the dispute concerning compensation can unilaterally request the establishment of such a third-party mechanism, composed of three members.

Adherence to the Liability Convention proves indeed to be highly beneficial, not only for States that are involved directly in space activities, but also for States that are not currently carrying out activities in outer space, because they can be victims of damage caused by space objects to the surface of the Earth or to aircrafts in flight. In the case of the re-entry of the Italian satellite Bepposax, in 2003, the Italian Government informed several equatorial States of the potential risk of damage, in order to prepare all possible counter measures in their territories. Luckily no damage was caused by the fragments of the satellite, which splashed down into the

Pacific Ocean on April 29 2003. But, had a damage occurred, only States parties to the Liability Convention could have sought compensation according to the rules and procedures set out by the Convention itself.

Another benefit deriving from adherence to the Liability Convention, is that it pushes the parties to enact national legislation implementing it, in relation to claims for damage suffered by nationals and covered by the 1972 Convention, paving the way for the progressive development of national space law.

Finally, only States parties to the Convention can participate in further law making to develop the existing regime and to authoritatively interpret it.

In conclusion, a generally accepted legal regime for Liability for damage caused by space objects is a main tool for increasing international cooperation among space-faring and non space-faring nations in the exploration and use of outer space, in a spirit of reciprocal trustworthiness. A common rule of law is always the better way for increasing mutual confidence and for carrying out space activities for the benefit of all humankind.

UN/NIGERIA WORKSHOP ON SPACE LAW

NOVEMBER 21-24, 2005

"BENEFITS OF BECOMING PARTY TO THE TREATIES AND CONDUCTING ACTIVITIES IN ACCORDANCE WITH THE PRINCIPLES"

KEN HODGKINS
US DEPARTMENT OF STATE

WHY ADHERE TO THE TREATIES?

- IMPACT ON NATIONAL ACTIVITIES
- IMPACT ON INTERNATIONAL ORGANIZATIONS
- IMPACT ON INTERNATIONAL COMMUNITY

IMPACT ON NATIONAL ACTIVITIES

- OST ARTICLE VI
- BASIS FOR NATIONAL LEGISLATION
- PROVIDES PREDICTABILITY & PROTECTION FOR COMMERCIAL ENTITIES OPERATING ON INTERNATIONAL BASIS
- ALLOWED TO PARTICIPATE IN AMENDING TREATIES

IMPACT ON INTERNATIONAL ORGANZATIONS

- RESCUE & RETURN AGREEMENT - ARTICLE 6
- LIABILITY CONVENTION – ARTICLE XXII
- REGISTRATION CONVENTION – ARTICLE VII

IMPACT ON INTERNATIONAL COMMUNITY

- CONTRIBUTES TO ORDERLY USE OF OUTER SPACE
- INCREMENTAL DEVELOPMENT OF CUSTOMARY BEHAVIOR
- CREATES LEVEL PLAYING FIELD FOR ALL ACTORS
- NON-STATE ACTORS WILL COMPLY WITH TREATIES
- STRATEGIC STABILITY AND PREDICTABILITY
- IN ABSENCE OF CASE LAW, THIS IS ALL WE HAVE

NPS PRINCIPLES

- REASSURE INTERNATIONAL COMMUNITY OF BENEFITS OF NPS AND THAT TECHNOLOGY CAN BE USED SAFELY
- ESTABLISH COORPERATIVE MECHANISMS IN EVENT OF ACCIDENTS
- TRANSPARENCY

REGISTRATION CONVENTION

- MEANS TO ASSIST IN IDENTIFICATION OF SPACE OBJECTS
- STATE RESPONSIBILITY
- LIABILITY
- ESTABLISH LAUNCHING STATE
- STATE ACCOUNTS FOR NON-GOVERNMENTAL ENTITIES

National Space Law and Policy

The United States of America National Space Law Regime

(or as much as is reasonable to attempt to address in a single presentation)

U.N./Nigeria Workshop on Space Law

Presented by

Prof. Joanne Irene Gabrynowicz

22 November 2005

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National REMOTE SENSING and SPACE LAW Center

Evolution

- **1958: Infrastructure**
  - Response to Cold War exigencies
  - Civil program and national security
- **1980s: Commerce**
  - Added to civil and military sectors
- **80s and 90s: Applications**
  - Launch
  - Remote sensing/earth observations
- **2000s: Regulatory refinement**
- **Etc.**

National REMOTE SENSING and SPACE LAW Center

U.S. Domestic Space Law Regime

Infrastructure: The NAS Act of 1958

- The National Aeronautics and Space Act of 1958
  – "Space Act"
- Created the U.S. civil space program
- Established NASA
- Signed by President Eisenhower

U.S. Domestic Space Law Regime

Infrastructure: The NAS Act of 1958

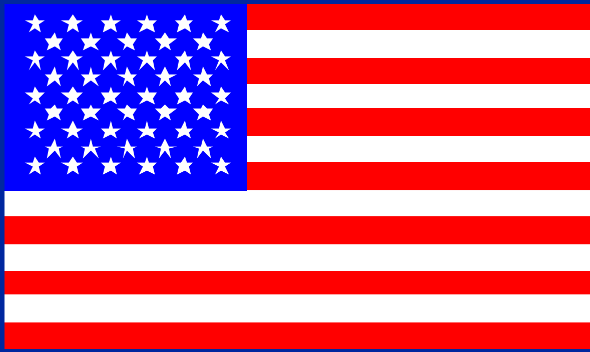
- **Multiple bodies of law**
  - Contract, Tort, International, IP, Space
- **Wide variety of subjects**
  - ISS, space settlements, Congressional Space Medal of Honor, Science, Space, and Technology Education Trust Fund, space commerce agreements, life sciences strategic plan

U.S. Domestic Space Law Regime

Infrastructure: The NAS Act of 1958

Purpose

- "The Congress 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."



U.S. Domestic Space Law Regime

Infrastructure: The NAS Act of 1958

Civil - Military Separation

- "aeronautical and space activities...shall be directed by a civilian agency...except activities peculiar to or primarily associated with development of weapons systems, military operations or defense of the U.S...shall be directed by, DoD"
- Relationship changes over time
  - Economics sensitive
- Still, fundamentally civilian

U.S. Domestic Space Law Regime

1980s: Commerce

- "Congress declares that the general welfare requires that NASA...seek and encourage, to the maximum extent possible, the fullest commercial use of space."
  - Commercial added to civil and military
- Information access, invention property rights for small and large businesses, etc.

U.S. Domestic Space Law Regime

1980s and 1990s: Applications

Launch

- Commercial Space Launch Activities
  - Space transportation law has consolidated:
    - '84 Commercial Space Launch Act
    - '88 Amendments
    - ‘04 Amendments
  - On-going regulatory development
- Commercial Space Act
- Thurmond National Defense Authorization

U.S. Domestic Space Law Regime

1980s and 1990s: Applications

Launch

- Includes launches and launch infrastructure
- Part of overall transportation law
- Martin Marietta v Intelsat
  - Dormant but important issue
  - "Best efforts"

U.S. Domestic Space Law Regime

1980s and 1990s: Applications

Launch

- Export licenses
- Launch licenses
  - Applications
  - Requirements
  - Suspensions, revocations, sanctions
  - Administrative hearings, judicial review
  - Preemption of of scheduled launches
  - Acquisition of USG Property and Services
  - Acquisition costs, direct costs, insurance

U.S. Domestic Space Law Regime

1980s and 1990s: Applications

Remote Sensing - Earth Observations

- 1984 Land Remote Sensing Commercialization Act
- 1990 Global Change Research Act
- 1992 Land Remote Sensing Policy Act
  - Amended '84 Act
- 1998 Commercial Space Act

U.S. Domestic Space Law Regime

1980s and 1990s: Applications

Remote Sensing - Earth Observations

- **1984:** Commercialization focus
  - Privatized Landsat
  - Envisioned no need for public systems in future
- **1992:** Public/environmental focus
  - Public and private distinction
  - "Proper"commercialization
- **2001:** Commercialization focus again
  - Landsat Data Continuity Mission data buy failed
- **2005:**Landsat decision literally in progress now
  - Office of Science and Technology Policy: Landsat is “public good”

U.S. Domestic Space Law Regime

2000s: Regulatory Refinement

- 2000 NOAA private systems licensing regulations
  - Remote sensing - Earth observations
  - Under regulatory review now; comment period closed
- 2000 NASA Authorization Act
  - Defines "commercialization," "privatization" and related terms
  - All space activities
  - "Sense of Congress”
- Commercial Space Launch Amendments Act of 2004

U.S. Domestic Space Law Regime

2000s: Regulatory Refinement

NOAA License Regulations

The Public - Private Spectrum

Public	Hybrid	Private
All Tax $$	Public and Private $$	All Private $$
Full Nondiscriminatory Access	Case-by-case determination	Access to sense states only

National REMOTE SENSING and SPACE LAW Center

U.S. Domestic Space Law Regime

2000s: Regulatory Refinement

NOAA License Regulations

- Company must disclose
  - Amount of government resources that went into, or will contribute toward, the development, fabrication, launch, or operation of the system
- If <u>fully</u> government funded
  - All unenhanced data available on nondiscriminatory basis

National REMOTE SENSING and SPACE LAW Center

U.S. Domestic Space Law Regime

2000s: Regulatory Refinement

NOAA License Regulations

- If <u>entirely privately</u> funded
  - – Data provided according to reasonable commercial terms and conditions
  - – "Sensed state"
- If <u>partial government</u> support
  - – Some access to unenhanced data on a nondiscriminatory basis
  - – NOAA makes case-by-case determination with provisions included in the individual license

U.S. Domestic Space Law Regime

2000s: Regulatory Refinement

FAA/AST Launch Regulations

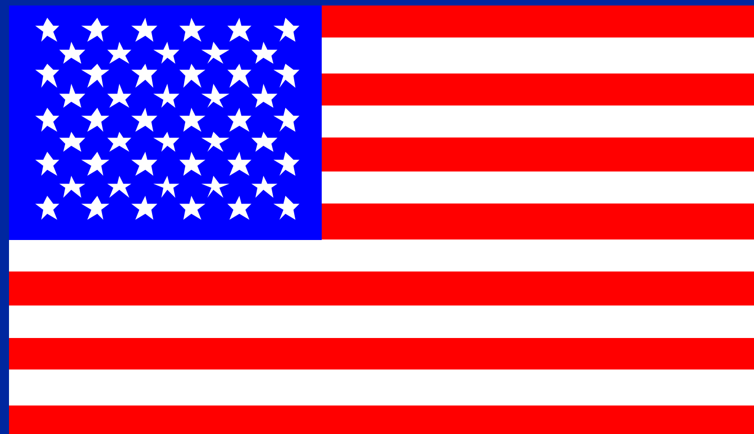
- **2000:** licensing process for RLV missions, including with on-board crew, and reentry of a reentry vehicle
- **2004:** Commercial Space Launch Amendments Act
  - Distinct regulatory framework for private human space flights
  - "Experimental permits" allow RLV research and development
  - Requires "space flight participants" informed consent to assume risk
  - Protects safety of uninvolved public
  - Extends federal government indemnification to licensed commercial human space flights

U.S. Domestic Space Law Regime

Etc.

- 1968 Hazardous Material Transportation Act
- 1976 National Science and Technology Policy, Organization and Priorities Act
- IRS Code - Source Rules for Space and Certain Ocean Activities
- Joint Resolution to Designate Jan. 28, 1989 as "National Challenger Day"
- World Ag Outlook Board, Dept. of Agriculture

U.S. National Space Law Regime



- Questions?
- Comments?

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National REMOTE SENSING and SPACE LAW Center

Overview of National Space Laws and Policies:
Nigerian National Geoinformation Policy and Current Steps Towards its Implementation

Ganiy Agbaje
National Space Research and Development Agency, Nigeria

Introduction

The realization of the objectives of a nation's socio-economic development programmes depends on availability and speedy access to Geospatial Information (GI) through provision of relevant infrastructures for data acquisition, processing, standardization and sharing. GI is much a part of a nation's infrastructure as its other elements such as the transportation network, health care system and telecommunication, and should therefore be accorded the same level of support and priority because it provides information on the geography of the country in terms of her assets and potentials (Kufoniyi, 2004, GSDI, 2004). Increase in sharing and better access to high quality GI data would lead to efficient management of a nation's natural resources and environment, resulting in the improvement of the quality of life of the people.

Information and Communication Technologies (ICT) are a major driving force in the implementation of an efficient National Geospatial Data Infrastructure (NGDI) as it permits GI sharing and growth. However, data sharing is difficult as data created for an application may not be easily translated into another application. Efforts are now underway to ensure interoperability between systems (e.g. OpenGISConsortium), but the problem of data sharing goes beyond technical, as organizations/institutions are not accustomed to working together and hence not willing to share data. Non-availability of metadata (i.e. information about data on 'who owns what, when, where and how') databases inhibits data sharing among organizations/institutions and loss of millions of dollars on reproducing/duplicating already existing data.

The NGDI Project in Nigeria under the National Space Research and Development Agency (NASRDA) has as its main objectives, the discovery, harmonization and standardization of geospatial data production and management, and the provision of a platform for data sharing, thereby eliminating data duplication and conserving cost and time spent in producing already available data. This paper examines the institutional arrangements in place to facilitate GI sharing among organizations in Nigeria as contained in the national Geospatial Information Policy. Issues such as data access and data security, and steps to ensure partnerships among producers of GI, will be discussed. The paper further examines the progress made so far in the implementation of the GI Policy since its completion in September 2003. The national NGDI Committee has been inaugurated with relevant subcommittees to facilitate data sharing and data access. The task of this committee and various subcommittees, and the laid down strategies for achieving easy access to information and information dissemination, are discussed in the paper. When analyzed against the developments at the regional level in Africa, the Nigerian approach may serve as one of the best practices for the development of Spatial Data Infrastructures (SDI) at national levels.

I. National Geospatial Information Policy of Nigeria

1. Preamble

> "The importance of developing a supporting policy/organizational environment should not be underestimated. Potential stakeholders will only become active participants if they see advantages for their organizations and if they do not feel threatened by the infrastructure. The buy-in and commitment from senior management of all stakeholders is critical to the success of the infrastructure as a whole and to that of access element in particular" (GSDI, 2004: pg. 70).

Governmental agencies are the main sources of GI in Nigeria and hence the major stakeholders in the development of NGDI. Each of these agencies has a statutory mandate and business plan with subject-specific strategy of production, quality control and dissemination of their datasets. Therefore, their role in the development and operation of the data access component of the infrastructure will depend on government policy that will ensure that these agencies collaborate with each other, interact with the private sectors and the GI users in order to make these disparate datasets more widely available. Identifying these agencies and their roles in the development of the infrastructure are important steps toward achieving this.

Due to the increasing awareness of the use of GI for decision-making over the past years, coupled with the expected availability of primary datasets from the Nigerian Satellite (NigeriaSat-1), the country has realized the need to adopt policies for promoting greater awareness and public access to standard and coordinated geo-spatial data production, management and dissemination by all sectoral institutions. It is essential to note that most of the SDI initiatives in African countries usually commence without paying attention to the issue of policy to guide proper implementation. In many cases, problems are then encountered after the commencement of the initiative raising the need to then formulate a guiding policy. When possible, it is advised that the policy issue be put in the forefront of any Geospatial data Infrastructure (GDI) implementation. In the case of Nigeria, the on-going implementation of the country's NGDI started by first providing a GI policy.

2. The Geo-Information Policy on *Information Access and Dissemination*

The GI Policy aims to facilitate coordinated production and utilization of geospatial data that are common to multiple applications to eliminate duplication of efforts and wastage of resources. This will be achieved through the promotion of relationships among organizations and encouraging them to use NGDI-endorsed standards in order to create and maintain data at a high level of quality and consistency, which can improve the value of the data in decision-making and thus serves as an economic resource for wealth creation.

Some of the policy implementation strategies that will ensure easy data access and dissemination are:

- Establishment of Clearinghouse in the NGDI node agencies and loading of certified metadata of data producers;
- Creation of metadata for existing dataset(s) by the custodian(s) of the dataset(s) and making the metadata available to the NGDI clearinghouse;
- Definition of the metadata content and structure for the NGDI and production of detailed metadata implementation guidelines, including practical advice on maintenance and use of the metadata; and
- Development of data standards compliant with the International Organization for Standardization (ISO) for the NGDI.

The GI Policy sets out to achieve an NGDI administrative/organizational framework that is a multidisciplinary, inter-agency and inter-sector network of institutions coordinated by the lead agency – NASRDA. The coordinating /lead agency shall work in close collaboration with the relevant national, state and local government legislative committees and geospatial data producing organizations. This arrangement will remove the institutional barriers that have in the past inhibited GI sharing among the producers and users. Full policy document and further information can be found at www.rectas.org; www.nasrda.org and in Kufoniyi, 2004; NASRDA, 2003 and UNECA, *et al.* 2003.

3. International Workshop of NGDI Stakeholders/Users

The GI Policy, which is expected to guide the realization of NGDI in the country, was drafted by 10 GI experts from the academia, stakeholder ministries, and GI related community in the private sectors. The draft GI Policy was circulated to stakeholders for comments and was a subject of an international workshop of NGDI stakeholders/users held in Abuja, Nigeria in February 2003. The workshop served as a major strategy to bring GI stakeholders together and began the process of partnering on GI related matters. The workshop can be seen as a watershed in the history of our collective aspiration to establish NGDI in Nigeria as it brought together over 300 participants working in related areas: surveyors, scientists, planners, policy and decision-makers, and business executives from national and international organizations.

In general, the workshop was meant to create greater awareness of and promote public access to standard and coordinated geo-spatial data and the establishment of geo-spatial clearinghouses at various levels in the country. It also provided the opportunity to identify and recognize major stakeholders and users in the production, management and utilization of geo-spatial data and information products in Nigeria. Hence, it marked the foundation for partnering in information sharing among stakeholders.

The NGDI initiative aimed at enhancing GI harmonization, access and use by the government, universities, non-government organizations, private sector and civil society. While still expecting the passing into law, the NGDI implementing agency in the country – NASRDA - has already embarked on the implementation of the recommended strategies in the Policy. One such strategy is the inauguration of the NGDI Committee and Subcommittees.

II. The NGDI Committee

NGDI can only become a reality through the cooperation among all the stakeholders' organizations/institutions at all levels. On 9 September 2004, a 27-member NGDI Committee, to guide the establishment and implementation of the NGDI in line with the GI Policy, was inaugurated by the Minister of Science and Technology. The Committee members are drawn from academia, public organizations, and GI related NGOs, IGOs and the private sector. The NGDI Committee composition is depicted in Table 1. The Committee members are well spread in terms of stakeholders and geographical distribution across the country, in order to enforce partnership and create an enabling environment for data access and dissemination.

#	Agency/Organization	Remarks
2	NASRDA	Lead agency
2	Universities	Universities selected in rotation
2	Poly/Monotechnics	Poly/Monotechnics selected in rotation
6	Six Geopolitical zones – StateStates nodal agencies	StateStates within each geopolitical zone selected in rotation
4	Private Sector, Inter-governmental & Non-governmental organizations	GI related sectors
11	Federal Ministries/Agencies	(See GI Policy for full list)

Table 1: Composition of the NGDI Committee

1. Functions of the NGDI Committee

The functions of the Committee can be summarized as follows:

- Develop the phases of implementation of the NGDI project;
- Coordinate the GI –related activities of all NGDI node agencies;
- Develop, streamline and enforce standards and policies for the infrastructure;
- Appraise the manpower potentials of the nation in all sectors for a successful realization of NGDI;
- Mobilize local funding as well as foreign assistance whether technical or financial;
- Create Subcommittees within it for specific tasks as necessary;
- Co-opt any person (s) it considers relevant in its function; and
- Sustain, at all times, the tempo or momentum of change that will remain a necessary tonic for the realization of the NGDI project.

NGDI Subcommittees

At the inaugural meeting of the NGDI Committee, the following six subcommittees were created in line with the recommendations of the NGDI stakeholders/users meeting of February 2003:

(i) *Geospatial Datasets Subcommittee* - The activities of this subcommittee cover both fundamental and thematic datasets as defined in the policy. Their activities include the following:

a) Development of a framework/strategy for the production of NGDI recognized fundamental datasets (accompanied by the dataset's metadata) and promotion of their use;
b) Review at intervals of the list of recognized fundamental datasets for possible modification of the list, based on user needs assessment;
c) Determination of the minimum content of these datasets;
d) Identification of the approved custodian for each dataset;
e) Identification/inventory of existing geospatial data resources;
f) Upgrading, densification and harmonization of the national geodetic control network, which must be compliant with the African Geodetic Reference Frame (AFREF) and the International Terrestrial Reference Frame (ITRF);

g) Promotion of synergy with international mapping programmes such as the Global Mapping, Global Land Cover Network and Mapping Africa for Africa; and
h) Creation of relevant working groups.

(ii) *Standards Subcommittee* - The activities of the subcommittee on standard include:

a) Inventory and review/evaluation of existing national standards;
b) Review of existing international standards e.g. Africover's Land Cover Classification System (LCCS);
c) Development of national standards in conformity with ISO;
d) Registration of the standards with the Standard Organization of Nigeria (SON) and ISO;
e) Development or adoption of standard terminologies;
f) Linkages with related standards working groups and organizations locally and internationally, e.g. the Standards Working Group (WG) for ICT if available, Standards WG of the Committee on Development Information-Subcommittee on Geoinformation (CODI-Geo), ISO/TC211, International Steering Committee for Global Mapping (ISCGM), the Global Spatial Data Infrastructure (GSDI), Open GIS Consortium (OGC), etc;
g) Publication of NGDI supported standards;
h) Development of best practice guidelines providing advice on the application of standards;
i) Development of a model for standards services (operational, technical, systems, information model);
j) Facilitation of the creation of preliminary standards services to help users understand and apply standards;
k) Promotion of interoperability; and
l) Promotion of the benefits of using the NGDI supported standards.

(iii) *Clearinghouse and Metadata* - This subcommittee will, among other relevant issues, focus on metadata standard development; metadatabase design; compilation of data dictionaries; recommendation of a common (i.e. to be used by all) metadata software through adaptation of existing ISO-compliant metadata software; a mechanism for conformance monitoring; a data exchange mechanism; data security measures; establishment of a clearinghouse at NGDI nodes; access protocols and public-private-partnership (PPP) for data sharing.. Some of the objectives of the subcommittee are to:

a) Produce detailed metadata implementation guidelines;
b) Develop best practice guidelines giving practical advice on maintenance and use of metadata;
c) Identify, catalogue and evaluate information sources;
d) Obtain commitment from existing service providers and data producers for the metadata infrastructure;
e) Establish preliminary metadata services;
f) Promote the metadata services to the existing and potential GI communities;
g) Target information providers and encourage and advise on how they can make their metadata available;
h) Develop conformance and testing clauses for metadata; and
i) Investigate and establish appropriate conformance mechanisms for the metadata

(iv) *Capacity Building and Awareness Subcommittee*: Capacity building is very essential to the success of NGDI. It is crucial to ensure that policy makers and the general populace are made aware of the importance of GI and NGDI to all facets of the national economy. The policy has provided the ingredients to ensure that capacity building receives the priority attention that it deserves. This subcommittee will ensure that the policy items are translated to implementable activities. Among other activities, the subcommittee will:

a) Encourage basic training on NGDI and its components – metadata development, data exchange protocols and transfer formats, development of clearinghouse, etc;
b) Promote research on GI application success stories as well as on resources and development opportunities being lost, due to absence of GI and NGDI and disseminate findings on them;
c) Promote awareness on the importance of GI to development and sensitise policy/decision makers and end-users on the importance of NGDI;
d) Encourage development/review of geoinformatics curricula in our higher institutions of learning;
e) Promote institutional reforms in GI organizations to facilitate assimilation of NGDI by the organizations;
f) Promote a mandatory continuous development programme on NGDI concepts and geo-information science by relevant professional bodies;
g) Promote activities that will build mutual respect and trust among NGDI stakeholders;
h) Promote general awareness on NGDI using various media: print and electronic media, newsletter publication, synergy with NITDA, Internet website, geo-kiosk at conferences, etc;
i) Identify and promote (the use of) existing applications of NGDI compliant information;
j) Identify parallel initiatives to NGDI and integrate with them where beneficial;
k) Market and promote the use of GI;
l) Identify what advisory services are required; and
m) Ensure linkage with international organizations and bodies in the area of GI/GDI capacity building.

(v) *Legal Subcommittee*: The activities of this subcommittee include:

a) Promotion of early approval of the GI policy and its enactment;
b) Provision of a mechanism for implementation of all legal aspects of the policy;
c) Identification/inventory of existing related legislation and regulations at the national and international levels;
d) Review of existing copyright and privacy laws;
e) Review of right-to-public-information;
f) Provision of laws for copyright and intellectual property rights;
g) Development of mechanism for implementation and monitoring of copyright and other legal provisions of NGDI (e.g. on local content, local implementation of project and support of Environmental Impact Assessment (EIA) reports with GI data);
h) Prescription of appropriate disciplinary measures for non-conformance with the provisions of the GI policy and related regulations.
i) Provision of relevant regulations to guide full realization of NGDI and amendment of existing ones where necessary;
j) Promotion of synergy among related policies and amicable resolution of areas of conflict; and

k) Development of a mechanism for the implementation of PPP.

(vi) *Sustainability and Funding Subcommittee*

NGDI will be a success only when the initiative can be sustained. It calls for initial focused funding by the government at various levels. However, as it will be very unlikely to get the required funding from the government for all aspects of NGDI, the NGDI Committee will have to prepare a strategy for the implementation by prioritizing the activities. However, for sustainability and funding in general, this subcommittee will work towards successful implementation of the NGDI Fund. The activities of the sub committee will include:

a) Development of a funding strategy for every NGDI activity: data production/update, clearinghouse, funding of activities of NGDI Committee and every subcommittee and working group, etc;
b) Identification of funding sources;
c) Formulation of pricing policy – data fee, access fee, etc;
d) Identification of the aspects of NGDI in which PPP will be feasible and encouragement of its implementation;
e) Liaising with the relevant organs of the government (Ministry of Finance, relevant committees of the national and state assemblies, etc.) to attract funding; and
f) Development of mechanism to ensure that donor-driven NGDI projects are effectively and efficiently executed in the national interest.

Each subcommittee was given approval to have a number of working groups as may be deemed necessary after obtaining the NGDI Committee's clearance.

III. NGDI Administrative/organizational framework

The NGDI administrative/organizational framework is shown in Figures 1 and 2 here below. Working with geospatial data-producer organizations, the lead agency – NASRDA, shall have powers to enforce rules and standards.

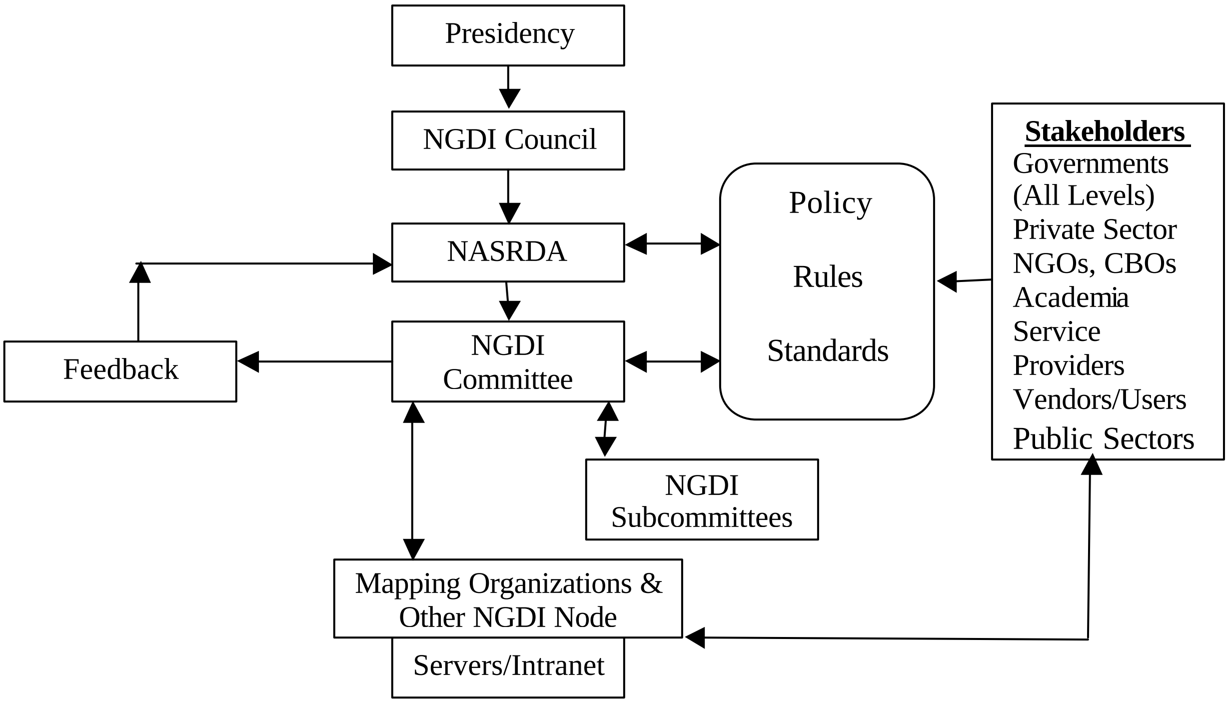

Figure 1: NGDI Organizational Framework

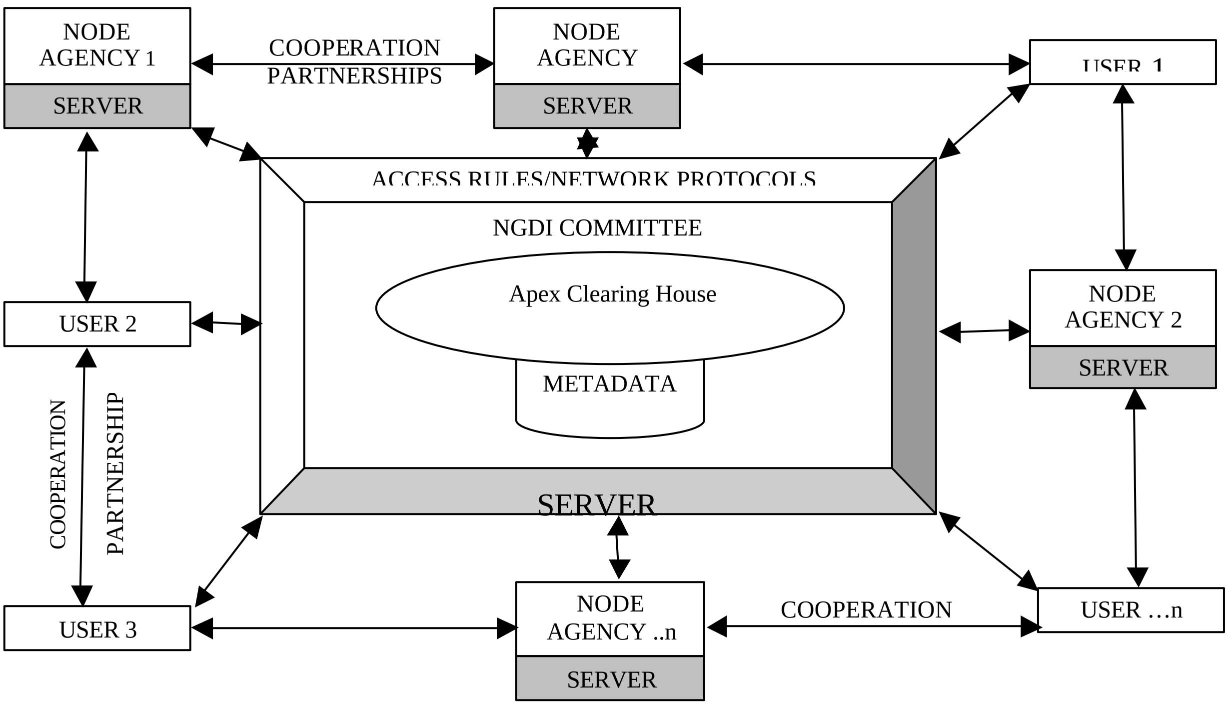

Figure 2: Nigerian NGDI Technical Framework to ensure access to and dissemination of GI data.

One of the goals of NGDI is to build relationships among GI data producers to support continuing development of the project.

The NGDI Council (yet to be inaugurated) has the Vice-President as the Chairman and seven ministers of major stakeholders' ministries as members State States (see GI Policy for full list). Their function shall be to develop all policy guidelines on NGDI. The multidisciplinary, inter-agency and inter-sectoral network of institutions that forms the administrative/organizational framework shall focus on the production, management, sale and use of geospatial information. The stakeholders would collectively ensure the successful realization of the NGDI vision.

IV. Data Access and Data Security

Transparent access to a wide variety of geospatial data can provide relevant information for countless applications leading to value-added services and market opportunities in a deregulated economy (NASRDA, 2003). Data sharing is facilitated through a coordinated and structured access to geospatial data owned by public and private sector organizations within a legal framework in order to ensure the rights of all parties (owners, custodians and users).
In the GI Policy, data access has been divided into two categories: i) restricted access and ii) community access. Restricted access will be granted to geospatial data related to national security projects, while community or free access is granted to other datasets taken into account of the protection of copyright. Data can be changed from one category to another as circumstances change over time. Data providers shall disclose or make available, their dataset on request unless prevented by law.

To achieve easy accessibility to data, an apex clearinghouse shall be established in NASRDA and a metadata database server linked to the apex clearinghouse in each geospatial data-producing agency and they will also be designated as clearinghouses. The owner/custodian of the geospatial data shall be responsible for accessibility of the data through supply of the metadata to the clearinghouse.

The strategies outlined in the GI Policy to achieve easy accessibility to geospatial data are as follows (NASRDA, 2003: p.34):

- Develop and implement the access rules and protocol including pricing rules and a flexible, easy to use search request form;
- Develop and implement a standard request authentication system for use in the Clearinghouse of all NGDI node agencies;
- Put in place a high-speed and high-bandwidth backbone carrier in the apex Clearinghouse as the main gateway and master server;
- Implement a database server at each NGDI node using the access protocol and linked to the master server; and
- Design and implement an appropriate network linkage mechanism among the NGDI node agencies.

The GI Policy also provides for copyright/intellectual property. A data owner shall own the copyright of the data produced and for value-added data, the producer shall own the copyright of only the value-added component of the data. Confidentiality, privacy and liability issues are also dealt with in the GI Policy. For example, geospatial data are to be collected only by the organization that is legally recognized to do so and they shall be accountable for the integrity of their unmodified data.

The development of a sustainable business model for the operation of the access component of NGDI is critical to the long-term success of the entire infrastructure. In light of this, Chapter 9 of the GI policy dealt with the commercial aspects of the infrastructure. To facilitate sustainable development of NGDI and promote development of GI on a cost recovery basis, a pricing mechanism shall be adopted for providing access to data (i.e. data search), apart from the data cost.

The GI Policy is to ensure accessibility of the information and provide a recognized contact point for the distribution, transfer or sharing of the information.

V. The current policy implementation

The holding of an international workshop of the NGDI stakeholders/users (see Section I.3), the setting up of the NGDI Committee and Subcommittees (see Section II) are some of the steps taken towards achieving geospatial information sharing/access in the country.

1. Users Requirement Survey and Analysis (URSA) and project document

An understanding of users' needs, operational priorities, related data and database requirements, and stakeholders' participation at each stage of the development are fundamental to a successful and cost effective NGDI implementation.

The URSA is currently being carried out alongside an awareness campaign to increase the stakeholders' buy-in to the NGDI initiative. The URSA is expected to logically review existing NGDI stakeholders and their data and databases that will affect the development and implementation of the project. The URSA will also capture the current use of data within the data producers, co-producers, users and other stakeholders. An assessment of the level of synchronization between existing data and desired data will be carried out.

The URSA will encompass data holdings, data needs, hardware and software capacity, data flow parameters, staffing requirements and organizational dimensions. The Survey results will identify data needs, systems requirements and budgetary implications.

The results of the URSA will serve as an essential input in the development of the *NGDI Project Document* that will provide a description of the NGDI systems development approach including project architecture and master schedule.

The URSA was planned to be completed in the first quarter of 2005.

2. Provision of Fundamental Datasets

In line with the National GI Policy, NASRDA is currently collaborating with the Federal Surveys in the provision of a network of GPS geodetic controls all over the country. Apart from being fundamental datasets for the NGDI, the establishment of these geodetic controls is essential for the processing of NigeriaSat-1 imageries to ortho-rectification level.

The successful completion of the GPS geodetic controls project will be an essential input into the ongoing plan by the Federal Surveys Department, the Surveyors Council of Nigeria (SURCON) and some Nigerian universities to densify, harmonize and adjust the national geodetic control network as a pre-cursor of an effective NGDI.

Currently the existing analogue 1:50000 topographic map series of the country are being converted to digital format by the Federal Surveys Department. This will be an essential dataset for NGDI.

3. Development of Application-Specific Projects

In order to demonstrate the power of Geographic Information System (GIS) and hence the need for NGDI for efficient planning and good decision-making, NASRDA is currently collaborating with the National Electric Power Authority (NEPA) and the Nigerian National Petroleum Corporation (NNPC) on NGDI application-specific projects.

The NEPA project is meant to demonstrate the usefulness of the system in the effective planning of energy generation and distribution. On the other hand, the NNPC project is the oil/gas pipeline mapping/monitoring project. The updating of the 1995 Land Use/Land Cover map of Nigeria using NigeriaSat-1 has been incorporated into the projects. Project implementation committees are already setup for both projects and preliminary work is on-going.

NARSDA is also collaborating with the National Emergency Management Agency (NEMA) in the development of a flood early warning system. The project will make use of NigeriaSat-1 imagery along with imageries from other satellites.

Conclusions

The problem of data sharing goes beyond technical, as organizations/institutions are not accustomed to working together and hence not willing to share data. Therefore, the participation of key stakeholders in the development and operation of the data access component of an SDI depend strongly on GI policy regarding data distribution, cost recovery etc.

The Nigerian GI Policy was drafted with contributions from stakeholders including an international workshop, in order to give it the necessary credence. The Policy is an essential backbone for the efficient realization of NGDI. Data sharing is facilitated through a coordinated and structured access to geospatial data owned by public and private sector organizations within a legal framework in order to ensure the rights of all parties (owners, custodians and users). The NGDI Policy, as it relates to the institutional arrangements in place that will facilitate GI sharing among organizations in Nigeria, was discussed.

In line with the GI Policy, NASRDA has embarked on some of the implementation strategies in the Policy such as the inauguration of the NGDI Committee. The associated Subcommittees and working groups have also been set up and given set objectives and mandates to supervise the implementation of the GI policy. NARSDA has also embarked on the implementation of the URSA, and the NEPA and Oil/Gas pipeline monitoring application-specific projects.

The development of NGDI for the country is seen as a major step towards poverty alleviation and hence sustainable development. The world is witnessing an information age that provides an opportunity for countries that have missed out on the agricultural and industrial revolution to catch up with the rest of the world.

When analyzed against the developments at the regional level in Africa, the Nigerian approach may serve as one of the best practices for the development of SDI at the national level.

References

Kufoniyi, O., 2004 Geospatial Information Policy Development, an Essential Backbone for SDI Implementation in Africa. In: *Proceedings of the 7th International Conference on Global Spatial Data Infrastructure*, Bangalore, India. 14p.

GSDI, 2004 Developing Spatial Data Infrastructures: The SDI Cookbook.

NASRDA, 2003 Draft Geoinformation Policy for Nigeria. *National Space research and Development Agency* (NASRDA), Fed. Ministry of Science and Technology, Nigeria.

UNECA, 2001, The Future Orientation of Geoinformation Activities in Africa. Committee on Development Information (Geo-Information Subcommittee), United Nations Economic Commission for Africa, Addis Ababa, 37p.

UNECA, EIS Africa, GSDI and ITC, 2003, SDI Africa – An Implementation Guide. United Nations Economic Commission for Africa, Development Information Services Division, Addis Ababa.

NASRDA

National Space Research & Development Agency

Nigerian Geoinformation Policy and Current Steps towards its Implementation

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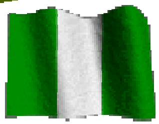
Theme: "Meeting International Responsibilities and Addressing Domestic Needs"

Space Law



NASRDA

Nigeria2005

United Nations/Nigeria Workshop on Space Law

Rockview Hotel (Royale), Abuja, Nigeria

21-24 November 2005

Presentation Outline

- Introduction
- National Geospatial Information Policy of Nigeria
  - GI Policy on Information Access and Dissemination
- International Workshop of NGDI Stakeholders/Users
  - Laying the foundation for partnering in GI sharing
- NGDI Committee Composition
  - to Enforce Partnership
  - Enabling Environment for data Access & Dissemination
  - NGDI Sub-Committees
- NGDI Administrative/Organisational Framework
- Data Access and Data Security Issues in the Policy
- NGDI Implementation So Far
- Conclusion

Introduction

- There is a strong economic justification for national investment in the collection and management of fundamental Geospatial Information and integrating it into the centre-stage of national information and communication infrastructure (NICI).

- Inadequate access to accurate information needed to make rational and prospective allocation and management decisions can lead to food insecurity and hunger, air and water pollution, environmental degradation, poverty, diseases and death.

Introduction [2]

- Therefore realisation **of the objectives of a national's socio**–economic development programmes depends on availability of and speedy access to Geospatial Information (GI)
- Technically ICT permits GI sharing and growth BUT the problem of data sharing goes beyond technical!
- Organisations/Institutions are not accustomed to working together & hence not willing to share data.
- The National GI Policy provides a platform for data sharing and hence easy accessibility

Geospatial Data Infrastructure [GDI]

What is Geospatial Data Infrastructure?

"The Technology, Policies, Standards, and Institutional arrangements necessary to acquire, process, store, distribute, and improve the utilization of geospatial data – from many different sources and for a wide group of potential users"

(Groot, 1998)

Geospatial Data Infrastructure [GDI]

- Conscious efforts are being made to implement GDI (or SDI) in various African countries. However most of the initiatives usually commence without paying attention to the issue of policy to guide proper implementation leading to various setbacks in achieving this laudable objective.

- It is advisable that policy issue be put in the forefront of any GDI implementation as is the case in on-going implementation of NGDI in Nigeria.

National GI Policy of Nigeria

Policy Objectives

- Coordinated production of Core GD to eliminate duplication
- Rapid socio-economic growth through widely available, accessible, current, reliable and authoritative GI for development
- Use of endorsed standards to create and maintain data at a high level of quality and consistency
- Legal framework for the production, management, distribution and use of GD
- Promotion of partnership and Investments in the production of GD
- Common solution for discovery, evaluation, access and exploitation of GD
- Awareness of GI and its applications
- Adequate funding
- Promotion of capacity building in GI.

National GI Policy on Information Access and Dissemination

- The GI Policy aims to facilitate coordinated production and utilisation of Geospatial data through the promotion of relationships among organisations

- Policy implementation strategies to ensure easy access and dissemination:
  - Establishment of Clearinghouse in the NGDI node agencies
  - Creation of metadata for existing dataset(s) by the custodian(s) of the dataset(s) and making the metadata available to the NGDI clearinghouse.
  - Define the metadata content and structure for the NGDI and produce detailed metadata implementation guidelines, including practical advice on maintenance and use of metadata
  - Develop ISO-compliant geospatial data standards for the NGDI

National GI Policy on Information Access and Dissemination

NGDI Structural Strategy

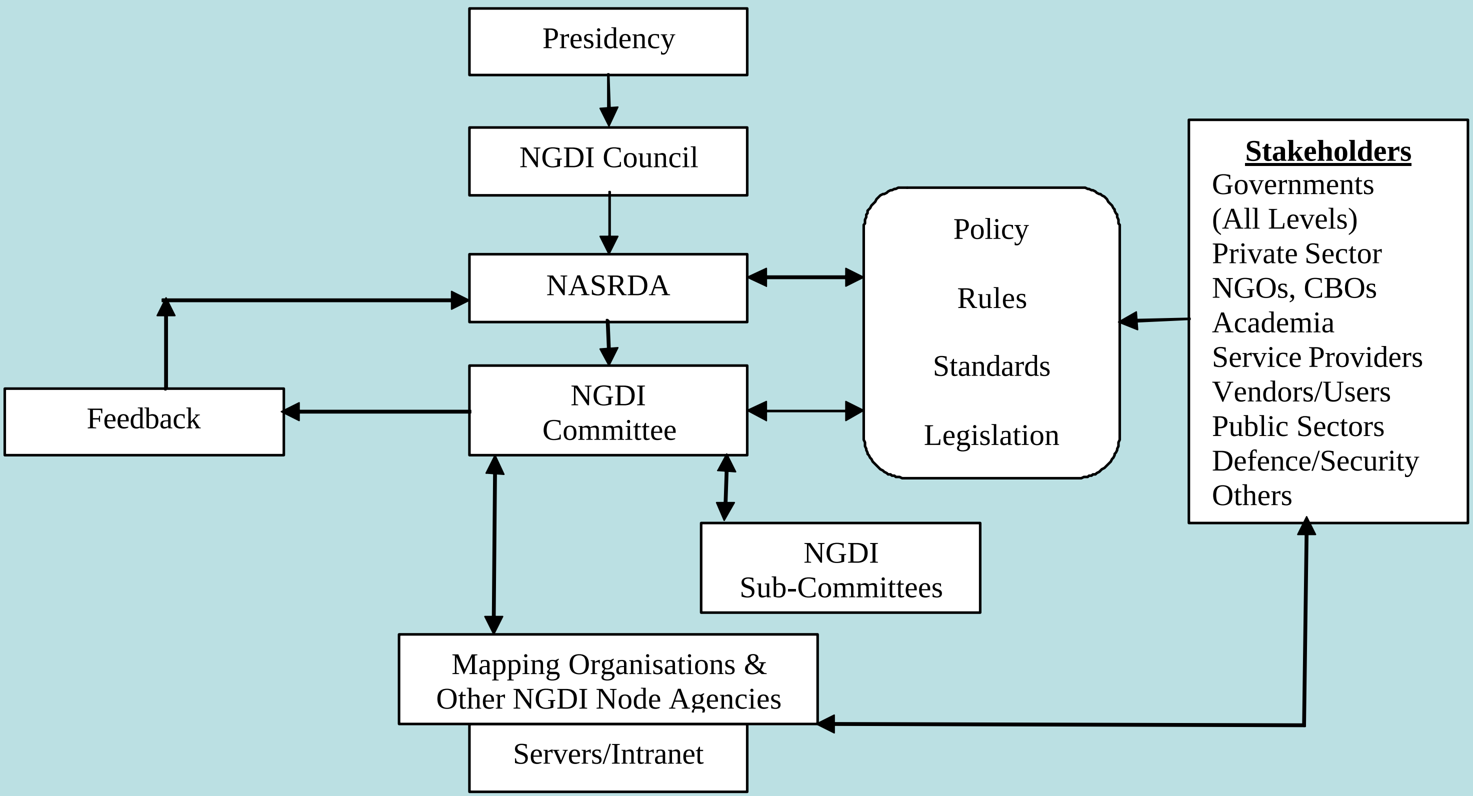
- Establishment of NGDI Council
  - Members:
    - His Excellency, The Vice President of the Federal Republic of Nigeria
    - Hon. Minister of Agriculture & Rural Development
    - Hon. Minister of Defence
    - Hon. Minister of Environment
    - Hon. Minister of Science and Technology
    - Hon. Minister of Solid Minerals
    - Hon. Minister of Water Resources
    - Hon. Minister of Works

- An administrative/organisational framework that is multidisciplinary, Inter-agency and Inter-sectorial network of Institutions coordinated by the lead Agency – NASRDA

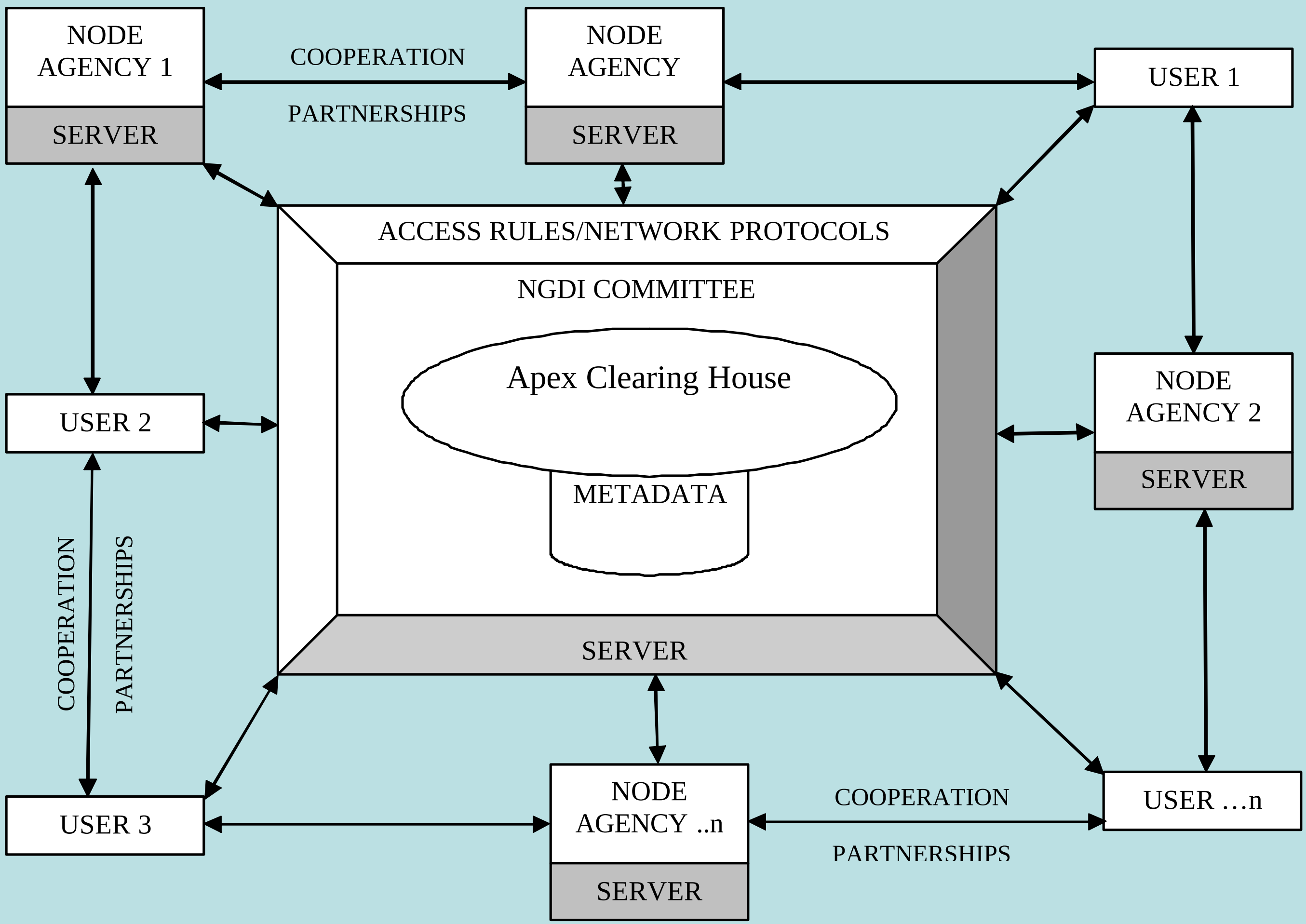
- Nasrda to work in close collaboration with the relevant National, State and Local Government Legislative Committees and Geospatial data producing organisations and shall have powers to enforce rules and standards

- This arrangement will remove the institutional barriers that have in the past inhibited GI sharing among the producers and users.

NGDI Organisational Framework



NGDI Technical Framework



Nigerian Geoinformation Policy

Policy Implementation Strategies

- Carry out User Requirements Survey and Analysis
- Make provision for immediate production of non-existent but essential fundamental datasets by the agency legally mandated to produce them
- Datasets producers to be custodian while making metadata available to the NGDI Clearinghouse
- Develop geospatial data standards for the NGDI
- Define metadata content and structure for the NGDI

Nigerian Geoinformation Policy

Policy Implementation Strategies

- Set-up 27- member NGDI Committee
- Establish Clearinghouses by creating Geospatial Data Catalogues in NGDI node agencies
- Put in place high-speed and high-bandwidth backbone carrier in the apex Clearinghouse as the main gateway and master server and implement a database server at each NGDI node agency.
- Encourage indigenous personnel with relevant skills in acquisition and analysis of GI in the country by ensuring that all GI related projects are locally implemented to a minimum of 75%.
- Ensure adequate fiscal provisions and funding of the NGDI

Data Access and Data Security

Implementation Strategies

- **Develop and implement the access rules and protocol including pricing rules and a flexible, easy to use search request form.**

- **Develop and implement a standard request authentication system for use in the Clearinghouse of all NGDI node agencies.**

- **Put in place high-speed and high-bandwidth backbone carrier in the apex Clearinghouse as the main gateway and master server.**

- **Implement a database server at each NGDI node using the access protocol and linked to the master server.**

- **Design and implement appropriate network linkage mechanism among the NGDI node agencies.**

Data Access and Data Security

- **Data sharing is facilitated through a coordinated and structured access to geospatial data owned by public and private sector organisations within a legal framework in order to ensure the rights of all parties (owners, custodians and users).**
- **Access**
  - **Restricted Access**
  - **Community or Free Access**

- **The owner/custodian of the geospatial data shall be responsible for accessibility to the data through supply of the metadata to the Clearinghouse.**

Data Access and Data Security

COPYRIGHT/Intellectual PROPERTY

- **A data owner shall own the copyright of the data produced**
- **Confidentiality, privacy and liability issues:**
  - **e.g. geospatial data are to be collected only by the organisation that is legally recognised to do so and they shall be accountable for the integrity of their unmodified data.**

Business Model

- **To facilitate sustainable development of the NGDI and promote development of GI on a cost recovery basis, a pricing mechanism shall be adopted for providing access to data (i.e. data search), apart from the data cost.**

Laying the foundation for partnering in GI sharing
- An International Workshop of Stakeholders/Users

- **A 10 – Man Committee was inaugurated on the 21st November 2002 to develop a Geospatial Information Policy that will guide the implementation of the NGDI.**
- **Prior to the submission of the draft GI policy in September 2003, it was a subject of an International workshop in February 2003.**
- **The Workshop serves as a major strategy to bring GI stakeholders together and began the process of partnering on GI related matters.**
- **A watershed in the history of our collective aspiration to establish NGDI in Nigeria**
- **Provides the opportunity to identify and recognize major stakeholders and users in the production, management and utilization of geo-spatial data and information products in Nigeria.**

The Policy Implementation so far [1]

- Project/Programme Implementing Agency:
  - National Space Research and Development Agency (NASRDA)
- Project/Programme Consultant:
  - Regional Centre for Training in Aerospace Surveys (RECTAS), Nigeria
- Inauguration of the NGDI Committee and Sub-Committees & Creation of Working Groups
  - On 9th September 2004 the 27-member NGDI Committee was inaugurated.
  - The Committee meets quarterly apart from regular electronic discussions.
  - The six sub-committees and their WGs were created and have all started work in line with their TORs.
  - The NGDI Committee composition is as depicted in Table 1

NGDI Committee

Composition: Not more than 27 persons

Chairman-: elected in rotation among members for a maximum of 2 consecutive terms of One year each

No	Representation	Remarks
2	NASRDA	Lead /Coordinating agency
2	Universities	Universities selected in rotation
2	Poly/Monotechnics	Poly/Monotechnics selected in rotation
6	Six Geopolitical zones – States nodal agencies	States selected in rotation
4	Private Sector, Inter-governmental & Non-governmental organisations	GI related Sectors
11	Federal Ministries/Agencies	

Terms – Maximum of 2 terms of 2 years each

The Policy Implementation so far [2]

- Users' Requirement Survey and Analysis – on going

- Provision of Fundamental Dataset –
  - GPS Geodetic Control Network in collaboration with the Office of the Surveyor-General
  - Land Use/Land Cover in collaboration with Ministry of Environment (Forestry-FORMECU)

- Collaborative Implementation of Application Specific Projects
  - Oil/Gas pipeline Mapping and Monitoring
  - Energy generation/distribution
  - Flood Early Warning system

The Policy Implementation so far [3]

- **The Committee created six Sub-Committees for the Effective Implementation of her mandate:**
  - **Geospatial Dataset**
  - **Clearing House & Metadata**
  - **Sustainability & Funding**
  - **Capacity Building**
  - **Legal**
  - **Standards**

- **Working Groups**
  - **Each Sub-Committees have 2-3 Working Groups**

The Policy Implementation so far [4]

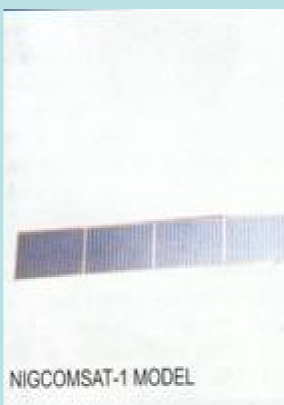
- Implementation Problems
  - Funding
    - Budgetary Allocation
    - Millennium Development Goals [MDGs] Fund
    - National Economic Empowerment Development Strategy [NEEDS] Fund
    - External Donor funding

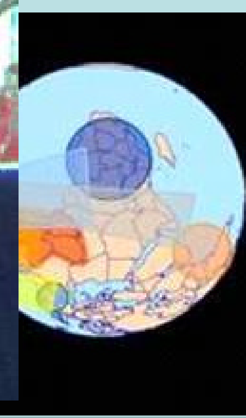
PROJECTS THAT WILL HAVE BENEFICIAL IMPACT ON NGDI

NigeriaSat-1

-2 [ARMS]

NigComSat-1





CONCLUSION

- **The problem of data sharing goes beyond technical**
- **The participation of key stakeholders in the development and operation of the data access component of an SDI depend strongly on Geo-Information policy regarding data distribution, cost recovery etc.**
- **The GI Policy was drafted with contributions from stakeholders including an international Workshop in order to give it the necessary credence.**
- **The NGDI Policy as it relates to the institutional arrangements in place that will facilitate GI sharing among organisations**
- **The Development of SDI for the country is seen as a major step towards poverty alleviation and hence sustainable development.**

Conclusion [2]

- **When analyzed against the developments at regional level in Africa, the Nigerian approach may serve as one of the best practices for the development of SDI at national levels.**

- **The GI Policy is to ensure accessibility of the information and provide a recognised contact point for the distribution, transfer or sharing of the information**

- **The world is in an information age. The information age provides opportunity for countries that have missed out of the agricultural, and industrial revolutions to catch up with the rest of the world.**

Overview of National Space Laws and Policies:
Remarks on Brazilian Space Laws

José Monserrat Filho
Professor**
Associação Brasileira de Direito Aeronáutico e Espacial, Brazil

Let me first present an overview of the main space projects Brazil is developing today. It can give you an idea on the scope of legal issues my country is facing now.

I. Chinese-Brazilian Earth Resource Satellite (CBERS), based on the agreement signed in 1988

CBERS-1 was launched in 1999 and CBERS-2 was launched in 2003.

CBERS-2B, in construction now, should be launched by October 2006, in order to prevent any interruption between the end of CBERS-2 time life and the beginning of CBERS-3. CBERS-3 is planned to be launched by 2008, and CBERS-4 by 2010.

The high quality of CBERS-2 images gives it reliability and competitiveness.

Since June 2004 more than 150,000 images have been distributed freely in the Brazilian territory to more than 14,000 users in more than 2,000 institutions.

China, where the images of CBERS are paid, has distributed about 10% of this number.

In Brazil, the free distribution of satellite images for the past two years at least is spreading the culture of utilization of remote sensing data and creating a large internal market for its products.

II. Brazilian-Russian cooperation established in 2004 to improve the Brazilian launch vehicle VLS-1, with the introduction of a solid fuel stage

The old Satellite Lauch Vehicle-1 (VLS-1) failed in three attempts of launching. The new VLS-1 may be launched by 2007.

** José Monserrat Filho, Vice-President, Brazilian Association of Air and Space Law (SBDA); Member of the Board, International Institute of Space Law (IISL); Member, Space Committee, International Law Association (ILA). E-mail: <monserrat@alternex.com.br>

III. Brazilian-Ukrainian Treaty, signed in 2003, which creates a bilateral company to explore commercial launchings by Cyclon-4 from Alcântara Launch Center located in the north of Brazil, near the Equator circle.

IV. Creation of the Alcântara Space Center, of civilian nature, in more than 85% of the territory of the Alcântara Launch Center, which is actually a military base under the command of the Brazilian Air Force.

V. Brazilian participation in the International Space Station (ISS), based on a protocol signed by the Brazilian Space Agency and NASA in 1997.

The first Brazilian astronaut, trained by NASA, is planned to arrive to the ISS by March 2006 onboard the Russian spacecraft Soyuz. He is going to carry out many scientific experiments from the Brazilian universities.

VI. Design and construction of telecommunication and meteorological satellites, as well as two scientific satellites (Equatorial Atmospheric Research Satellite- Equars –, and X-Ray Imagiator and Monitoring Satellite - Mirax).

All these actions, and some others, are described in the new National Programme of Space Activities 2005-2014, adopted in 2004 and published in 2005.

This important document is particularly useful for us to identify the Brazilian space legal demands of today and tomorrow.

But these demands are not mentioned in its text, although it has four annexes with legal documents enclosed.

So far, the major Brazilian laws relating to space activities are:

1) 1967 Outer Space Treaty, 1968 Rescue Agreement and 1972 Liability Convention, ratified by Brazil and incorporated into the Brazilian legislation. Brazil did not sign the 1975 Registration Convention, but is now prepared to become a Party, through a project of adherence, which is passing into approval by the National Congress;
2) Many bilateral agreements and protocols signed with China (about 15!), Ukraine, USA, Germany and some other countries, which are a basis for Brazil's space activities.
3) Law of 10 February 1994, which created the civilian Brazilian Space Agency (BSA);
4) Decree of 10 January 2003, which subordinated the BSA to the Ministry of Science and Technology;
5) Decree of 8 December 1994, approving the updating of the National Policy for the Development of Space Activities;
6) Decree of 10 July 1996, creating the National System for the Development of Space Activities;
7) Edict of 2001, adopted by the Superior Council of BSA, on the licensing for private enterprises to prepare launching operations in the Brazilian territory; and
8) Edict of 2002, adopted by the same Council, on the authorization for private enterprises to carry out launching operations in the Brazilian territory.

VII. A growing awareness of a general national law on space activities

In Brazil there is already an increasing awareness on the need for an all-embracing national legal space framework. It may be seen at the Brazilian Space Agency (only eleven years old), the National Institute for Space Research (INPE) and at some other institutions, as well as at the Brazilian Association of Air and Space Law.

A general law on space activities would probably include principles and provisions relating to both State (governmental) and private space activities.

Activities in different fields: Launching services, industrial, commercial, remote sensing, communication, insurance, intellectual property rights, and even in space education – regarding the enlargement of the formation of technical people and a highly skilled critic mass, as well as the massive dissemination of space information and knowledge.

The central idea of such a wide and ambitious project is the hope that it could be an essential contribution to the consolidation of a strong, efficient and well-organized space sector.

But we are fully aware that this is not an easy task.

The success of this complex work would depend on many factors, such as:

1) Consolidation of the Brazilian Space Agency, as the head of the national space policy and as a reference for the coordination of the system of all national space institutions;
2) Velocity of the development and implementation of the Brazilian Space Programme. It requires, above all, the regular and timely transfer of the budgetary resources to the Program. Frequently the Brazilian Space Programme, as well as other governmental organs, has the budget approved, but no money is available (released) to be expended in the Program; and
3) A bigger awareness of the public opinion on the Brazilian Space Programme, particularly in the National Congress.

The parliamentary group that is interested in the scientific and technological projects and particularly in the space ones – although it is still relatively small and less powerful than it would be ideally – has been growing during the past years and achieving a more prestige level and gaining more political weight.

The draft project of the new Brazilian space law will certainly be prepared by the Brazilian Space Agency. This text has to be approved by the Presidency of the Republic, which must submit it to the National Congress, where it should be discussed, reviewed and approved by both the Chamber of Deputies and the Senate. It is a long and sometimes not straightforward way. In the best-case scenario it can be concluded within two years, whereas this process has not started yet.

Is there any way we can save time and get there? It is not just a question; it is a challenge. Let us prove the creativity of the Brazilian players in fields other than that of soccer and football.

United Nations/Nigeria
Workshop on Space Law
21-24 November 2005, Abuja, Nigeria

Remarks on Brazilian space laws

José Monserrat Filho

Brazilian Association of Air and Space Law

Brazilian Association for the Advancement of Science

Main space projects Brazil in developing today:

1) CBERS - Chinese-Brazilian Earth Resource Satellite
2) Brazilian-Russian cooperation to improve the Brazilian launch vehicle VLS-1
3) Brazilian-Ukrainian Treaty of 2003 to explore commercial launchings of Cyclon-4
4) Creation of the Alcantara Space Center
5) Brazilian participation in International Space Station – First Brazilian astronaut
6) Creation of new telecommunication, meteorogical and scientific satellites

- All these actions – and some others – are described in the new NATIONAL PROGRAM OF SPACE ACTIVITIES 2005-2014, adopted in 2004 and published in 2005.

- This important document is particularly useful for us to identify the Brazilian space legal demands today and tomorrow.

- But theses demands are not mentioned in it, although it has four annexes with legal documents.

Major Brazilian laws relating to space activities:

- 1) 1967 Outer Space Treaty, 1968 Rescue Agreement and 1972 Liability Convention, ratified by Brazil and incorporated into the Brazilian legislation.
- Brazil did not signed the 1975 Registration Convention, but now it is prepared to be Party of it, through a project of adherence, which is passing by the National Congress.
- 2) Many bilateral agreements and protocols signed with China (about 15!), Ukraine, USA, Germany and some other countries, on the base of which Brazil carry out space activities.

- 3) Law of February 10th, 1994, which create the Brazilian Space Agency, of civilian nature.
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- 5) Decree of December 8th, 1994, approving the updating of the NATIONAL POLICY FOR THE DEVELOPMENT OF SPACE ACTIVITIES.

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- 7) Edict of 2001 adopted by Superior Council of the BSA on the licensing of private enterprises to prepare launching operation in Brazilian territory.

- 8) Edict of 2002 adopted by the same Council on the authorization of private enterprises to execute launching operation in Brazilian territory.

- The idea of a general national law on space activities is growing.
- In Brazil, there already is an increasing awareness on the need of an all-embracing national legal space framework
- It can be seen at the Brazilian Space Agency (only eleven years old), the National Institute For Space Research (INPE) and at some others institutions, as well as at Brazilian Association of Air and Space Law.

- A general law on space activities would probably include principles and provisions relating both to state (governmental) and private space entities and activities.
- Entities and activities in different fields:
- Launching services, industrial, commercial, remote sensing, communication, insurance, intellectual property rights, and even in space education – regarding the enlargement of the formation of technicians and highly specialized critic mass, as well as the massive dissemination of space information and knowledge.

- The central idea of such a wide and ambitious project is the hope that it could be an essential contribution to the consolidation of a strong, efficient and well-organized space sector.
- But we are full aware that this is an easy task.

- The success of this complex work would depend on many factors:

  1) Consolidation of the BSA as the head of the national space policy and the effective instance of coordination of the system of all national space institutions;

  2) Velocity of the development and implementation of the Brazilian Space Program.

  It requires, above all, regular and timely transfer of the budgetary resources to the program.

Frequently the Brazilian Space Program, as well as other governmental projects, have their respective budget full approved, but has no available (liberated) money to accomplish their commitments.

- 3) Bigger awareness of the public opinion, particularly of the National Congress about the Brazilian Space Program.

- The parliamentary group interested in science and technology projects and especially in space activities – although it still is relatively small and less powerful than it would be convenient and necessary – has been growing last years and achieving rather more prestige and political weight.

- The draft project of the new Brazilian space law certainly would be prepared by the BSA.
- It should be approved by the Presidency of Republic, who must send it to the National Congress, where it should be discussed, reviewed and approved by the Camera of Representatives as well as by the Senate.
- It is a long and very often tortuous way.
- In the best hypothesis, it could be concluded in two years, since the start of the process, which has not began yet.

- How to get there saving time?
- It is not a question. It is a challenge.
- Lets prove the creativity of the Brazilians players in other field than that of the football match...

the dti

THE DEPARTMENT OF TRADE AND INDUSTRY SOUTH AFRICA

SOUTH AFRICAN SPACE AFFAIRS

Mothibi Ramusi

22 November 2005

UN Space Law Workshop, Abuja, Nigeria

the dti

CONTENTS

Why Space Affairs in South Africa?

- Need for an ICT infrastructure
  - Rural connectivity requires satellite based as a primary infrastructure.
  - Addressing distance education, e-government, health, etc.
- Conduct trend analysis and provide proactive predictions on environmental matters, land use, water resources, disasters etc.
- Managing Government, Industry and Nations assets
- Support for the: Aviation and Maritime
- Participate in partnership or self in global space activities.
- Responding to user needs, e.g. Government Led User Group (*an intergovernmental group that interact with all government institutions gathering user needs)*
- Contribute to global space programmes – building capacity, grow R&D spend.

Meeting International Responsibilities

(Our Path)

- Recognition of UN Treaties on Peaceful Use of Outer Space and other similar Treaties.
- Supporting the Group on Earth Observation and other similar global initiatives in developing collective and integrated solutions
- Joint R&D programmes on global environmental challenges and providing predictions.
- Opportunity to develop joint solutions affecting humankind, e.g. Natural Disasters, etc.
- Developing and contributing to capacity building programmes – creating a knowledge based society.

Addressing Domestic Needs

(SA Approach)

- Encouraging participation of both Government, Industry, Academia and labour in gathering user needs.
- Prioritisation of programmes based on National Imperatives *(i.e. Government priorities).*
- Continuous consultation with the society – updating of users database of needs.
- Aligning domestic needs to Regional and International programmes.
- Growing the industry and creating a sustainable country.
- Create a knowledge based Space society.
- Growing R&D spend – responding to the GDP growth.
- Utilisation of media (print and electronic) in communicating all programmes including socio-economic benefits.
- Availing information to all and minimal or no cost using Space Technologies where possible.

South Africa's History in Space Affairs

- Became involved in space during the late 50's when NASA established TT&C (Telemetry, Tracking and Control) facilities near Hartebeeshoek for the support of its deep space and Apollo missions.
- Also one of the earliest signatories of Intelsat, and an Earth Station, managed by Telkom was established near Hartebeeshoek, used for intercontinental communications (telephony and television).
- Other centres of excellence were established over the years, mainly at the different universities, with capabilities to apply space technology.
  - University of Natal (NASA monitoring program),
  - University Cape Town (Radar technologies and oceanography applications)
  - University of the Witwatersrand (pollution monitoring, SAFARI program)
  - University of Stellenbosch (Sunsat PROGRAM)
  - RAU (Applications in Remote sensing),
  - Weather Services (Application of Space in weather monitoring)
  - Sentech and Orbicomm (Reception and redistribution of television content).

Cont.

- Other players emerged in the communications field developing their own private communications network, namely Transtel, Eskom, Local Municipalities.

- During the 1980's SA embarked on the development of a Space program with military objectives, including a launcher and reconnaissance satellite. Facilities to support this venture were established at Houwteq, Western Cape, with a launch site at OTB.

- This program was terminated in 1993 – "Need to align the needs of the Country"

What Next? - Government Institutions

(main drivers of the National & International Space Science and Technology Agenda)

Departments of:

- Communications
  - ICT and Postal
- Foreign Affairs
  - International Conventions
- Science and Technology
  - Earth Observation, Space, Astronomy, Testing laboratories,..
- Transport
  - Maritime and Aviation
- Trade and Industry
  - Space Affairs Policy & Regulatory and industrial Programmes
- Various Universities are involved in Space Science and Technology training whilst University of WITS – has a special course in Space Law.

Coordination of activities is currently managed through a National Secretariat on Space Science and Technology – led by Dr Peter Martinez.

Key supporters: Defence, Environment, Land, Agriculture and Treasury.

Key SS&T Programmes

(some of reasons for a need of an integrated Space Program)

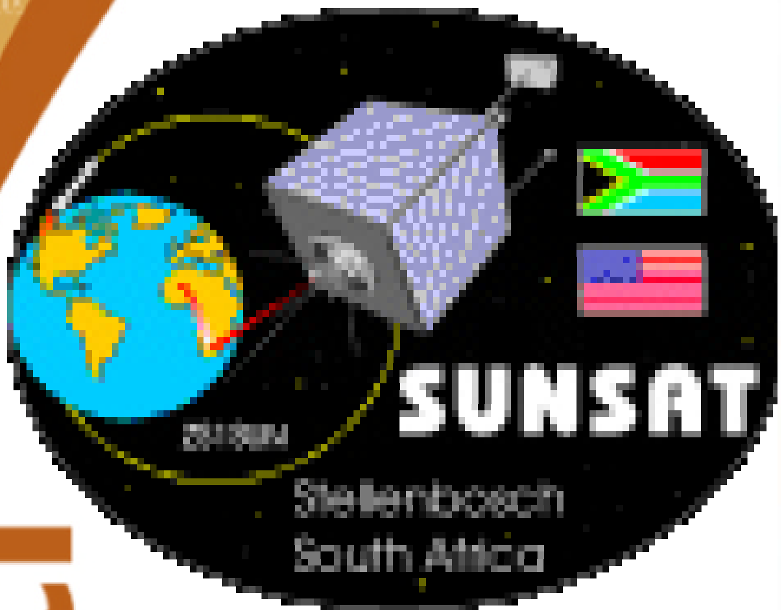
- Earth Observation
- Space Science
  - Astronomy
  - Testing Laboratories
- Navigation
- Maritime
- Telecommunications & Broadcasting
- Capacity Building
- Industrial Programs
  - Aeronautics, Space and Defence
- Launch facility and integration.

CSIR Satellite Applications Centre

SALT

OTB SATELLITE GROUND STATION COMPLEX

10 Meter Main Tracking Antenna at OTB


SUNSAT
Stellenbosch
South Africa

SOUTH AFRICAN NATIONAL ANTARCTIC EXPEDITION (SANAE)

Antarctica, the southernmost continent on Earth, does not belong to any country, but several countries have bases there. South Africa has had an Antarctic base since 1962. Data gathered at SANAE are used to study the upper layers of the atmosphere in detail, especially the ionosphere and the magnetosphere. Information is also gathered about the ozone hole.

HIGH ENERGY STEREOSCOPIC SYSTEM (HESS)

Provides an indirect way of detecting gamma rays from the universe. HESS is located near the Gamsberg on the Khomas Hoghland, between Windhoek and Walvis Bay, Namibia. HESS is an international collaboration in which South Africa is a partner through Potchefstroom University.

THE CSIR SATELLITE APPLICATIONS CENTRE (SAC)

Provides products and services related to the space industry and its applications. It can track and control spacecraft for clients using its antennas or help them set up their own antennas and tracking facilities. It also offers services related to getting, storing and using images of earth obtained from satellites. It has three main groups: Earth Observation; Ground Segment Services; and Information and Communications Technology Applications.

SUN SPACE AND INFORMATION SYSTEMS (PTY) LTD

SunSpace designs and develops small and micro-satellite systems, and related support equipment and ground-based applications. SunSpace has its origins in the SUNSAT satellite programme of the University of Stellenbosch. SUNSAT, South Africa’s first satellite, was developed completely by a local team of engineers, and launched in 1999 by the American space agency NASA. The team who designed and developed SUNSAT forms the core of SunSpace today.

INSTITUTE FOR SATELLITE & SOFTWARE APPLICATIONS (ISSA)

ISSA is based at the Houwteq satellite integration facility in Grabouw. Research conducted at ISSA includes satellite engineering, and excellent facilities are available for designing and testing small satellites.

CAPE TOWN PLANETARIUM

Inside the domed auditorium of the Planetarium in Cape Town, visitors are transported through the wonders of the universe – the ultimate in armchair travel! Their full monthly menu of shows and activities for all ages, as well as their astronomy courses, are very popular

JOHANNESBURG PLANETARIUM

Offers a variety of shows for small children, school groups and the general public, as well as astronomy courses. Special shows can be put together on request, and astronomical birthday parties can be arranged. It also supplies star-charts, telescopes, and other astronomy-related materials. A free e-mail service notifies subscribers of interesting sights in the South African night skies.

BOYDEN OBSERVATORY

Has the third largest optical telescope in Southern Africa, a 1,5 m reflector and various other telescopes for educational purposes, including an excellent solar telescope. An observation platform is ideal for looking at satellites, astro-photography and open-air slide/data projector presentations. Boyden hosts open evenings for school groups and adults. A Science Centre is now being established at the site. It is located just outside Bloemfontein.

THE HERMANUS MAGNETIC OBSERVATORY (HMO)

The HMO is part of an international network of magnetic observatories, which monitor and model changes in the Earth's magnetic field. Researchers at the HMO are also involved in studying the magnetosphere, which is the outermost layer of Earth's atmosphere. The HMO runs science awareness programmes for learners and offers presentations on space physics and guided tours of the HMO's facilities. There is also an interactive science centre and magnetometer museum.

HARTEBEESTHOEK RADIO ASTRONOMY OBSERVATORY (HARTRAO)

HartRAO operates a telescope 26 metres in diameter that can detect radio waves ranging in wavelength from 2,5 cm to 18 cm. The radio waves are emitted by many different kinds of objects in the sky, from atoms and molecules to neutron stars to galaxies. HartRAO has the largest steerable radio telescope in Africa, and it co-operates with radio telescope facilities on other continents.

THE SOUTH AFRICAN ASTRONOMICAL OBSERVATORY (SAAO)

National optical observatory of South Africa, dating back to 1820, when the Royal Observatory was established at the Cape. The headquarters are in Observatory, Cape Town, and the telescopes are at Sutherland in the Northern Cape. At present there are various telescopes with mirrors ranging in diameter from 0,5 metres to 1,9 metres in diameter. The telescopes detect visible light and infrared radiation. The SAAO Science Education Initiative offers astronomy workshops for educators.

SOUTHERN AFRICAN LARGE TELESCOPE (SALT)

The biggest single optical telescope in the Southern Hemisphere. By putting together 91 small hexagon-shaped mirrors, each 1 metre wide, SALT has an effective diameter of 11 metres. It will be able to record light from distant stars, galaxies and quasars a billion times too faint to be seen with the unaided eye – as faint as a candle flame on the moon

SQUARE KILOMETRE ARRAY (SKA)

South Africa is competing with other countries to host the SKA, a $1 billion international project to create an array of antennas for detecting radio waves that will cover an area of one square kilometer (about the size of 150 soccer fields). This area is 100 times larger than the biggest receiving surface that now exists. If South Africa wins this bid, the main part of the SKA will be built in the Northern Cape, with other parts distributed in Southern Africa. It will bring world class scientists to our country and the region.

Objective of the SA Space Affairs Policy

The Minister of Trade and Industry may, by notice in the Gazette, determine the general policy to be followed with a view to –

(a) meeting all the international commitments and responsibilities of the Republic in respect of the peaceful utilization of outer space, in order to be recognized as a responsible and trustworthy user of outer space; and

(b) controlling and restricting the development, transfer, acquisition and disposal of dual-purpose technologies, in terms of international conventions, treaties and agreements entered into or ratified by the Government of the Republic.

No person shall perform the following activities, except in terms of a licence issued by the Council, -

(a) any launching from the territory of the Republic;

(b) any launching from the territory of another state by or on behalf of a juristic person incorporated or registered in the Republic;

(c) the operation of a launch facility;

(d) the participation by any juristic person incorporated or registered in the Republic, in space activities -

(i) entailing obligations to the State in terms of international conventions, treaties or agreements entered into or ratified by the Government of the Republic; or

(ii) which may affect national interests;

(e) any other space or space-related activities prescribed by the Minister.

(2) A licence shall be issued subject to such conditions as the Council may determine for that particular licence,

taking into account -

(a) the minimum safety standards as determined by the Council;

(b) the national interests of the Republic; and

(c) the international obligations and responsibilities of the Republic.

Legislations

- Enacted the Space Affairs Act, 1993 (84 0f 1993) as amended.
  - Administration through an appointed Space Council from:
    - Government
    - Space Industry
    - Space Professionals including Academia
  - Licensing of satellite launches and facilities.
  - Co-ordination of all Space matters

Other legislations that have relevance to Space:

- Telecommunications and Broadcasting Act.
  - Recently adopted as “Information and Communications Act”

- Maritime and Aviation.

SA Regulatory Institutions

(Relevance to Space)

- Independent Communications Authority of South Africa (ICASA)
  - Telecommunications, Broadcasting and Postal
- Space Affairs Council
- Civil Aviation Authority
- Maritime Authority
- Non-Proliferation Council

International and Regional Initiatives

- An active participant in the following initiatives:
  - Designate Chair of CEOS (Nov ‘07 – Nov ‘08).
  - African Resource Management Constellation
    - Algeria, Kenya and Nigeria
  - Group on Earth Observation
    - Co-Chair of GEO
  - Crop Monitoring & Estimates
    - e.g. FEDAMA Rice Monitoring in Nigeria
  - TIGER – Water Resource Management
    - Ground receiving station for sensors such as EnviSat.
  - Disaster Management
    - Ground station for sensors such as NOOA – “near or real time data acquisition”
  - UN Committee on Outer Space

SA Space Roadmap
(2005 – 2014)

- Development of Earth Observation Strategy
    - Alignment to GEO
        - Driven by the Department of Science and Technology
        - Availing data to all

- Development of Space Policy
    - Preparing political framework for the SA Space Programme
        - Driven by the Department of Trade and Industry
        - Co-ordination of Space Affairs matters

- Establishment of Space Centre or Agency ***(its all about names)***
    - Establish and Coordinate space science & technology programmes
        - Driven by the Department of Science and Technology

- Aeronautics and Defence Strategy

- Develop an Outreach & Capacity Building also serve as feeder to the Curriculum Development

Cont.

- Industrial space program
  - Manufacturing
  - R&D
  - Application development (downstream)
- Review of the Space Affairs Act – align it today's needs.
- Finilise the Space Budget as per the envisaged programmes
- Launch of the ZaSat (micro-satellite) in the last quarter of 2006 and an associated Capacity Building programme.
  - Opportunity exists for research including development of other payloads such as Telecoms for Masters and PhD students.
- Joint development of the Africa constellation inititiave.

Developing National Space Policies and Strategies:
Issues in Developing National Space Policy and Laws

Henry R. Hertzfeld
Professor
Space Policy Institute, George Washington University, Washington, D.C., USA

Introduction

Government policy precedes legislative activity. Policy can be flexible and changed relatively easily. Laws usually require formal debate and enactment by a legislature or other law-making body. In order to enforce laws, subsequent regulations are needed. The power to make regulations is often given to a subordinate operating agency. Regulations often are drafted and available for public comment and input before being finalized.

Policy can be made either from a top-down or bottom-up process, and is often done both ways simultaneously. A fiat or mandate from a high-ranking official (top-down) can set broad goals, but without support from those carrying the policy out, there is a risk that such a policy will not prevail for very long. Rarely are detailed operational policies set from a top-down process.

Policies can be broad or very specific. Long-term strategic planning involves setting objectives and goals at a high level, while those making day-to day decisions handle specific problems, and, in effect, also set policy. Sometimes the combined actions of day-to-day decisions result in a *de facto* policy. (There are, of course, many levels between these two extremes.)

Space law exists primarily at the international and national levels. Occasionally, actions occur at local levels that involve local law, but for space issues, the major focus is on how nations and international organizations carry out their activities. The international legal framework is set by the U.N. treaties on outer space, as well as various resolutions concerning space issues. Major space-faring States have ratified these treaties, which guide the overall use of space.

Each nation sets its own policies on how to approach space activities. The decisions on what to do in space, how to get there and how much money to spend on those activities are made by each nation. These priorities are elaborated in annual budget documents as well as in formal policy Statements, and those priorities (policies) can change over time. In most nations, this process is a complicated one, involving many people, agencies and legislative bodies.

I. Space Programme Objectives

Many broad objectives for having a space programme are common to all space-faring nations. They are primarily aimed at social and economic development and include:

- Overall economic growth;
- Job formation;

- Being on the cutting-edge of high-technology, which can translate into increased international trade; and
- Stimulating the educational system and training of workers

One clear example of this can be found in the European Space Convention (Art. VII §1(b)), which clearly States that one policy and objective of the European Space Agency (ESA) is to develop European industry[1]. Similar policies can be found in the legislative documents of most space-faring nations.

However, a significant difference in policy exists in the United States. Formally, the U.S. Government does not have an "industry policy." (Some will point out that the lack of such a policy is really a policy itself.) It is still clear from legislative histories and from other documents such as the budget that the U.S. regards the economic and social benefits from space activities as a very important goal, even if the specific subsidy and support of an industrial sector or of specific applications, firms or commercial entities is not part of official policy.

The history of major space developments is closely tied to the Cold War. The United States and the former Soviet Union were in a combined political, military and technological "race." The objective was to demonstrate superiority in all areas. Space was a major area to show-off technological skill and advantages[2]. This Cold War thinking about space is a legacy that continues to a large degree in the U.S. and often in both official and policy Statements and documents the goals of demonstrating to the World that U.S. technological leadership remains one of the key components of U.S. space policy. (The same might be said today for the developing space policy and capabilities of China.)

A by-product of the technological "leadership" objective is an extension of the commitment to exploration in space by the major space-faring nations. Space science and research expenditures are a small fraction of the budgets for major space-faring nations, but this type of research is prevalent mainly in nations with advanced space capabilities. The more recent "exploration" initiatives of the U.S. in its Moon/Mars goals will represent a significant budget commitment, and can be seen as a combination of the goals of leadership and research. The economic component in terms of developing space applications for terrestrial use still takes a back seat to other objectives. (At least in the near-term, most of the economic development will be in the jobs created to fulfil the new programme objectives, not in the uses of space).

The major powers have also developed their capabilities in space to the point where they are valuable and now essential components, of their defence and security systems. The satellites devoted to monitoring the Earth as well as those devoted to defence communications and global positioning are well integrated into the network of defence operations. Keeping these systems operational and secure is another objective of space investments and goals for major powers.

Developing nations rarely have the ability or funds to maintain a complete space system. However, beyond the economic and social goals of their space programme is the realization that access to space and space applications also have strategic value. Whether through partnerships with major powers or through highly specialized small satellites (that are less costly), these nations also have policies and goals in space that involve security issues.

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[1] CSE/CS(73)19, rev. 7) was approved by the Conference of Plenipotentiaries held in Paris on 30 May 1975.

[2] See, for example, the NASA Act of 1958, P.L. 85-568, July 29, 1958, 72 Stat. 426, 42 U.S.C. 2451 particularly the preamble. (cite)

II. Policy Formation

In the United States, space policy formation occurs at all levels of government. Much is "bottom-up," being initiated at the technical and operational levels of space and eventually being implemented by Executive Orders and/or Congressional actions. For most policies, the government and many other entities are involved. No one policy can please all who may be affected, but the process of policy formation allows for inputs from all involved parties.

Formal government policies are rarely implemented before there is a need for them. Three factors are involved in motivating the creation of new policy and/or a change in policy:

1. Politics
2. Economics
3. Reaction to a failure.

Political motivations can be stimulated either by internal or external factors. An example of an internal motivation would be the need for resource planning. Particularly if a country is large and has a scattered, low-density distribution of population, terrestrial means of monitoring the environment and resources are expensive and limited. Space offers a clear advantage, both in cost and in the ability to observe changes in real time. Thus, a nation might develop a policy to prioritize, initiate and expand its space Earth observation programmes.

External factors can also be varied, ranging from a security or defensive need to monitor potential adversaries to joining an international programme (such as the International Space Station) that requires a level of commitment.

Economic motivations are often focused on the development of business interests. If there are companies that can take advantage of the space environment and are willing to invest, then governments will often provide the support and infrastructure to encourage these activities. Most space commercial opportunities are dual-use (government and civilian), therefore the economic benefits to the entrepreneurs will also benefit the nation in terms of providing services the government otherwise might have funded directly. In addition, there are additional economic benefits from training, education, new skill development and eventually new tax-paying businesses and export trade that can emerge from space activities.

Finally, policy changes may be needed in the wake of an accident or failure. Clearly, in the United States, the loss of Space Shuttle Challenger as well as the loss of Space Shuttle Columbia stimulated new analyses and new initiatives. In the case of Challenger, there was a direct initiative to encourage commercial launch providers and a move from relying on the Shuttle to relying on some types of payload launches on expendable launch vehicles built and operated by the private sector. After the Columbia accident, there has been a move to replace the Shuttle and to have U.S. policy move toward exploration of space and human activity on the Moon and eventually Mars. These goals have been suggested before, but the reaction to the failures stimulated the need for a change. And, of course, after a failure, there is always a focus on policies designed to avoid a replication of the mistakes that caused the failure.

III. Political Choice or Pressure: Developing Nations

Although the reasons for developing space policies are not very different among developing nations and the major space-faring nations, there are variations in priorities and in rationales.

Over 100 nations have ratified the U.N Outer Space Treaty (fewer have ratified the other Treaties on space). This, alone, has stimulated at least some minimal actions from national legislatures. By ratifying the Treaty, nations have obligated themselves to a number of conditions. One of the most significant conditions is the assumption of third-party liability for the actions not only of the government, but also of its citizens in space activities.

Besides this external political reason for having some form of space policy, the need for being involved in worldwide telecommunications and Earth observation initiatives provides another important external goal for space activities. Since most developing nations cannot afford to purchase and launch satellites, they need to join in international alliances to optimize their space activities.

Internal pressures provide the support and incentives for the space activities of developing nations. In particular, issues concerning security and long-run socio-economic changes (such as demographic shifts, weather and climate affects on land and crops and economic development issues) provide the motivation for governments to use information and data from space telecommunications as well as space instruments to meet social needs.

IV. Political Pressure: Industrialized Nations

For major space-faring nations, there are additional concerns that provide the political justification for space activities. The most important is security. Economic opportunities also provide an important justification for space activities. In addition, space research and development provides a fertile area for developing new technologies as well as providing important information for basic scientific advances.

V. Economic Needs

In combination with, as well as in addition to, political needs are the motivations for national space policy stemming from economic and profit motives. Governments have a responsibility to provide an infrastructure that stimulates economic growth. This can include direct support of research and development as well as may other components such as a robust telecommunications and financial system. Space activities contribute to this infrastructure.

The private sector is also an important part of the motivation for space policy and activities. Space has proven to stimulate the creation of new companies, jobs and skills that contribute to economic growth. Either through direct participation in developing new goods and services using space, or through indirect participation by supplying government or private space initiatives with components and services, longer-term growth can be robust.

Finally, there are the spin-off technologies that provide consumer goods and services. Advances related to space research include the miniaturization of electronic components, the development of strong, lightweight materials and a very large market related to the development of new telecommunications and entertainment products. Not all are dependent directly on space activities, but space activities are a necessary and important part of the smooth operation of many new goods and services.

Space policy can provide a stable and predictable national system for stimulating investments and activities in space. Different types of policies can encourage entrepreneurial activities, provide a source of new capital for investment and provide indemnification guarantees necessary for an activity that can have high levels of risk that possibly can subject a company to unusually high financial exposure to liability.

VI. Interaction of Space Law and Policy

New national laws for space are a result of a sequence of events than can span many years. As described above, social, economic or political pressures lead to new or changed space policy.

Major policy shifts often require specific legislation. For example, in reaction to the launching of Sputnik in 1957, the U.S. Government created a new agency, the National Aeronautics and Space Administration (NASA), in 1958. Following the terrorist attacks of 11 September 2001, the government created the Dept. of Homeland Security. Clearly, changes in policy occurred that needed legislative authority to formalize the changes.

Most policy changes are on a more minor scale. Even the recent change in NASA policy toward the "vision" and exploration was through Presidential action. (Although formal legislative approval will be debated and decided at a later date). Policy changes can be adopted quickly and are often reflected in annual government documents. The most important are budgets that reflect where future expenditure priorities will be. The only legislation required is the annual (in the United States) authorization and appropriations laws, which tend to be a compromise between the goals of the Executive branch and the Congress.

Specific legislation is needed to provide the legal basis for agencies to issue regulations. The ability of the Federal Aviation Administration (FAA) to issue regulations on launches is derived from the Commercial Space Launch Act, as amended[3]. These regulations can be very specific and the details can influence the nature and meaning of the policies. All such regulations in the United States are first published as "proposed" and are open for public comment. They may be modified based on the comments before being issued as final rules. And, if a citizen believes they violate the actual legislation, the judicial system is available to determine the validity of the rules and regulations.

VII. An Example of Space Policy Formation in the United States

An example of the complexity in space policy formation is presented below in an analysis of the types of policy changes and organizations that might be involved in the development of a true Reusable Launch Vehicle (RLV)[4].

The following discussion outlines the categories of policy that need to be addressed at a national level (Congress and the Administration) to modify current rules and regulations to enable the RLV to become a viable commercial launch vehicle. At the same time, these policy changes will encourage the growth and use of space as a place to conduct business. Once the types of policies that need change are identified, this section of the report discusses the specific types of changes in laws and regulations and identifies the appropriate places in the government where these changes will be discussed, debated and enacted. Because of the complexity of the process

[3] The FAA's authority to issue rules regarding commercial space transportation safety is found under the general rulemaking authority, 49 U.S.C. 322(a), of the Secretary of Transportation to carry out Subtitle IX, Chapter 701, 49 U.S.C. 70101–70121.

[4] This section is a summary taken from: Hertzfeld, H.R., and Williamson, R.A., *Operating a Commercial Reusable Launch Vehicle: Economic, Legal, and Policy Considerations*, Paper (#IAA-01-IAA.1.1.05) presented at the 52nd International Astronautical Congress, Toulouse, France: 1 October 2001.

and the reluctance of entrenched bureaucracies toward change, a long lead-time is necessary. It is appropriate to begin the process of educating the public and government officials to the problems of developing a successful RLV business immediately.

In addition to agencies of the U.S. Government, a number of foreign governments and international organizations will also have to address these same issues. This section, therefore, concludes with a list of non-U.S. organizations that will also have to change policies toward launch vehicles.

The major areas needing review include policy guidance in legislation and/or executive orders, addressing:

- The Department of Transportation (DOT)/FAA certification process
- Liability and indemnification
- Development and demonstration of certification technology
- Potential merging of international air and space law into aerospace law
- Regulatory guidance based on legislation addressing details of certification process
- Improved export/trade technology transfer guidelines
- Long term policy stability

Ultimately, to be successful, a certification regime will have to be imbedded in a larger set of governmental policies regarding international trade, fiscal responsibility, etc., that would grant some level of policy stability to the emerging RLV industry. The first step in the development of legislation for instituting a governmental RLV certification framework is the creation of a rationale for required legislation. Usually, but not always, legislation is the end process of many months, even years, of discussion among the affected commercial interests, executive branch institutions, and Congressional committees. Studies and analyses, conference papers, industry committee membership and hearings and briefings, all contribute to the creation of a willingness to consider the development of new legislation. In the case of RLVs, such legislation might address issues including the following:

- Governmental and private sector responsibilities for RLV certification;
- Development and demonstration of certification technology;
- Liability and indemnification; and
- Merging of international air and space law into aerospace law.

Certification legislation will also address certain details of the certification process, such as definitions of specialized terms and penalties for non-compliance.

However, certification legislation will not be successful in moving forward the development of RLVs for the international marketplace until Congress and the Administration develop improved, simplified, export/trade technology transfer guidelines. Despite recent efforts exerted by the Department of State to speed up its export approval process, the current system has slowed the export of commercial satellites to other nations, making collaborative international development, and even marketing, of space-related systems far more difficult than before[5]. Because of the increasing international nature of the aerospace industry, it may prove extremely

[5] In fact, recent data from the Satellite Industries Association/Futron survey of aerospace firms show a decrease in domestic sales of satellites that is attributed to the delays and difficulties in meeting new export control regulations.

difficult to develop an international certification regime without major policy or operating changes to U.S. technology export rules.

1. Executive Branch Institutions with a Vested Interest in RLVs

Department of Transportation (DOT)

The White House and several departments and agencies have a vested interest in the development of laws and regulations concerning RLV certification. Foremost among these is the FAA within the DOT, whose Office of Regulation and Certification currently oversees the certification process for aircraft safety and operation. Through the Office of Commercial Space Transportation (OCST), the FAA also licenses Expendable Launch Vehicles (ELVs) to carry payloads to orbit and more recently the launch and re-entry of RLVs (but not the safety of the vehicle or on-orbit operations).

Because of these vested interests, the responsibility for RLV certification would most likely be placed within the FAA. The most efficient way to proceed may be to establish a new office of Aerospace Certification that would draw from both OCST and the Office of Aircraft Certification of the FAA. It is possible that such an office would require the reorganization of FAA more generally. The exact nature of a new office would depend in large part on the interests of the individuals involved at the time, within the White House, FAA, and within the Congress, as well as the outside interests that would influence their decisions.

National Aeronautics and Space Administration

Because of its need for inexpensive space transportation to service its programmes as well as its long experience with the Space Shuttle and with RLV technology development, NASA has a direct interest in the process by which RLVs will be certified. Specifically, the Shuttle programme within the Office of Space Operations maintains considerable expertise in certifying each individual flight of the Shuttle orbiters. Just how much interest NASA might have in attempting to influence the development of the certification process for RLVs would depend in large part on the individual interests of the Shuttle managers at the time. Nevertheless, any possible interest on NASA's part should not be overlooked as it could influence the nature and scope of any certification process that was developed.

Further, NASA could provide substantial engineering and scientific expertise concerning the technologies needed for assuring safety of operation of an RLV. Just as the former National Advisory Committee for Aeronautics (NACA) provided early aviation with technical support and problem solving, today's NASA could provide technical support for developing or improving a variety of technologies critical to maintaining RLV flight safety and operations.

Department of State

Through its Bureau of Oceans, Environment and Science (OES), the Department of State will have a role in working with foreign governments to pave the way for any international agreements on the operation of RLVs within non-U.S. airspace. The State Department will also be involved in creating the basis for the reconciliation and/or merging of international air and space law to govern RLV flight and operations. OES will also work with international organizations such as the UN Committee on the Peaceful Uses of Outer Space (COPUOS) to ensure that U.S. interests are represented[6].

Under current regulations, the Office of Defence Trade Controls governs the process by which companies export space-related technologies to other countries. They also govern the process by which U.S. aerospace companies can work with non-U.S. companies. Hence, the requirements of this office could be crucial to the success or failure of any certification regime. On the other hand, the onerous nature of current controls has apparently caused the loss of significant foreign sales of commercial satellites and other aerospace technology. Hence, it is highly likely that the State's role in regulating sales of satellite technology will change by the time a decision is taken regarding a certification regime.

Department of Commerce

The Department of Commerce's Office of Air and Space Commercialization, under the Technology Administration, follows trends in space transportation commerce and seeks to assist in promoting U.S. space commerce generally. The office, which is currently very small, also supports the development of U.S. policy towards space commerce. If space commerce assumes a much greater percentage of the U.S. economy than it has today, the overall role of the Department of Commerce (DOC) in civil space policymaking, including space transportation policy, could increase. On the other hand, a new Presidential Administration may wish to close this office or merge it with other functions within the DOC.

The Bureau of Export Administration of DOC oversees the Commerce Control List of sensitive technologies and manages the export of non-munitions high technology items. It is this office that oversaw the export of satellite technology until the passage of the Strom Thurmond National Defence Authorization Act of 1999, which transferred those responsibilities to the Department of State.

Department of Defense

The Department of Defense (DOD) and the Air Force will play a part in RLV certification insofar as they contribute funds to the development of RLVs and perhaps to the setting of certification standards. Under current U.S. space transportation policy, NASA has the lead in the development of RLV technology, while the DOD carries the lead in ELV technology. Nevertheless, as RLVs are developed, the DOD is likely to acquire a role in certification through its interest in cheaper, more reliable space transportation. It will be important to keep DOD informed about the certification process and the progress of industry in developing certification methods.

The Air Force is also responsible for important components of the launch range system, including the provision of telecommunications and tracking services. Currently the Air Force sets prices for these services and establishes a number of safety and operational requirements. To the extent that an RLV will use federal facilities for launches and landings, the policies set by the Air Force will be influential. The Department of Defence also owns and controls the operation of the

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[6] It should be noted that the State Department actively promotes the interests of U.S. industry in international matters. Industry has to work with the government to inform the proper authorities in the State Department of their concerns about possible restrictions to the development and operation of a RLV that both U.S. foreign policy and the policies and laws of other nations may intentionally or unintentionally have on the RLV.

Global Positioning System (GPS) system and the missile tracking systems. Although both of these systems are currently in use in both aviation and space activities and should pose no significant problems with the introduction of a RLV system, they will have to be integrated into the operations of the RLV.

White House

Support of the White House, especially through the Office of the Vice President, the Office of Management and Budget (OMB) and the Office of Science and Technology Policy (OSTP), will be crucial to the development of an RLV certification effort. Since the Kennedy Administration, civil space matters have fallen under the direct purview of the Vice President, making support of that office of particular importance. The Office of the Vice President works directly with the OMB and OSTP to ensure that the Administration's policies are carried out by the agencies of the executive branch. Not only does OMB control the yearly budget process, working directly with each federal department and agency, it oversees the adherence by departments and agencies to Administration policies. Military and national security space issues are handled through the National Security Council, though OSTP and OMB both have input to those decisions.

VIII. The Role of Congressional Committees

Congressional committees will have an important role in the development of RLV certification, through both their oversight and their legislative functions. In the House of Representatives, the Committee on Science, through its Subcommittee on Space and Aeronautics, has direct responsibility for nearly all matters related to outer space: "including access to space; sub-orbital access and applications; National Aeronautics and Space Administration and its contractor and government-operated laboratories; space commercialization including the commercial space activities relating to the Department of Transportation and the Department of Commerce."[7] Hence, in the House of Representatives, this Committee will likely develop the legislation that will govern RLV certification, with input from the Committees on Transportation and Foreign Affairs.

The Committee on Foreign Affairs would also be involved in the development of any international treaties that are required for international certification. The Committee also oversees export control of space technologies and would be involved in any changes to current export control laws. The Committee on Armed Services would involve itself to some extent in discussions of certification if it involved substantial DOD funding or involvement.

In the Senate, the Committee on Commerce, Science and Transportation will provide oversight and develop RLV certification legislation. Although for space matters this Committee is the counterpart of the House Committee on Science, it has a larger jurisdiction, making it easier to develop and pass legislation that involves outer space, transportation and commerce than in the House, where jurisdiction is often divided among several committees. If the RLV were widely successful in increasing space commerce in the House of Representatives, committee jurisdiction over space transportation and space commerce could, in time, be moved into committees whose traditional oversight roles have been in air transportation and commerce.

The Committees on Foreign Relations and International Relations will have an interest in following the development of any formal international agreements, especially if they involve the

[7] Committee on Science, U.S. House of Representatives, Statement of jurisdiction.

creation of treaties. The U.S. Senate would have to ratify any treaty that was developed to codify the merging of air and space law. The Committee on Foreign Relations also has jurisdiction over export control, and therefore would certainly be involved in any changes to export control laws regarding space technologies and space systems.

RLV certification, *per se*, is not likely to be of interest to the Committees on Armed Services except insofar as Air Force research and development policies would be affected. However, if funding to support development of an RLV were sought from the DOD, these committees would play an oversight role, though their input to certification legislation would likely be minimal.

Finally, because the Appropriations Committees in both the House and Senate control the appropriation of all federal dollars for whatever purpose, these committees and their subcommittees are extremely important for the development and certification of an RLV. Although the primary purpose of the Appropriations Committees is to allocate funding among the competing interests for the federal dollar, the various subcommittees have, over the years, inserted numerous policy instructions into legislation. In the civil space arena, such policy initiatives have sometimes contravened the will of the authorization committees. Because the allocations for NASA, DOT, and DOD are handled by separate Appropriations subcommittees, each of which has different agendas and makes independent policy and funding tradeoffs, it is possible for policy disconnects to occur in programmes that otherwise have strong support outside the process. Hence, it is important to develop the support of the relevant subcommittees when seeking policy and funding support for new programmes. For example, NASA's funding competes every year with the much larger Departments of Housing and Urban Development and the Veteran's Administration. Because RLV certification could be of only moderate interest to NASA, federal funding for certification technologies could easily slip through the cracks unless pursued vigorously by interests external to the Agency.

1. Influences External to the U.S. Government

A number of other influences external to the U.S. Government may play a part in the development of RLV certification policies and practices. These include both U.S. and non-U.S. institutions.

Influential U.S. Non-Governmental Organizations (space)

Interest groups, including the Commercial Space Transportation Advisory Committee (COMSTAC), the Space Transportation Association (STA), the American Institute of Aeronautics and Astronautics and the American Astronautical Society, can all play a part in any effort to develop the case for RLV certification through the development of white papers, holding professional meetings or informational sessions for Members States of Congress or Administration officials. Because RLVs are aerospace vehicles that operate in two major physical regimes, interest groups from aviation may also play a part in the development of RLV certification. Additional research will be needed to determine which aviation interest groups may be particularly influential.

The National Academy of Engineering (NAE), through its Aeronautics and Space Engineering Board, could have an important influence on the development of the certification process. Like its sister institution, the National Academy of Sciences, the NAE is a private, independent, non-profit institution that conducts studies, "whenever called upon by any department or agency of the Government, [in order] to investigate, examine, experiment and report upon any subject of science or art." The results of its studies are often crucial in the development of U.S. science and technology policy.

Potentially Influential Non-Governmental, Non-U.S. Organizations (space)

- United Nations Committee on the Peaceful Uses of Outer Space (COPUOS)
- International Astronautical Federation (IAF)
- International Academy of Astronautics
- International Telecommunication Union (ITU)
- World Intellectual Property Organization (WIPO)
- International Civil Aviation Organization (ICAO)

Finally, at some point in the future, international organizations will become involved in deliberations regarding certification, as new international agreements will likely be needed. The issues of the merging of air and space law, in particular, will be of special interest to COPUOS. Organizations such as IAF and IAA serve as venues for floating new ideas and gaining international support. New frequency uses, should they be required, would be developed and vetted through ITU. When the discussion over certification involves issues related to the distinction between air space and outer space, ICAO may become involved.

The development of a strategy for promoting RLV certification both nationally and internationally will involve balancing efforts among these diverse institutions and interest groups. The importance of any one of them is likely to vary considerably over time, depending on the specific period in question and the details under consideration. Hence, a strategy needs to be dynamic, changing as circumstances warrant.

IX. Export Controls

Current law and U.S. Government policy would treat RLVs as launch vehicles, not as aircraft. Hence, unless current laws are changed, the Departments of State and Defence would subject RLVs to the same controls and standards as munitions. These standards would impose strict rules on the vehicles and seriously complicate the commercial nature of the planned markets for RLVs.

Further, if a RLV lands in a foreign nation, even in an emergency landing, a number of problems would immediately arise. First, the vehicle itself and any payload aboard would be under the jurisdiction and control of a foreign nation. Permission for take-off may be denied unless the company operating the RLV shares technical information with the local government about its flight characteristics.[8] Under current U.S. law, this may cause many delays and create many sensitive problems regarding technology transfer. The Shuttle may be viewed as an RLV. NASA has negotiated many bilateral agreements with other nations to permit emergency landings if there is a problem with Shuttle operations. Presumably, these bilaterals are models to use for a commercial RLV.

[8] Most nations will request such information because they have a vested interest in protecting the safety of their own citizens. Furthermore, the vehicle will have to clear air traffic control in the nation, which will require some sharing of information. Although, on its surface, this may seem trivial when contrasted with the many take-offs and landings of commercial aircraft, an RLV is different and it may be many years until these vehicles are accepted in normal air operations.

However, that conclusion may not be valid. First, the Shuttle is a unique government vehicle involved in Research and Development and in international joint programmes. It is not a commercial vehicle operating to make a profit. Second, it flies comparatively only a few times a year. Third, NASA has paid for those landing rights, either by enhancing equipment at the foreign locations, enlarging the runways or through outright monetary compensation. A commercial company would have to renegotiate all of the agreements, possibly at considerable expense.

There are other international legal issues, such as foreign domestic legislation on over flight, launch licenses, liability, indemnification, treatment of pilots and passengers, intellectual property rights, registration of vehicles, etc. Also at issue is the appropriability and applicability of the existing U.N. treaties on outer space to commercial operations.

Current U.S. policy and law would not permit true commercial operations of an RLV when foreign landings and takeoffs are involved, even as contingencies. Because of the altitude, speed and characteristics of RLV flight, a purely domestic commercial operation is highly unlikely. Therefore, action by the U.S. Government to amend the International Traffic in Arms Regulations (ITAR) and Missile Technology Control Regime (MTCR) to permit commercial RLV operations will eventually be necessary. It is an open question whether (and for how long) such a vehicle could operate under a U.S. experimental label and avoid at least some of these problems.

Conclusions

Space policy and related legislation is a complex process involving numerous and varied interests. For major changes to take place, the underlying needs have to merit the difficult and time-consuming process. Many years may elapse before formal changes take place through legislation and subsequent rulemaking.

But, using the various tools of government, any particular policy can be implemented long before the formal requirements are finalized. Using the budgetary process, Executive Orders, and minor procedural changes at an agency level, a government administration can effectively change the direction of a major programme. And, by using Memoranda of Understanding (MOUs), international agreements can be completed without going through the lengthy formal treaty process. Even though the results may not have the same legal status as a treaty, the MOUs can effectively change foreign policy relationships.

Major policies for space should not be changed frequently, since stability in programmes and objectives is an important element to both the success of long-term initiatives as well as to encourage private investment. Hence, new policies and laws should allow for a degree of flexibility to accommodate changing conditions. Space policies should closely follow other national policies. They should be coordinated with international space treaty obligations, and also well coordinated with the existing domestic laws.

Appendix: A Summary List of U.S. Agencies and Organizations Involved in the Formation of Space Policy

Note: This list is suggestive of the many agencies and entities that would be involved in policy based on the example of a new launch vehicle, the RLV, as described in the text. Other initiatives and policies will involve other agencies and offices. Even for launch vehicles, the recent proposed combination of Lockheed-Martin and Boeing Evolved Expendable Launch Veihcles (EELVs) has required an anti-trust review performed by the Federal Trade Commission. In developing policy for telecommunications satellites, the Federal Communications Commission would also be an important part of the policy decision, as would different offices within the Departments of Commerce and Defence, among others.

<u>Executive Branch:</u>

<u>Department of Transportation</u>

- FAA Regulation and Certification Group
    - Responsibility for implementing aircraft certification
- Office of Commercial Space Transportation (AST)
    - Responsibility for licensing ELVs, RLVs

<u>NASA</u>

- Office of Space Operations
- Office of Exploration Systems

<u>Department of State</u>

- Bureau of Oceans, Environment, and Science
- Any necessary international agreements
- International air/space law
- Office of Defence Trade Controls
- Export control

<u>Department of Commerce</u>

- Technology Administration's Office of Air and Space Commercialization (OSC)
- Tracking, promoting of U.S. space industry

<u>Department of Defence</u>

- Office of the Secretary of Defence
- Overall security space policy
- Air Force
- Operational space issues

<u>Executive Office of the President</u>

- Office of the Vice President
    - Overall space policy
- Office of Management and Budget
    - Budget *and* operational space policy
    - Regulatory policy
- Office of Science and Technology Policy
    - Overall space policy formulation, interagency cooperation
- National Security Council
    - Military/intelligence space policy

<u>CONGRESS</u>

<u>House Committees</u>:

- Science
  - Subcommittee on Space and Aeronautics (all civil space aviation)
  - Subcommittee on Environment, Technology, and Standards
  - Subcommittee on Aviation (aviation)
- International Relations
  - Subcommittee on International Operations and Human Rights (international agreements)
  - Subcommittee on International Economic Policy and Trade (technology exports)
- Armed Services
  - Subcommittee on Military Research and Development (DOD Research and Development)
- Appropriations
  - Subcommittee on HUD, VA, and Independent Agencies (NASA)
  - Subcommittee on Transportation (FAA)
  - Subcommittee on Armed Services (DOD)

<u>Senate Committees:</u>

- Commerce, Science, and Transportation
  - Subcommittee on Science, Technology, and Space
  - Subcommittee on Aviation
- Armed Services
  - Subcommittee on Emerging Threats and Capabilities (R&D)
  - Strategic Subcommittee
- Foreign Relations
  - Subcommittee on International Economic Policy, Export and Trade Promotion (technology exports)
  - Subcommittee on International Operations and Human Rights (international agreements)
- Appropriations
  - Subcommittee on HUD, VA, and Independent Agencies (NASA)
  - Subcommittee on Transportation (FAA)
  - Subcommittee on Armed Services (DOD)

Non-U.S. Government Organizations

- Commercial Space Transportation Advisory Committee (COMSTAC)
- Aerospace Industries Association (AIA)
- Space Transportation Association (STA)
- American Institute of Aeronautics and Astronautics (AIAA)
- American Astronautical Society (AAS)
- Institute of Electrical and Electronics Engineers (IEEE)
- Society of Automotive Engineers (SAE)
- National Academy of Engineering (NAE)

Issues in Developing National Space Policy and Laws

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Space Program Objectives

- For almost all space-faring nations:
  - ECONOMIC AND SOCIAL DEVELOPMENT
    - Economic growth, jobs, high-technology applications
    - Stimulating the educational system and training of workers
    - *Example: ESA Convention, Art. VII §1(b)*
  - Prestige
- In addition, for major powers:
  - Demonstrate technological prowess
    - *Example: NASA Act: Preamble*
  - Use space capabilities for legal (i.e. abide by Treaties and agreements) security applications
    - Communications, monitoring, etc.
  - Basic scientific research and exploration

Policy Formation

- Formal government policies are rarely implemented before there is a need for them
- Motivating factors:
  - Politics
    - Internal and external forces
  - Economics
    - Anticipate and respond to business interests and stimulate economic growth
  - React to a failure
    - Avoid repeating mistakes

Political Choice or Pressure: Developing Nations

- External Forces:
  - Ratification of United Nations Treaties on Outer Space
    - Desire to participate in space activities
      - Telecommunications
      - Earth observations
      - Other
  - Potential international liability for actions of citizens
- Internal Forces:
  - Joining alliances or bilateral agreements
  - Territorial jurisdiction
  - Long-run social changes
    - Demographic shifts
    - Introduction of new technologies

Political Pressure: Developed Nations

- Ratification of United Nations Treaties on Outer Space
- Changes in security regime
  - Transportation and Remote Sensing regulations
  - Export controls
- Changes in Government Administration
  - Philosophical differences after elections
- Long-run social changes
  - Economic deregulation
  - Demographic shifts
  - Development and introduction of new technologies

Economic Need: Developing Nations

- Government
  - Desire to invest in high-technology to stimulate economic growth
  - Necessity of managing resources through use of space applications
- Private Sector
  - Formation of space-related company by either domestic interests and/or foreign investment
  - Investment in space telecommunications

Economic Need: Developed Nations

- Provide stable and predictable infrastructure for economic expansion
  - Space-based hardware
  - Financial/investment/regulatory
- Protect government and citizens to stimulate investment opportunities
  - Liability issues
    - *Example: government indemnification schemes*
- Encourage and enable entrepreneurial activities
  - *Example: new laws/regulations for suborbital human flights following X-Prize success*

Other Reasons for Policy Change

- React to a failure
  - Remedy and/or prevent repeat of a serious and embarrassing accident or systemic failure
    - *Examples:*
      - *Enactment of new legislation reflecting findings of accident review panels and boards*
      - *Post Challenger legislation establishing Commercial Space Launches*
      - *Post Columbia changes in National Space Transportation Policy and Exploration*
      - *In aviation, new FARs*

Stated and Implied Objectives

- Sometimes space policies and laws are justified on one premise but have many other goals
  - A policy may be justified on economic development rationales but aimed more directly at goals such as:
    - Developing long-term national prestige or
    - Justifying a civilian capability easily used for security purposes if necessary

Interaction of Space Law & Policy

1. Social/Economic pressures lead to new policy
2. Policy changes precede new legislation
    - *Example: Administration decision in 1958 to establish civilian space agency preceded the Act that set-up NASA*
  - In U.S. often Administration policy documents are incorporated into public laws
    - *Example: Appropriations Acts include Administration Space Policies in Public Laws*
3. Legislation is necessary for implementing regulations
  - Regulatory authority granted to an agency
  - Formalizing regulations can take years
    - Need for citizen/corporate inputs and comments
      - *Administrative Procedures Act requirements have to be followed.*
4. Administrative proceedings and the court system for adjudicating problems

Policies Change Over Time

- Flexibility to react
- Speed of change unpredictable and depends on urgency of situation
  - Also related to the complexity of the political and legal system and the strength of the supporters of change at any given time
- Laws are often slower to change
- Interpretation of laws by the administrative and legal system follows, but with even more delay

Policy in the United States

- Many diverse parties involved
- Many different government interests
  - Civilian science
  - Civilian applications
  - Security/defense
  - Stimulation of private business opportunities
- Many private sector interests
- No one policy can accommodate all interests

Parties Involved in Space Policy and Law in the United States

- Executive Branch of Government
  - White House (OSTP, OMB, NSC, other)
  - Cabinet Departments and Agencies (and many different offices within each Agency
    - NASA, DOD, DOC (NOAA), DOT (FAA), Dept. of State, DOI, DOA, other
- Independent Regulartory Agencies
  - FCC, FTC

Parties Involved (continued)

- Legislative Branch of Government
  - House of Representatives Committees
    - Science (space subcommittee), Transportation, Foreign Affairs, International Operations and Human Rights, Armed Services, Appropriations, HUD, VA, & Independent Agencies
  - Senate Committees
    - Commerce, Science Transportation, Armed Services, Foreign Relations, Appropriations, etc.
  - Congressional Offices
    - GAO, CBO, CRS

Parties Involved (continued)

- Private Industry
  - Government contractors
  - Domestic firms
  - Foreign firms
  - Small businesses
  - Multinational businesses
- Universities
- Not-for-profit research entities

Parties Involved (continued)

- Influential organizations outside the Federal Government
  - State and local governments
  - Independent advisory groups to government agencies
  - Trade associations and lobbying organizations
  - Interest groups
  - Professional associations (e.g. AIAA, AAS, IEEE)
  - National Academies

Parties Involved (continued)

- International Organizations (where U.S. is a member)
  - United Nations (UNCOPOUS, ICAO, other)
  - UNIDROIT
  - ITU, WMO, WIPO, WTO, other
- Other international organizations involved in space activities
  - Intelsat, Inmarsat (both now privatized)
  - CEOS (Committee on Earth Observation Satellites)
  - Professional organizations (IAF)

Other Policy Considerations

- Coordination with State and Local Laws
  - May differ from National law
    - *Example: regulations for spaceports must also adhere to local corporate, zoning, safety, and other rules (or obtain waivers)*
- Coordination with other Federal Laws and Policies
  - Trade agreements and export controls
  - Health and safety
  - Labor laws
  - Federal procurement laws
    - *Examples: Buy America Act, Anti-deficiency Act*
  - Other
    - *Example: OMB procurement policies (A-76--buy/lease)*

Issues: Policy Formation for Space

- Many different interests have to be satisfied
- For major changes, needs must be overwhelming
- Can take many years to formalize changes
  - But can effectively speed-up process through use of administrative procedures
    - *Examples: changes in budget line items, Presidential Executive Orders, agency rulemaking, procurement decisions, negotiated international MOUs, etc.*
- Policies have to be flexible and provide enough latitude to accommodate some reinterpretation as needs change

Summary: Developing Space Laws

- Should closely follow national policy
- Should be coordinated with other international space law
  - *Example: U.N. Treaty obligations*
- Should be coordinated with existing domestic law

Space Law: Important Elements

- Establish a regime for safety
  - Terrestrially
  - In outer space
- Establish a system for financial responsibility
  - With respect to domestic interests
  - With respect to foreign interests
- Establish coordination with laws of other nations
- Establish a mechanism for cooperative efforts with other nations

Fundamental Provisions for National Space Laws

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Introduction - *'The Questions'*

Whilst national space laws currently are a 'hot' topic in general discussions on space law and policy, and rightly so, one should never lose sight that 'national space law' is not something self-evident or nature-given. In each case there is a general need to justify any efforts and resources inevitably required for establishment to start with, then continuing adaptation and implementation, of a national space law.

From that perspective, the present paper tries to answer three questions that are of paramount importance. Firstly, why do we need or want national space laws in the first place? Secondly, the question follows as to what should be in such national space laws: what issues and topics should be addressed? And thirdly, would there be any role in respect of national space laws for international bodies, a topic particularly relevant in Europe in view of the existence of two relevant international European bodies, the European Union (EU)[1] and the European Space Agency (ESA)[2]?

I. The rationale for national (space) law

To start with the first question on the 'why', the rationale for national legislation dealing more or less specifically with space and space activities in the first instance stems from international space law. Once the fundamental decision to spend resources and undertake efforts on the matter has been taken, other rationales would logically come in, notably to give due expression to national policies in the field, but the basis lies in the handful of international treaties commonly referred to as the *corpus juris spatialis*[3].

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[1] See Treaty on European Union, Maastricht, signed 7 February 1992, entered into force 1 November 1993; 31 ILM 247 (1992); OJ C 191/1 (1992).
[2] See Convention for the Establishment of a European Space Agency, Paris, signed 30 May 1975, entered into force 30 October 1980; 14 ILM 864 (1975).
[3] This concerns notably three of the five United Nations treaties on outer space:
- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (hereafter Outer Space Treaty), London/Moscow/Washington, signed 27 January 1967, entered into force 10 October 1967; 610 UNTS 205; TIAS 6347; 18 UST 2410; UKTS 1968 No. 10; Cmnd. 3198; ATS 1967 No. 24; 6 ILM 386 (1967);
- Convention on International Liability for Damage Caused by Space Objects (hereafter Liability Convention), London/Moscow/Washington, signed 29 March 1972, entered into force 1 September 1972; 961 UNTS 187; TIAS 7762; 24 UST 2389; UKTS 1974 No. 16; Cmnd. 5068; ATS 1975 No. 5; 10 ILM 965 (1971); and
- Convention on Registration of Objects Launched into Outer Space (hereafter Registration Convention), New York, signed 14 January 1975, entered into force 15 September 1976; 1023 UNTS 15; TIAS 8480; 28 UST 695; UKTS 1978 No. 70; Cmnd. 6256; ATS 1986 No. 5; 14 ILM 43 (1975).

In turn, the necessity to undertake such efforts stems largely from the major development of ever-increasing private participation in space activities. On the one hand, the treaties referred to are very much State-oriented: States are both the 'makers' and the 'breakers' of space law. States 'make' space law, as is the case generally in international law, by drafting treaties and then individually deciding on whether to sign and ratify them or not. In addition, they may choose to abide by customary rules of international law that are essentially distilled from their own, international and official behaviour.

On the other hand, States under space law are also the 'breakers' in that the rules, rights and obligations proffered by the treaties are addressed almost exclusively to States – including cases where private entities may somehow qualify as the real actors or authors of a particular space activity. There is provision for a secondary role of international organizations[4], but since this is expressly limited to intergovernmental organizations, it still concerns public bodies.

Private entities, by contrast, are not even mentioned as such in the key treaties. Thus, the ever increasing measure of private participation in space activities, starting with satellite communications a few decades ago but gradually spreading to such other areas as remote sensing, launching services and navigation[5], raises two fundamental questions in this respect.

Firstly, how should it be ensured that such private entities and their activities will also be bound and forced somehow to comply with international space law and its provisions, in the absence of private parties being amongst the addressees of the relevant treaties? Secondly, from the other angle, does international space law take private interests sufficiently into account? To what extent *should* it take such interests into account, even if the general acceptance of a role for private enterprise in the world's societies may now be considered a rather widespread and generally accepted phenomenon?

II. From international to national space law

When focusing on the requirements for national space legislation stemming from international space law there are essentially two structural concepts that are key here: those of State responsibility and State liability as they were developed specifically within the *corpus juris spatialis*.

International responsibility – basically the responsibility of States 'augmented' with international responsibility by international organizations wherever they have a somewhat independent role to play – is regulated by Article VI of the Outer Space Treaty, which provides:

> "States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental

[4] Cf. e.g. Artt. VI, XIII, Outer Space Treaty, Art. XXII, Liability Convention, Art. VII, Registration Convention.

[5] The European second-generation satellite navigation system Galileo, which is to be operational by the end of the current decade, is intended to be a Public-Private Partnership. See Council Regulation setting up the Galileo Joint Undertaking, No. 876/2002/EC, of 21 May 2002; OJ L 138/1 (2002); and Council Regulation on the establishment of structures for the management of the European satellite radio-navigation programmes, No. 1321/2004/EC, of 12 July 2004; OJ L 246/1 (2004); further e.g. the present author's *Quis vadit cum vobis*, Galileo? – Institutional Aspects Of Europe's Own Satellite Navigation System, in *Proceedings of the Forty-Sixth Colloquium on the Law of Outer Space* (2004), 361-2.

> entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization."

Private space activities are effectively included in the phrase "activities (…) carried on (…) by non-governmental entities". Consequently, States are held responsible on the international level for private space activities to just the same extent as if it concerned their own, governmental activities – actually, in regard of the former they are actually saddled with an additional obligation of "authorization and continuing supervision". Obviously, States would therefore be well advised in applicable cases to ensure that legal tools exist to monitor and control such activities.

A similar situation applies to liability – once more reference is made to 'international liability' as adding to State liability properly speaking that of international organizations, where relevant. Here, Article VII of the Outer Space Treaty provides:

> "Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air or in outer space, including the Moon and other celestial bodies."

Once more, therefore, as a matter of fact private space activities would be included in this concept, and hence might lead to liability for damage resting upon a State or a few States on the international level. The next question automatically arises from there – for *which* categories of private space activities are which States internationally responsible and/or internationally liability? And then: how would you deal with them in more detail?

III. State responsibility and private space activities

For the solution regarding the allocation of private space activities to certain States for the purpose of international responsibility, of course one should firstly revisit Article VI of the Outer Space Treaty. From this particular perspective, as a result of that Article a State is responsible for any space activities, whether undertaken by whatever private entity or not, *as long as that State qualifies as the State in respect of which these activities can be defined as national activities*.

This, however, largely still begs the question – *which* activities qualify as 'national activities'? Several options offer themselves in the respect that could basically be grouped into three versions. Firstly, one could equate 'national activities' to the activities of nationals of the State.[6] Secondly, one could equate them to activities in respect of which the State qualifies as the 'launching State', which is the criterion for dealing with liability under international space law.[7] And thirdly, following a more theoretical but logical approach, one could equate them to

[6] Cf. e.g. Artt. VI, IX, Outer Space Treaty.
[7] See further the Liability Convention, in particular Art. I(c), defining the 'launching State' criterion.

activities in respect of which the State in question has jurisdiction, since in that way a State will be held responsible for exactly those sets of activities for which it has the principal legal tools to control.

Such an approach would then mean that a State would be internationally responsible for (a) any activities conducted from its national territory (since it is authorised to exercise jurisdiction over them on a territorial basis), (b) any activities conducted by its nationals (since it is authorized to exercise jurisdiction over them on a personal basis), and (c) any activities conducted involving space objects registered (since under Article VIII of the Outer Space Treaty it is entitled to exercise jurisdiction over such space objects as well[8].

It remains to be noted, however, that in the absence of any internationally-agreed interpretation of 'national activities', individual States, when implementing national space law, have made their own decisions as to how to interpret this concept and define the scope of their national law accordingly[9].

IV. State liability and private space activities

Following the same approach as with international responsibility, for liability reference should first be made to Article VII of the Outer Space Treaty. As a consequence of this Article and the elaborating Liability Convention[10], a State is internationally liable for any damage caused by a space object, whether owned, operated, launched or paid for by whatever private entity, *as long as that State qualifies as the launching State of the space object concerned*. Such a definition is formally provided by the Liability Convention and of a fourfold version, as Article I(c) thereof provides:

"The term "launching State" means:

(i) A State which launches or procures the launching of a space object;

(ii) A State from whose territory or facility a space object is launched."

While seemingly that definition leads to a much clearer picture than the phrase 'national activities' did in the context of responsibility, once it comes to the allocation of liability in the context of fundamental private involvement in the launch of the space object concerned, in view of the linkage of damage caused by a space object to the 'launching State(s)'.

This comes down to the interpretation of the reference to "State" in this context: if Article I(c) of the Liability Convention provides that the first way in which a State can be qualified as a 'launching State' is when it "launches" the space object concerned, what if a private launch operator is actually undertaking the launch? Does this make the State of nationality and/or registration of the private launch operator liable under this criterion, or is there no State that can be held liable under this criterion, since no State "launches" in the proper sense of the word?

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[8] Art. VIII, OST, provides: "A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth. Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return."

[9] See for an extensive analysis of some of those aspects, e.g. the author's Current and Future Development of National Space Law, in *Disseminating and Developing International and National Space Law: the Latin American and Caribbean Perspective* (2005), 30-46.

[10] See in particular Art. I(c), which further elaborates and formalizes Art. VII, Outer Space Treaty, without however changing fundamentally its scope.

Similar uncertainties apply with respect to the second criterion, of a State "that procures the launching", and the third criterion, of a State "whose facility" is used for the launch. What if the launch customer is a private company, for example a satellite communications company, or if the spaceport from which the launch occurs is owned and operated by a private company – as is currently the case in a handful of instances within the United States?

The one criterion so far not discussed concerns that of the State "whose territory" is used for the launch. Having 'territory' in the international legal sense of the word is something exclusively reserved for States. Though of a different nature, an important question arises here as well: what if the launching takes place outside the territory of any State, as has now repeatedly occurred with launches conducted by the private consortium Sea Launch from its launch platform that is towed out to the high seas prior to launch?

V. The 'Building Blocks'

When it comes to such international legal parameters for national space law, it is appropriate to refer to a major research project, called 'Project 2001+', conducted by the University of Cologne's Institute of Air and Space Law and the German Aerospace Center (DLR,) with the involvement of a number of (largely European) legal and policy experts, including from the Leiden International Institute of Air and Space Law. In the context of the Project, the conclusion was drawn that international law as it stood gave rise to the need to deal with five main topics, presented as five main building blocks to be included in any proper national space law.

The first building block should deal with the authorization of space activities, referring especially to the relevant phrase in Article VI of the Outer Space Treaty. It should deal with issues of scope, such as the interpretation of 'space activities', the application to activities with regard to territory and legal as well as natural persons, the observance of certain principles such as referring to contamination, the sharing of financial liability risks between the government and non-governmental actors, and the observance of the obligations regarding cooperation and mutual assistance.

The second building block refers to (continuing) supervision of space activities, that other direct obligation resulting from Article VI of the Outer Space Treaty. Here, the focus should be on periodical information either provided by the owner of an authorization or collected by the public authority concerning the terms of the authorization, and on sanctions in case of non-observance of the terms of the authorization.

The third building block deals with the registration of space objects, including the application and interpretation of the notion of space object, and the setting up of a national registry and determination of the supervisory authority. It should moreover determine the contents of mandatory registration: the five pieces of information required by Article IV(1) of the Registration Convention[11], plus additional information such as that concerning the mass of the space object or safety assessments in case nuclear power sources are involved. Finally, such issues as the registration of space objects that have re-entered the Earth's atmosphere, the

[11] Art. IV(1) provides for the following parameters of any particular space object launched to be notified to the UN Secretary-General: (a) name of launching State(s), (b) an appropriate designator of the space object or its registration number, (c) date and territory or location of launch, (d) basic orbital parameters including nodal period, inclination, apogee and perigee, and (e) general function of the space object.

possibility of changes being made to registered information and access to the registry should be dealt with.

The fourth building block focuses on the regulation of indemnification. It would, generally, provide for definition and implementation of a right of recourse for the launching State, once it has paid compensation under Article VII of the Outer Space Treaty and/or the Liability Convention to another State, in case the damage compensated has actually been caused solely or largely by a private party concerned. It would also, possibly, limit such indemnification to a certain fixed sum, for example to the insured sum (see further below).

The fifth building block finally would cover certain additional regulation, which is submitted to be of crucial importance here as well. This refers in particular to (further) regulation of insurance and liability-related issues, patent law and other intellectual property rights issues, financial securities, transport law and dispute settlement.

VI. Towards national space laws (in a strict sense)

The exercise of establishing 'building blocks' for national space law already indicates at least part of the answer to the fundamental questions of why national space laws would be necessary or desirable and what should be in them. It should be added here, that the term 'national space law' is used in a strict sense, as referring principally only to those national laws that predominantly focus on space activities and deal principally with the consequences of private space activities with a view to the structure and contents of international space law as discussed.

It may be added here, that during the United Nations/Republic of Korea Workshop on Space Law it was concluded in this respect:[12]

- That a fundamental *duty* exists under Article VI of the Outer Space Treaty to provide for authorization and continuing supervision of private space activities, the form of which was in principle left to the State concerned, and that, in view of the comprehensiveness and transparency of such an approach, a strong *recommendation* arose for such authorization and continuing supervision to be incorporated into a broader licensing regime as part of a national (framework) law;
- That a strong *incentive* arises from Article VII of the Outer Space Treaty and the Liability Convention to arrange domestically for liability arrangements as between the State and private entities concerned in order to deal with the possibility of States being held liable to pay compensation for damage caused by relevant categories of private space activities and to provide for a mechanism ensuring reimbursement up to the desired level, again, preferably by means of establishment of a national space legislation including a licensing system;
- That another strong *incentive* for the establishment of national space legislation arises under Article VIII of the Outer Space Treaty and the Registration Convention, as presenting the best way to establish a national registry for relevant space objects and thus further ensuring jurisdiction and control over such space objects and the operators thereof; and
- That finally, especially from the liability requirements an indirect but nevertheless strong *incentive* arose, to include in the licensing systems to be established by national space laws, requirements for insurance to be taken by relevant licensees –

[12] See e.g. the author's Current and Future Development of National Space Law, in *Disseminating and Developing International and National Space Law: the Latin American and Caribbean Perspective* (2005), 26-7.

> since otherwise the reimbursement obligations suggested before might turn out to be rather hollow to the extent that licensees themselves would be unable to reimburse the State concerned.

From this angle, national space law would most prominently be there to *control* private space activities to the extent necessary, by means of a licensing system including a list of licensing requirements, procedures for the supervision of such activities, and the establishment or proper empowerment of a central governmental (space) agency to actually undertake the relevant activities.

Referring to the other side of the coin, questions may also be raised as to the extent that, under general or more specific national economic polices, stimulation of private space activities would be due. Once the answer to such questions would be largely in the affirmative, however, national space laws seem to present the most comprehensive, transparent and efficient legal instrument for the purpose. Such stimulation could take many forms, including but not limited to subsidies for research and development or tax incentives, but also the provision of an indemnification obligation of State liability only up to a certain limit.

Finally, once the decision is made for such a national law to be established or to be developed further, coordination with other existing national laws is obviously required as well – ranging for telecommunications and intellectual property rights laws to trade, commerce, environmental and even penal laws.

VII. Dealing with liability

When dealing with liability, as the most directly-material issue to be dealt with by means of national space legislation, the general approach will by now arise relatively clearly. The licensing of private activities is the key tool here: relevant private entities should have a license to undertake an activity in outer space or with a distinct space-oriented character, otherwise they should be held criminally accountable.

Further, the conditions for being licensed by the State or governmental agency can then include those it considers relevant to ensure the optimum balance between allowing private entities to undertake such activities in the first place and the interests of the State and the public at large in the safe, secure, sound and beneficial usage of outer space. Procedures for monitoring, read ‘continuing supervision’, and sanctioning should also be provided for. At a national level, a national space law would offer the benefits of a ‘one-stop-shop’ regime for licenses.

Finally, since liability is essentially about money, one way or another it should deal with the issue of reimbursement under the license by the licensee of any State liability arising under Article VII of the Outer Space Treaty and/or the Liability Convention. Here, there are various options available for dealing with that issue.

Firstly, with reference to the issue of reimbursement properly speaking, a State is confronted with the fundamental choice whether to relegate the unlimited liability applicable on the international level[13] in full to the licensee – which will lead to considerable problems for the private party concerned to obtain insurance against a reasonable sum or even at all – or to limit the indemnification obligation to a certain amount – which would make the State *de facto* into a partial insurer of the space activities concerned.

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[13] See Art. XII, Liability Convention.

Secondly, partly depending upon which option is to be implemented regarding reimbursement, further options with regard to insurance for third-party liability indemnification offer themselves. States could make such insurance mandatory, in order to ensure that, should a reimbursement obligation on the part of the licensee arise, there would actually be something for the licensee to reimburse with. Sub-options could provide for such mandatory insurance to be up to the level of the limit to reimbursement, alternatively choose a lower level – providing the State with a real guarantee that reimbursement will occur up to that lower level, and a legal guarantee that reimbursement will also be realized above that lower level up to the limit to reimbursement.

Similarly, also if the reimbursement for third-party liability is unlimited, it could be contemplated to provide for a limit to mandatory insurance coverage. Of course, States could also choose to make insurance for the licensee against reimbursement obligations optional – even if it would allow for betting the company in adverse circumstances.

In addition, once a State starts to deal with third-party liability in a fundamentally thorough manner through the establishment of a national space law, it might well consider dealing with inter-party liability issues in one go as well. This is, for example, the case in the United States in view of the usage of governmental launch facilities for most of the commercial launches.[14]

VIII. Towards international harmonization…?

Brief reference has been made above to the absence of any authoritative interpretation at the international level of some key elements of the responsibility and liability concepts, and the resulting diverging implementations at the national level. In addition, it may be noted that apart from the dozen or so States that have implemented distinct national space legislation in the stricter sense of the word, in effect a number of States are currently in the process of developing such legislation. From the impressions gained of these processes so far, there does not seem to be much reason to expect that this lack of coherence will become less as a result – quite the contrary.

For that reason, finally, the third question posed at the beginning becomes relevant: is there a need – and an attendant possibility – for some measure of international coordination, perhaps even harmonization of national space laws, or at least of some of their more salient features? In other words, beyond the mere (and quite obvious) inclusion of the building blocks discussed at the abstract level, 'as such', is there a possibility and a desirability to also discuss harmonization at a more substantial level, of *how* these building blocks are then actually dealt with?

It is submitted, that there would be such a need – and attendant possibility, at least in law – on two counts. One concerns the 'structural' issues referred to before that is somehow delineating the scope of exercise of national jurisdiction for the purpose of a national space law and licensing system. This could be achieved largely by means of authoritative definitions of the key concepts of responsibility and liability: what should we understand by 'national activities'? How should we interpret the various criteria for the 'launching State' once private companies start launching, procuring launches or offering spaceport facilities for launching of a space object?

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[14] See Commercial Space Transportation – Commercial Space Launch Activities, 49 U.S.C. Subtitle IX – Commercial Space Transportation, Ch. 701, Commercial Space Launch Activities, 49 U.S.C. 70101-70119 (1994)

It may be noted that recently the UN Committee On the Peaceful Uses of Outer Space has undertaken a first step in refining the concept of the ‘launching State’ with a view to dealing with fundamental private involvement, but it is submitted more would be necessary. At the same time, it may be seen as confirmation that, indeed, COPUOS would be the best forum for taking further steps, and in principle would have the mandate to do so.

The other area where some harmonization of national space law might be both necessary or desirable, and possible (whether through COPUOS or through other mechanisms) concerns those substantive issues that fundamentally have to do with the establishment of a more or less level global playing field in terms of safety and security.

From the area of the law of the sea, considerable (negative) experience has been accumulated over the years with ‘flags of convenience’: too often licenses would be handed out by certain States without any substantial link between the operation to be licensed, or the operator undertaking it, and the State supposedly monitoring it. This in turn led to ‘license-shopping’, where private operators would be tempted to look for the ‘easiest licensor’ to avoid any substantial screening, easily giving rise to flagrant neglect of safety, security and social standards considered ‘normal’ under the circumstances – and hence to considerably enhanced risks of incidents and accidents.

If COPUOS (or other instrumentalities) could initiate an effort to arrive at some generally accepted mechanisms to be (in mandatory fashion) incorporated into any national space law, whether existing or prospective, such as liability and insurance requirements as well as certain technical and operational requirements referring to the financial, technical and operational capabilities of a prospective licensee to undertake the space activities concerned as safe and secure as possible, this would already constitute an important contribution to a safer and more secure ‘spacescape’. Actually, the mere obligation to establish such a law where relevant private activities are a distinct probability would already be a valuable step towards such a safer and more secure ‘spacescape’.

Conclusions - *‘The Answers’*

In conclusion, it has now become possible to answer concisely, but quite clearly, the three questions posed at the beginning. Why do we need or want national space laws in the first place? To implement some international obligations and protect some important legal as well as financial interests of the State concerned, with a view in particular to responsibility and liability.

What elements should be included in such national space legislation? Somehow, this boils down to the building blocks as distilled from the work of Project 2001+, which is a licensing system allowing control and monitoring of licensed activities and prominently including provisions on liability reimbursement and attendant insurance obligations.

Finally, would and/or should there be any role in this for international bodies? Yes, especially at the level of structure – better delineation of responsibility and liability – and with regard to some substantive issues, notably as that of counteracting possible trends towards ‘flags of convenience’ and ‘license-shopping’.

INTERNATIONAL INSTITUTE OF
AIR AND SPACE LAW

Fundamental provisions for national space laws

Dr. Frans von der Dunk

Director Space Law Research

International Institute of Air and Space Law

Introduction - *'The Questions'*

- *Why do we need or want national space laws in the first place?*
- *What should be in them?*
- *Would there be any role in this for international bodies?*

The rationale for national (space) law

- International space law
  - *"States makers & breakers space law"*
  - Secondary role IGO's
- ←→ Private participation
  - → How to bind private entities to international space law?
  - → Does international space law take private interests into account?

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International → national space law

- State responsibility
  ↔ Private space activities
- State liability
  ↔ Private space activities

→ ***Which*** private space activities?

- And how will you then deal with them?

State responsibility & private space activities

A state is responsible for any space activities, whether undertaken by whatever private entity or not,

as long as that state qualifies as state in respect of which these activities can be defined as ***national activities***

(cf. Art. VI, OST)

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Allocation of responsibility

- Which activities qualify as *'national activities'*?
  - Activities of nationals of the state?
  - Activities in respect of which the state qualifies as 'launching state', i.e. liable?
  - Activities in respect of which the state has jurisdiction?
    - Territory / nationality / Art. VIII, OST-registration

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State liability & private space activities

A state is liable for any damage caused by a space object, whether owned / operated / launched / paid for by whatever private entity,

as long as that state qualifies as ***launching state*** *of the space object* (cf. Art. VII, OST)

Allocation of liability

- Linkage damage caused by space object to *'launching state(s)'*
  - Interpretation "state":
    - "that launches" ←→ private launch operator?
    - "that procures the launching"
      ←→ private launch customer?
    - "whose facility" is used for the launch
      ←→ private owner & operator of space port?
    - "whose territory" is used for the launch
      ←→ launching outside of state territory…?

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The 'Building Blocks'

- Research project 2001+
  - Lead: University of Cologne & German DLR
- Five main building blocks
  1. Authorisation space activities
  2. Supervision space activities
  3. Registration space objects
  4. Indemnification regulation (liability!)
  5. Additional regulation (incl. insurance)

Towards national space laws (strict sense)

- Control private space activities
  - Licensing, incl. licensing requirements
  - Supervision (procedures)
  - Central governmental (space) agency
- Stimulation private space activities?
  - Subsidies for R & D; tax incentives
  - *Only partial reimbursement of state liability*
- Coordination with other nat'l laws

Dealing with liability – the approach

- Licensing of private activities
  - Otherwise criminal accountability
  - Conditions for being licensed
  - Procedures for monitoring (viz. 'continuing supervision') & sanctioning
  - One-stop-shopping
- Liability is about ***money***…
  - Reimbursement under license of state liability under Liability Convention 1972

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Dealing with liability – the options

- Issue 1: reimbursement proper
  - Unlimited? → problems for private party
  - Limited? → state *de facto* partial insurer
- Issue 2: insurance
  - Obligatory – up to level of limit? Even if liability is unlimited?
  - Optional → allow for betting the company…
- Inter-party liability as well?

International harmonisation…?

- Especially on **‘structural’** issues
  - Scope of exercise of national jurisdiction
  - ←→ Definitions of the key concepts
    - Current activities UN COPUOS…
- *Some* **substantive** issues
  - Problem of ‘flags of convenience’ & ‘license-shopping’
    - Liability & insurance requirements…?
    - Technical & operational requirements…?

Conclusion - *'The Answers'*

- *To implement int'l obligations & protect (legal & financial) interests of the state concerned*
- *Somehow, the Building Blocks*
- *Yes, especially at the level of structure & safety / security*

Coordinating national space-related activities

UN/NIGERIA WORKSHOP ON SPACE LAW

NOVEMBER 21-24, 2005

"WAYS AND MEANS OF COORDINATING NATIONAL SPACE-RELATED ACTIVITIES"

KEN HODGKINS

DEPARTMENT OF STATE

RATIONALE FOR COORDINATION OF SPACE ACTIVITIES

- ENSURE SPACE ACTIVITIES CONTRIBUTE TO NATIONAL OBJECTIVES
  - SECURITY
  - SCIENTIFIC
  - ECONOMIC
  - SOCIETAL

- CONSISTENT WITH TREATY OBLIGATIONS - OST ARTICLE VI
- CONGRESSIONAL OVERSIGHT
- PUBLIC SAFETY AND CONSISTENT WITH NATIONAL LAWS

POLICIES

- NATIONAL SPACE POLICY
- GPS
- COMMERCIAL SPACE TRANSPORTATION
- COMMERCIAL REMOTE SENSING
- SPACE EXPLORATION PROGRAM
- FULFILL CONGRESSIONAL ACTIONS
- ESTABLISH INTERAGENCY RESPONSIBILITIES
- SETS OUT NATIONAL GOALS, OBJECTIVES, PRIORITIES

MECHANISMS

- PRIVATE SECTOR ADVISORY COMMITTEES
- CONGRESSIONAL HEARINGS
- INTERAGENCY WORKING GROUPS ESTABLISHED BY EXECUTIVE DIRECTIVES
- POLICY COORDINATION COMMITTEE FOR SPACE
  - NSC LEADS
  - WORKING LEVEL
  - DEPUTIES COMMITTEE
  - CABINET
  - PRESIDENT
- DEVELOP POLICY & RESOLVE INTERAGENCY DISPUTES

ACTORS

- DEPARTMENT OF STATE
  - EXPORT CONTROL
  - TREATIES
  - FOREIGN POLIC Y
- DEPARTMENT OF DEFENSE
- INTELLIGENCE COMMUNITY
- US TRADE REPRESENTATIVE
- NOAA
- NASA
- US GEOLOGICAL SURVEY
- FAA
- NSC
- OSTP
- OMB

CONGRESS

- OVERSIGHT
- AUTHORIZATION & FUNDING
- LAWS REQUIRING FURTHER REGULATORY ACTION
  - REMOTE SENSING - NOAA
  - COMMERCIAL SPACE LAUNCH - FAA

STRENGTHES & WEAKNESSES

- BUREAUCRATIC – SO WHAT? THIS IS GOVERNMENT!
- SYSTEMATIC WAY TO MANAGE VITAL TOOL FOR NATIONAL WELL BEING
- BOTTOM UP APPROACH
- AGENCY INTERESTS FULLY REFLECTED
- MULTI-DISCIPLINARY
- SCIENTIFIC , SECURITY, ECONOMIC, FOREIGN POLICY BALANCED AT ALL LEVELS
- TRANSPARENT
  - PRESS BRIEFED
  - DIPLOMATIC CHANNELS

WAYS AND MEANS OF COORDINATING NATIONAL SPACE-RELATED ACTIVITIE

“THE NIGERIAN EXPERIENCE”

Prof. R.A.Boroffice
Director General/CEO
National Space Research and Development Agency

United Nations / Government of Nigeria Workshop on Space Law
21st to 24 November 2005, Abuja

Nigerian Space Policy

- Established NASRDA on May 5th 1999
- Space Policy Approved in 2001
- National Space Council
- Technical Advisory Committee
- International Cooperation Committee

Policy Objective

ENHANCE THE DEVELOPMENT OF SPACE SCIENCE AND TECHNOLOGY:

- **Basic Space Science and Technology**
- **Remote Sensing**
- **Satellite Meteorology**
- **Communication and Information Technology**
- **Defence and security**

Mandate of the Agency

The Agency shall gear its organization and activities towards the implementation of National Space Research and Development programme which shall be directed towards the goal of self reliant use of space technology for national development

Thus the Agency shall:

- promote the co-ordination of space application programme for the purpose of optimizing resources;
- develop national strategies for the outer space and make these part of the overall national development strategies
- develop space technologies of direct relevance to national development
- implement strategies for promoting private sector participation in space industry

Mandate of the Agency cont.

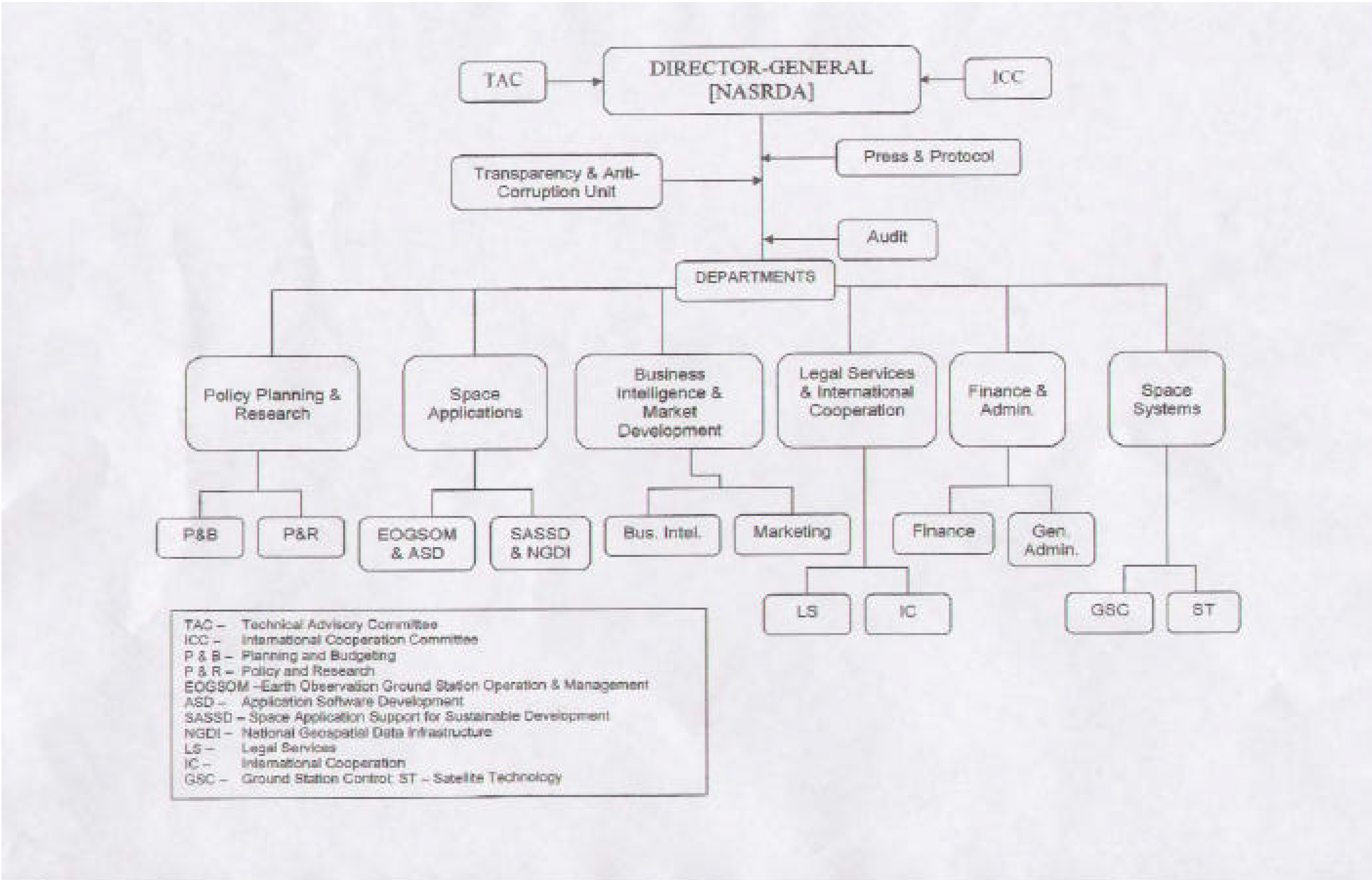
- strengthen capacity building and human resource development , which are required for the implementation of the national space programme.
- provide support for universities and other academic institutions in the country for research and development projects relevant to the national space programme
- establish and supervise centres and units for the purpose of executing the national space programme
- establish information network to promote exchange of information in order to facilitate communication and transmission of data concerning the activities of the Agency
- collaboration with international research centres, NGO's, Universities , Industries and other national and international Space Agencies in areas that are relevant to the national space programme
- Promote active participation of Nigeria in the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and other United Nations specialization Agencies involved in Space Science

NASRDA'S Institutional Framework

ACTIVITY CENTERS UNDER NASRDA

- Centre for Space Science and Technology Education, Ile-Ife
- Centre for Remote Sensing, Jos
- Centre for Satellite Technology Development , Abuja
- Centre for Geodesy and Geodynamics, Toro
- Centre for Space Transport and Propulsion, Epe
- Centre for Basic Space Science and Astronomy, Nsukka

NASRDA'S ORGANOGRAMME



Centre for Basic Space Science

Capacity building to address developmental needs of the country in:

- Astronomy
- Solar terrestrial physics
- Cosmology and Origin of Life
- Meteorology and climatology
- Ionosphere physics
- Geomagnetism
- Communication physics
- Remote Sensing
- Rocketry and Balloons
- Satellite Science Technology

National Centre for Remote Sensing

- Capacity building in satellite data applications
- Implement space application programmes of national importance
- Acquisition of satellite data from various satellites
- Operate multi-choice satellite archiving station

Centre for Geodesy and Geodynamics

- Capacity building in geodetic surveying and mapping.
- Monitoring of coastal deformation and subsidence due to excessive oil and gas exploitation
- Monitoring of sea level rise
- Monitoring of seismic and geodynamic phenomena
- Develop capability in the application of Satellite Laser Ranging (SLR), Very Long Interferometery (VLBI) and GPS network

Centre for Space Transport and Propulsion

- ❖ Develop engineering and scientific ability to produce space transportation vehicles
- ❖ Acquire technology to manufacture rocket components
- ❖ Develop various types of fuel for rocket propulsion
- ❖ Develop technological capability to launch rockets.

Centre for Satellite Technology Development

- Build capacity on all aspects of satellite technology
- Build and Launch satellites
- Operate ground stations for tracking and telemetry and command

Centre for Space Science and Technology Education

❖Skills and knowledge enhancement of univeristy educators and research scientist:
- Remote sensing and GIS
- Satellite Communications and GPS
- Meteorological Satellite Applications
- Basic space and atmospheric sciences technology

❖ Development of Space Science and Technology curricula

❖ Aid research scientists and projects personnel in preparing space derived information.

❖ Undertake and promote regional and international cooperation in Space Science and Technology programmes

International Co-operation

- ❖Disaster Monitoring Constellation
- ❖International Charter on Space for Major Disaster
- ❖Committee On Earth Observation Satellites (CEOS)
- ❖Global Earth Observation System of Systems (GEOSS)
- ❖United Nations Committee on
  the Peaceful Uses of Outer Space (COPUOS).

ACHIEVMENTS

- Built and launched a Low Earth Orbiting remote sensing satellite (NigeriaSat-1)
- Established a Mission Control Centre in Abuja manned by Nigerian Engineers
- Signed Contract for the design manufacture and launch of Nigeria's first communication satellite (NigcomSat-1)
- Presently training 50 Engineers in China to man space and ground segments of NigcomSat-1

FUNDING

- Government is sole source of funding for the Space programme in Nigeria

- Funding for Space programmes/projects up by more than a 1000% since 1999

- Less than 2% of funds provided by other governments to major space agencies in the world

- Need for private sector investment in Space programmes

Future Plans

- A Nigerian Astronaut in the next ten years
- Launch a satellite manufactured in Nigeria within the next 18 years
- Develop launch capabilities in the next 20 years

Ways and means of coordinating national space-related activities – the African experience:

Coordination of Space Science and Technology in South Africa

Peter Martinez

Coordinator, National Working Group on Space Science and Technology, South Africa

Abstract

South Africa has been involved on a small scale in the global space arena since the dawn of the space age. Over the past five decades, a number of institutions have developed capabilities and facilities in various fields of space science and technology. However, the resulting programmes have been conducted in a largely disparate fashion following the interests and priorities of the organizations engaged in them. This paper explores the current drivers for the renewed interest in space science and technology in South Africa and describes recent efforts to improved coordination by the different players in the South African space arena.

Introduction

Like every other country these days, South Africa is critically reliant on a wide variety of space-based systems. Space is so much a part of the 'plumbing' of modern life that it is often taken for granted, however, over the past few years there has been a growing appreciation of the importance of space systems in the daily lives of people on the ground, and the South African Government has started to take a more strategic view of space issues in general. The World Summit on Sustainable Development, held in Johannesburg in 2002, played an important role in highlighting the value of space technology to address national and regional development priorities in a cost-effective manner. This provides the current context for the renewed interest in space technology by South Africa. We do not pursue space technology as an end in itself, but rather as a vehicle to address national development imperatives. These imperatives cascade down through various national sectoral strategies (such as the National Research and Development Strategy) and policies that are implemented as programmes by the various departments and agencies of the South African Government.

The cross-cutting nature of space applications means that a wide number of Government departments and institutions have developed systems that make use of space technology to meet their operational requirements. Lack of coordination among these different users of space technology has resulted in duplication of effort and in purchases of the same data sets or establishment of the same capability by different government organizations. In parallel with the increasing use of space technology by both the public and private sector in South Africa, the past decade has seen the emergence of a local micro-satellite industry, built on the heritage of Sunsat, a university-built satellite launched in 1999 as a secondary payload on a United States launcher. Because of the lack of coordination, the user requirements, particularly from the perspective of Government user departments, were not clearly formulated. Without such guidance, the industry was developing from a basis of 'technology push' rather than 'applications pull'. The result of this is that there was until recently no government demand for the locally developed space technologies. Given that space activities are developed as a public good, and that only governments can afford the necessary long-term investment horizons associated with such activities, this situation was clearly not conducive to stability and growth of the industry in the long term.

With the lack of a national space policy and a space agency (or indeed any single government entity) to define and implement a national space programme, many issues were not receiving the necessary attention. This state of affairs was generally appreciated by the various government and industry stakeholders in the South African space arena, and the year 2003 marked a watershed in the sense that the Government started to improve coordination of national uses of space technology.

This paper describes the historical backdrop against which these developments occurred and the current initiatives to develop a more strategic and coordinated approach to the utilization of space technology in South Africa.

I. Historical Backdrop (1957 – 2002)

South Africa has been involved on a small scale in space activities since the dawn of the Space Age in 1957. In the earliest days of the Space Age, in the late 1950s and early 1960s, South Africa participated in the early 'Moonwatch' programme to observe the orbits of numerous Soviet and American satellites. These institutional satellite tracking activities continued up until the 1970s, after which they were continued by amateurs. In the early 1960s, NASA established one of its Deep Space Network stations in Hartebeesthoek. This station, known as DSS51, supported a number of the early robotic missions to the Moon as well as some of the later human landings on the Moon in the Apollo era. It also supported robotic missions the other planets of our solar system. One of the highlights of the planetary exploration activities supported by DSS51 was that it was the ground station to receive the first close-up images of the surface of the planet Mars, taken on 15 July, 1965 by a Mariner IV fly-by of Mars. In 1974, this station ceased to operate as a Deep Space Network station of the National Aeronautics and Space Administration (NASA) of the United States and it was transferred to the South African Government. The facility, with its 26-metre dish, became the Hartebeesthoek Radio Astronomy Observatory, the national facility for radio astronomy researchers. This facility has participated in many international astronomical research projects requiring very long baseline interferometry (VLBI) techniques. The station is also the principal facility for space geodesy in South Africa and hosts a Moblas 6 Satellite Tracking Station in collaboration with NASA, as well as conducting geophysical research using Global Positioning System signals.

Also at Hartebeesthoek, the Council for Scientific and Industrial Research (CSIR) Satellite Applications Centre (SAC), established in 1975, provides commercial telemetry, tracking and command services to a host of international satellite operators and launch providers. This facility is the premier ground station facility in the sub-continent, with a footprint extending as far north as Luanda on the west coast and Dar es Salaam on the east coast of Africa. The SAC sensor portfolio includes: Landsat 5 and 7, Spot 2, 4 and 5, ERS 2, the NOAA series, Seawifs, MODIS, EROS A1, QuickBird, IKONOS and RadarSat.

Research facilities for space science include the national facilities for optical/infrared astronomy, radio astronomy, space geodesy, geomagnetism and the South African research base in Antarctica. Several universities conduct research programmes in the space sciences and provided undergraduate and postgraduate level training in this sphere. There has been little or no over-arching coordination of these various activities.

In the late 1980, South Africa established a military space programme to build a reconnaissance satellite and launch vehicle. To support this programme, a satellite integration facility was established at Grabouw, near Cape Town, and a launch facility was established at Arniston, on the Cape south coast.

With the break-up of the Soviet Union in December 1991, the geopolitical situation in the sub-continent changed and so did South Africa's relations with its neighbours. With the peaceful transition to a fully representative democratic government in South Africa, the reasons for the establishment of the space programme largely disappeared. This programme was terminated in the mid-1990s after an unsuccessful attempt to commercialize the satellite under the name Greensat. The satellite and launch system never reached operational status.

Although South Africa's first space programme was terminated before operational satellites were produced, the infrastructure that was established for satellite integration and testing is still in existence, and may be useful again in future. In 1995, South Africa became an adherent to the Missile Technology Control Regime (MTCR) and formally abandoned all work on the development of launch vehicles. The facilities that were developed for that programme are still in existence and could form part of a future civilian space programme. The former integration facility at Grabouw was taken over by the Department of Communications and used as the site of the Institute for Satellite and Software Applications (ISSA). This Institute offered postgraduate diplomas in engineering together with Stellenbosch University. The emphasis was on students from previously disadvantaged communities. The Institute developed a strong software and information technology focus and now forms part of a larger initiative called the Meraka Institute. The Overberg Test Range in Arniston has continued to be used as a test flight facility, although not for rocket research.

On the regulatory front, South Africa adopted space legislation in 1993. The primary South African legislative instrument governing the regulation of both governmental and non-governmental space-related activities is the Space Affairs Act, No. 84 of 2 July 1993, as amended by the Space Affairs Amendment Act, No. 64 of 6 October 1995. This Act established the South African Council for Space Affairs under the authority of the Minister of Trade and Industry. The Council has as its object the implementation of the space policy of South Africa. The Council is also the national regulator and licensing authority of space activities in the country. However, the national space policy was not clearly articulated and because, after the termination of government-driven space activities in the mid-1990s, there was no implementing agency to promote space activities, the Council became an inactive body.

In 1999, space activities once again entered the spotlight with the launch of Sunsat. This was a 64-kg micro-satellite built by the faculty and students of the electronic engineering department of Stellenbosch University. The satellite had a small imager, a packet radio communications payload, magnetometer, GPS array and a retro-reflector array. Sunsat was successfully launched on 22 February 1999 aboard a US Air Force Delta II launcher as a secondary payload to the ARGOS satellite. The primary mission objectives were imaging, worldwide store-and-forward email communications and satellite engineering research. Secondary mission objectives were studies of the Earth's magnetic field, gravity field, atmosphere and ionosphere, plus inter-comparison of GPS and SLR precision orbits. Sunsat's functional life in orbit ended on 1 February 2001, just three weeks short of two years of on-orbit operation.

The construction and operation of Sunsat created a team with direct experience of satellite engineering and satellite operations. This was a capability to be nurtured and developed, although not in a university environment. In 2002, the company SunSpace was established around a core team of four members of the Sunsat project to commercialize and further develop the technology base established with Sunsat. This marked the birth of an indigenous micro-satellite industry in South Africa. In the few years since its establishment, SunSpace has managed to develop an impressive range of capabilities and services; however, this was done without the guidance of a national space policy, and essentially at risk to the company.

The final event that marked the end of this first era of South African space activity was the flight by South African internet billionaire Mark Shuttleworth to the International Space Station as a flight participant in April 2002. Although Shuttleworth's flight was entirely privately funded, the intense media coverage it generated highlighted the high levels of public interest in space activities, and led to renewed interest in the previously existing space-related facilities and programmes. This interest was sustained for some time after the event by Shuttleworth's celebrity status and by the activities of the Shuttleworth Foundation to promote science and mathematics education in the country.

II. The situation in 2003

The year 2003 saw a number of developments that collectively helped to shape a more strategic view of space by the South African Government.

The Southern African Large Telescope (SALT) project was initiated in September 2001 and it generated immense media interest in astronomy and space science. The SALT project is an international collaboration led by South Africa with partners in Germany, New Zealand, Poland, the United Kingdom and the United States. Originally intended to be built as a southern hemisphere copy of the Hobby-Eberly Telescope at McDonald Observatory, Texas (United States), the South African scientists and engineers working on SALT had in fact developed a considerably more capable telescope than the Texas prototype. Three years into the project, specifications for SALT seemed to promise performance exceeding that originally anticipated from the prototype, and the project was progressing on time and in budget. This is a rare experience for large telescope projects, and helped to establish SALT in the international scientific community. This healthy situation prevailed right through to the completion and official opening of the telescope in November 2005.

In neighbouring Namibia, the High Energy Stereoscopic System (HESS) was under construction, not far from Windhoek. HESS is a system of imaging atmospheric Cherenkov telescopes for the investigation of cosmic gamma rays in the 100 GeV energy range. The instrument allows astronomers to explore gamma-ray sources with intensities at a level of a few thousandths of the flux of the Crab nebula. South Africa is a minor partner in HESS through the North West University. The first of the four telescopes of Phase I of the HESS project went into operation in the summer of 2002; all four were operational in December 2003. The facility was officially inaugurated on 28 September, 2004.

Large-scale international facilities such as SALT and HESS were attracted to the region because of the excellent climatic conditions for astronomy and because the region is politically stable and has an adequate infrastructure and industrial base to support such hi-tech ventures. At this point, government officials began to realize that conditions were right to promote the attractiveness of the southern African region as a hub for large-scale astronomy projects. The reason for the Government interest was that, in addition to the scientific benefits of such projects, they also provide lucrative industrial and technological opportunities for local industry. A new project that was emerging at the time was the Square Kilometre Array (SKA), a project to construct a radio telescope with a collecting area of one square kilometre. Such a facility would extend over an area of thousands of kilometres. SKA is an international project valued at over one billion US dollars, and is therefore attractive to potential host countries. The large, unpopulated (and consequently radio-quiet) expanses of the northern Cape and central Namibia regions loaned themselves to such a project, and the successful work on SALT and HESS gave the South African Government the confidence to lend its political support to the bid to attract the SKA project to South Africa. Because of the extent of the facility, neighbouring countries would also be involved, so the bid to host SKA is in fact a regional bid led by South Africa. At the time of this writing, the various international bids to host SKA are still under consideration, but the bid process itself generated immense momentum in the space science and technology arena in South Africa and neighbouring countries.

At the time these developments were going on, there was an approach to South Africa to join the World Space Observatory project, an international project to construct and operate a space astronomy mission for studies in the ultraviolet region. There was also a proposal spearheaded by SunSpace to develop a South African national satellite and also a proposal to work with other African countries towards the establishment of an African Resource Monitoring Constellation of satellites.

In July 2003, South Africa was one of the countries that participated in the First Earth Observation Summit in Washington, DC. This Summit aimed to strengthen cooperation and coordination among global observing systems and research programmes for integrated global observations, as called for in the World Summit on Sustainable Development and other similar fora. South Africa was elected as one of the co-chairs of the Group on Earth Observation (GEO) with the expectation that it would represent the interests of developing countries in the GEO process and in the development of the GEO 10-Year Implementation Plan. This placed a huge responsibility on South Africa to ensure that its own Earth observation situation was well coordinated and able to respond to the requirements of GEO. To this end, the Government initiated the development of a South African Earth Observation Strategy (SAEOS) involving all the providers and users of in-situ and space-based Earth observation data in South Africa.

The cross-cutting nature of the various large-scale developments discussed above highlighted the need for improved coordination across all Government departments involved in various aspects of the space arena in South Africa. On 25 May 2003, representatives of the national Departments of Science and Technology, Communications, Trade and Industry and Foreign Affairs established an informal and *ad hoc* National Working Group on Space Science and Technology. The activities of this working group will be discussed in more detail later in this paper.

III. Improved Coordination post-2003

The various challenges and opportunities presented by the developments in 2003 required improved coordination by the government if South Africa was not to miss significant opportunities. This led to a much more strategic and purposeful approach to space science and technology issues.

To harness the geographical and other advantages of the region for astronomy in support of the SKA bid, the national Department of Science and Technology initiated the *Astronomy Geographical Advantages Programme*, which is providing funding for capacity building and technology development in radio astronomy. As part of the SKA international collaborative project, South Africa is planning a science demonstrator radio telescope (the Karoo Array Telescope) which will be a scaled-down version of the SKA (about 1% of the collecting area) to demonstrate its capabilities and capacity to build and support major science instruments. Research and development programmes to develop the technologies for the telescope are ongoing. Following completion of the prototyping phases, the telescope is likely to be built in the Northern Cape between 2007 and 2009.

The South African contribution to GEO is being developed in the context of SAEOS. This strategy is under development by a wide group of stakeholders in the Earth observation domain.

To improve the coordination among leading government stakeholders in space, in December 2004 a Government Lead Users' (GLU) Group was established. This Group has representation from what might be described as the 'client' government departments that make use of space data, or that potentially could make use of space data to meet their mandates in a more cost effective or timely manner. To date, the GLU Group has produced the South African user requirements document as an input into the discussions between Algeria, Kenya, Nigeria and South Africa on the development of an African Resource Management Constellation. The other outputs of the GLU inform discussions around user requirements in the National Working Group on Space Science and Technology.

IV. The National Working Group on Space Science and Technology

This Working Group was established in May 2003 as an ad hoc inter-departmental initiative to improve coordination in the South African space arena. It was jointly established by the Department of Trade and Industry (which has responsibility for the Space Affairs Act), the Department of Communications (which sets policy for the communications industry, the biggest user of space services in the country), the Department of Science and Technology (which supports research, technology development and training in space science and technology and its applications) and the Department of Foreign Affairs (which represents the interests of the Republic in the global space arena).

The aims of this Working Group are advocacy for space, information sharing, input into policy discussions and coordination of cooperative activities among the members. The Working Group comprised mostly those Departments that could be seen as 'providers and regulators' of space technology. A completely different set of discussions was required for Departments that could be seen as 'users' of space technology. For that purpose, a forum called GLU Group was established. By maintaining this intentional separation between the 'users' and the 'providers' of space data, the discussions in each group could proceed at an optimal pace. The outputs of the GLU are regularly channelled through the Working Group to ensure that the providers of the technology respond to user requirements.

One of the first tasks of the Working Group was to commence an audit of the South African space arena. As of this writing, the information gathering for this audit has been completed and the preparation of the findings is currently in progress. This will be a useful baseline document to track the development of the South African space arena in future.

The Working Group has also been supporting the national discussions towards the establishment of a South African Space Agency through the production of technical papers on other space agencies, position papers, etc. The initiative to establish a space agency is being led by the department of Science and Technology, acting as an aggregator for a multi-Departmental initiative.

The Working Group is coordinated and supported by a Secretariat, based in the National Research Foundation (NRF), the principal agency of government for supporting research in the sciences and humanities. The Department of Science and Technology has contracted the NRF to operate the Secretariat.

V. Building Public Support for Space Science and Technology

A significant, and growing, area of activity for the Working Group Secretariat is in public outreach and communications of space issues. Since 2003, the Working Group has utilized World Space Week, which takes place from 4 to 10 October every year to promote wider awareness of space issues at various levels in South African society. In 2004, the Secretariat developed the South African Space Portal (www.space.gov.za) as a means to support the policy discussions around space issues and as a platform to communicate the importance of space to the public at large. In the absence of any other such website, the South African Space Portal rapidly established a substantial following among the internet-literate public in South Africa. It is interesting to note the marked increase in visits to the Portal every time there is a major global space event. The most popular page is 'Space in South Africa.' This shows that the public is beginning to identify the Portal as the first 'port of call' when trying to obtain information about space issues in South Africa. The Portal is also being used to advertise study and work opportunities, space conferences and so on.

In addition, the constant background programme of publicity around space issues, the Working Group utilizes World Space Week to engage the public in a week of media-intensive, high-profile events around the country. In 2003, the objective was to raise general public awareness of space issues. The message was "Space is exciting and useful to you." This message was communicated though a public awareness campaign based on popular lectures, educational posters and competitions. In 2004, the objective was to raise political awareness of space issues. The message was "Space should be part of the development agenda." A special three-day workshop on space and development was organized for Government officials from a wide variety of departments that did not normally engage with broader space issues. The workshop was arranged in conjunction with the International Space University, with sponsorship from the departments in the Working Group. This workshop allowed officials from a wider number of departments to develop an appreciation for space issues and resulted in the establishment of the GLU Group, which was mentioned above. The political awareness campaign was complemented on the public level with the launch of the South African Space Portal, which provided a 'shop window' to the South African space arena. The Workshop was also complemented by a brochure titled 'Space for Sustainable Development', which was widely circulated to members of Parliament and many officials in national, provincial and local government, and also to academia and the media. The electronic version of the brochure was made available for downloading on the South African Space Portal to maximise its reach. In 2005, the objective of World Space Week activities was for Government to demonstrate its commitment to the development of the space arena in South Africa. The message was "Exciting things are happening." At the start of the week, the Minister of Science and Technology announced the inception of a three-year capacity-building programme in the area of satellite engineering. South Africa thus plans to launch its second micro-satellite in late 2006 or early 2007. The name of the satellite will be decided through a national competition. The Department of Science and Technology and the Department of Trade and Industry also co-sponsored a series of three workshops on Space Policy (in Pretoria for government officials), on Space and Education (in Durban for educators and students) and on

Space and Science (in Cape Town for researchers and university students). These activities were complemented by the usual public awareness campaign in the media and through special events at museums, planetaria and so on.

Our experience with the past three World Space Weeks has been that this is an extremely effective way in which to promote wide awareness of the relevance of space to society. From the academic viewpoint, the October timing is a bit unfortunate as this is close to the end of the academic year in South Africa, and this has limited participation by schools in activities organized during that week. Follow-up activities in schools are also extremely difficult after early October as the schools start to concentrate on preparing the learners for their year-end examinations. In future, we plan to start the various awareness programmes much earlier in the year, and then have them culminate during World Space Week.

The initial focus on World Space Week also provided an opportunity for different government departments and other entities to collaborate in a largely symbolic activity. This was important because the various role-players had not always seen the benefits of working together on space issues. Collaborating on a symbolic project in 2003 created the opening for more substantive collaboration in subsequent years.

VI. Developments during 2005

In May 2005, the Minister of Science and Technology, Minister Mosibudi Mangena, noted the fragmented nature of current space-related activities and indicated a long-term goal to consolidate all efforts through a single space agency. The Department of Science and Technology, in close partnership with other government departments, has set itself the task of developing the country's integrated space programme.

In October, Minister Mangena announced that his department had initiated a three-year integrated capacity building and satellite development project. The project will result in an increase in satellite engineering capacity and the launch of South Africa's second micro-satellite. It is a joint initiative between the Department of Science and Technology, the Stellenbosch University, SunSpace and the Satellite Application Centre of CSIR. A satellite is expected to be launched under this programme in late 2006 or early 2007. In addition to this, the Department of Science and Technology has also been playing a leading role in discussions with Algeria, Kenya and Nigeria on a possible African Resource Monitoring Constellation, and has opened discussions with other countries on possible cooperation agreements in space science and technology.

All the above activities generate regulatory and legal questions. These questions have reanimated discussions around the need for a national space policy and a review of the general regulatory climate governing space activities in South Africa. The Department of Trade and Industry, as the responsible department for such matters, has initiated a process to develop a space policy framework to facilitate the development of a future space policy and to create a supportive regulatory environment for space activities in South Africa. It is working closely with the Department of Science and Technology in support of its work towards the eventual establishment of a South African Space Agency.

Summary and Conclusions

South Africa is reliant on space technology and has developed a wide range of capabilities to utilize this technology over the past five decades; however, these capabilities are spread over a wide number of institutions and government departments. Before 2003, there was no attempt at coordination of these activities, which resulted in duplication of efforts and facilities.

The establishment of an ad hoc National Working Group on Space Science and Technology in 2003 created an informal forum for different stakeholders to engage in discussions on improved coordination of the space arena in South Africa. This forum was established at a time when there was a growing sense of the need for improved coordination, so although the forum had no statutory foundation, its existence created an opportunity for information exchange and dialogue that had not existed before 2003.

At first, the dialogue was limited to discussing cooperation on projects of largely symbolic value, and did not touch on issues of harmonization. In this sense the World Space Week provided an ideal context for the different Departments to cooperate on a common project that demonstrated the cross-cutting nature of space science and technology. The positive experiences of the World Space Week 2003 collaboration created an opening for dialogue and cooperation on more substantive issues in 2004 and 2005.

As was noted above, South Africa currently has a regulatory authority for space, the South African Council for Space Affairs, but there is no agency charged on an operational level to coordinate and promote space science and technology. In 2005, the Minister of Science and Technology indicated that his department was working towards the establishment of a South African Space Agency, in concert with other government departments. The Working Group continues to play a coordinating role in these discussions.

Coordination of Space Science & Technology in South Africa

Peter Martinez
secretariat@space.gov.za

Outline

- Development of space in SA
- SA's means in space
- Drivers for improved coordination
- Coordinating initiatives
- Current developments

Space and National Development

National Development Imperatives

National R&D Strategy

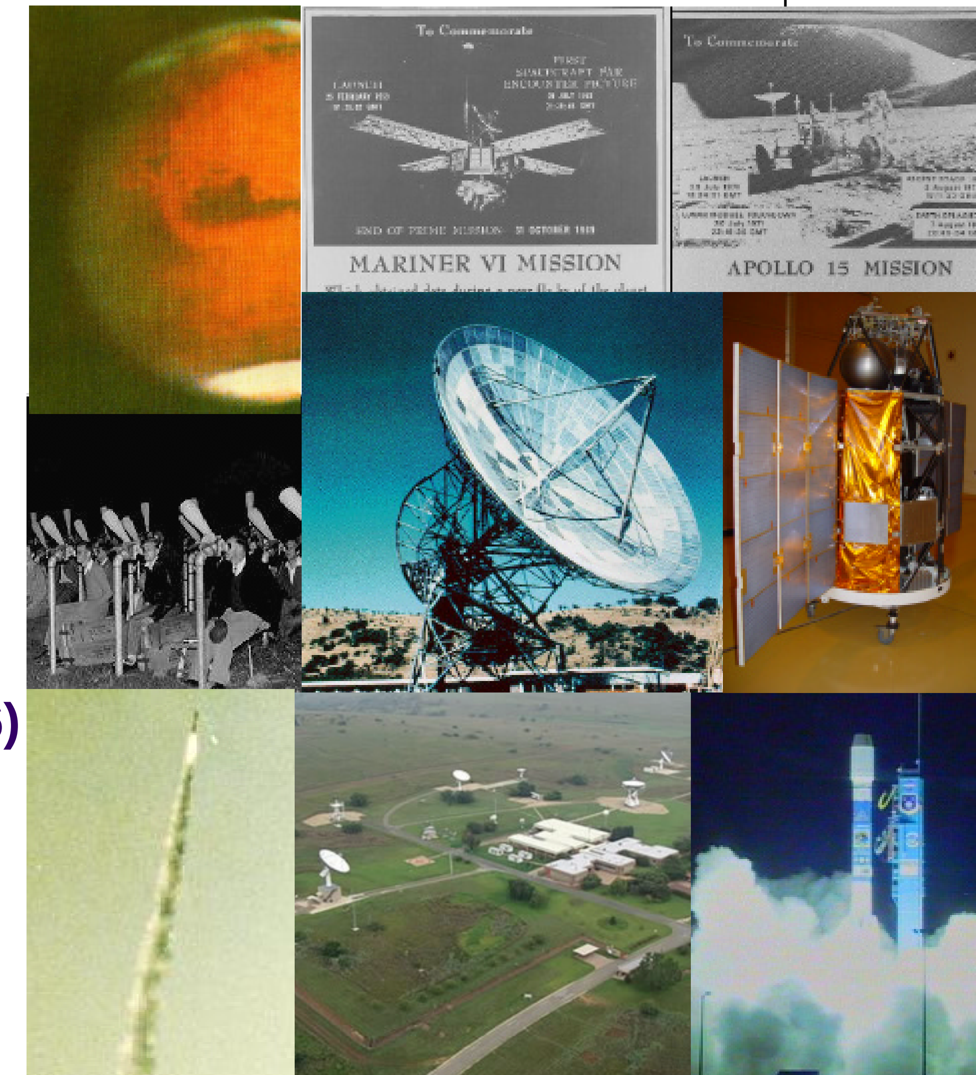
Various Sectoral Policies

Convergence of SA

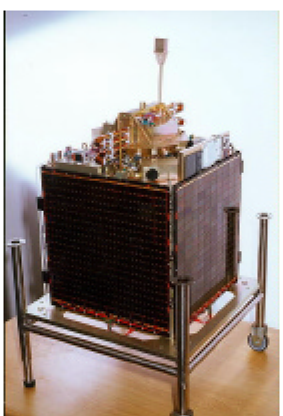
Space Science activities

Space in South Africa
Some historical highlights

- **Satellite tracking**
  - 1957 – 1970s
- **Support of lunar & planetary missions**
  - 1960s – early 1970s
  - Still ongoing
- **Greensat programme**
  - Late 1980’s – 1994
- **Space Affairs Act (1993, 1996)**
- **Sunsat launch 1999**
- **Shuttleworth flight 2002**



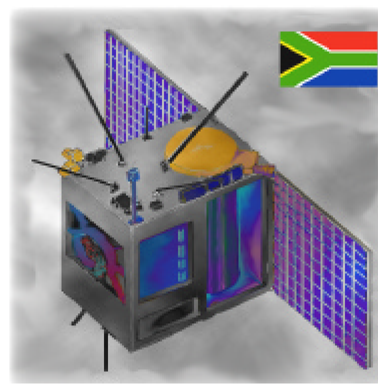
Situation before 2003:
Wide Range of disparate Activities



Situation in 2003
Several New Large-Scale Projects

- Attractiveness of Southern African Region for Large Scale Astronomy Projects
  - SALT, HESS
  - Bid to host SKA
- 1st Earth Observation Summit

- Bid to host SKA
- World Space Observatory
- Proposed new SA satellite
- Proposed African Resource Management Constellation



WIDE RANGE OF COMPETENCIES SPREAD ACROSS GOVT DEPARTMENTS.

NEED COORDINATION, POLICY DEVELOPMENT AND REGULATORY CAPACITY

Response to opportunities

- A more strategic approach to harnessing the advantages of the region for astronomy
  - Astronomy Geographical Advantages Programme (AGAP) → SKA bid
- South African implementation of GEO responsibilities & coordination of EO community (space + aerial)
  - SA Earth Observation Strategy (SAEOS)

Improved coordination between 'users' & 'providers'

- **Improved Coordination among leading Government players in space**
  - **National WG on Space Science & Technology**

User Requirements

- **Improved coordination among government users of space data**
  - **Government Lead User Group**

Current Activities

COORDINATION

NATIONAL WORKING GROUP ON SPACE SCIENCE & TECHNOLOGY

- **An Inter-Departmental initiative to improve coordination in the SA space arena**
  - Established jointly by DST + DoC in 2003
- **Aims**
  - Advocacy
  - Information sharing
  - Input into policy issues
  - Coordination and cooperative activities
- **Government Lead User Group established Dec 2004 to establish government needs for space data**
- **Current Activities**
  - Audit of the SA space arena
  - Supporting national discussion towards a national space agency
  - Public Outreach & Communication
    - World Space Week

Space Week

- **2003 – RAISING PUBLIC AWARENESS**
  "Space is exciting and useful to you"
  - **Public awareness campaign**
    - **Lectures, posters, competitions**

- **2004 – RAISING POLITICAL AWARENESS**
  "Space should be part of the development agenda"
  - **Allow the 'client' Government Departments to engage with space**
    - **3-day ISU Workshop for Government officials**
    - ***Space for Sustainable Development* booklet widely distributed**
  - **South African Space Portal launched**
  - **Public awareness campaign**

- **2005 – GOVERNMENT DEMONSTRATES ITS COMMITMENT**
  "Exciting things are happening"
  - **Announcement of ZASat Programme by Minister Mangena**
  - **One-day policy workshop for Government officials (Pretoria)**
  - **One-day workshop in Durban for educators**
  - **One-day workshop Cape Town for academia**
  - **Public awareness campaign**

Current Activities

COMMUNICATION

www.space.gov.za

NWGSST Activities

- 2003
  - Secretariat established in NRF
  - Building relationships among stakeholders
  - WSW2003 was the first joint project (DST, DoC)
    - Mostly public awareness
- 2004
  - Secretariat coordinates WG
  - Provides technical advice to the member Departments
  - WSW2004 used to engage more ‘user’ Departments (DWAF,DEAT,DLA)
  - Government awareness
- 2005
  - Secretariat coordinates WG
  - Secretariat organises three one-day workshops
  - Secretariat supports ZASat, ARM, space agency discussions
  - Responds to requests from various Government Departments
  - Liaises with user community
  - Dedicated funding for secretariat - First project officer employed

Putting the Users First

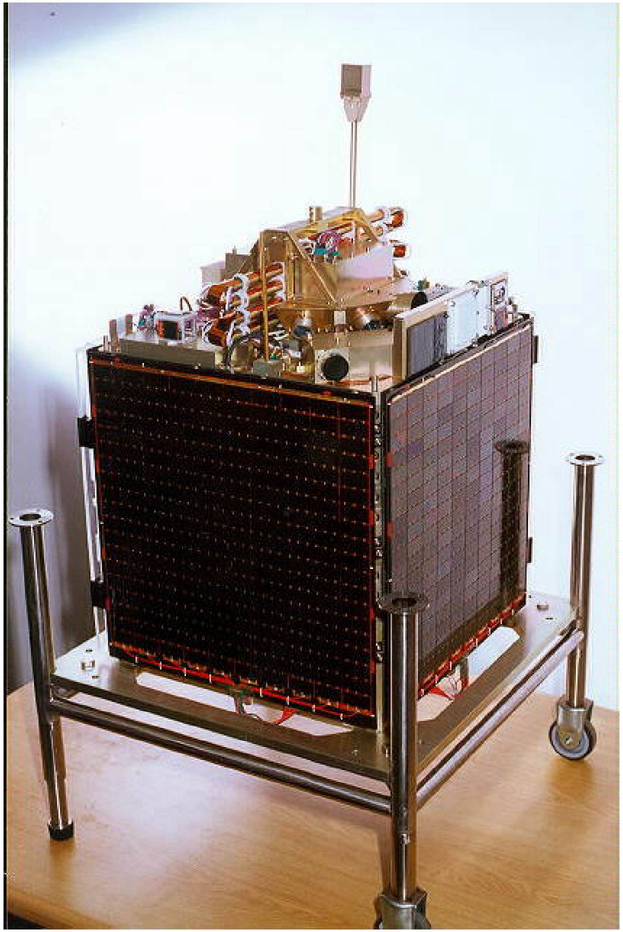
GOVERNMENT LEAD USERS' GROUP

- **Comprises the 'client' Departments**
  - (water, environmental affairs, transport, etc)

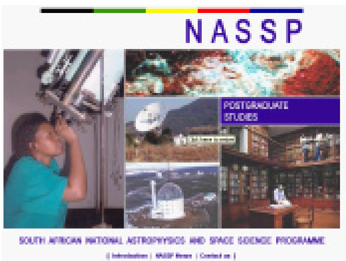
- **First Output**
  - Government User Requirements Document for space data

Current Activities
SATELLITE ENGINEERING

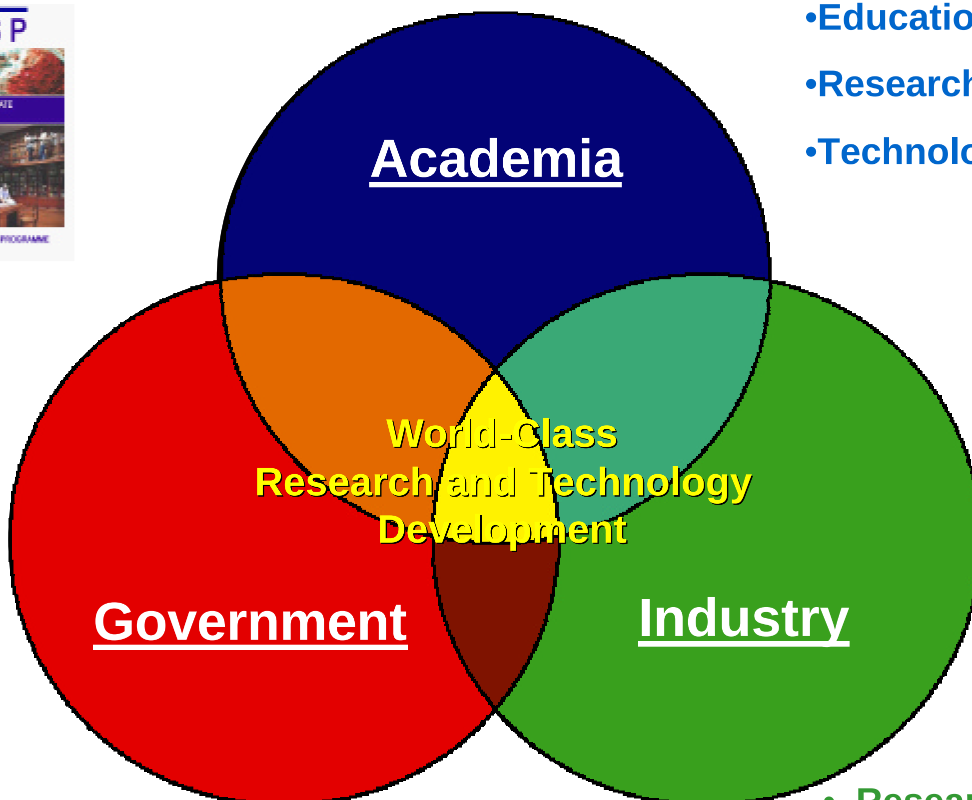
- Development of new microsatellite technologies
- Pathfinder programme
  - Satellite development
    - 70 kg satellite
    - Remote sensing
  - Capacity Building
- Research & innovation in space science & applications



Capacity Building
PARTNERSHIPS



- Education
- Research
- Technology Development



- Leadership
- Policy
- Funding
- Program Management

- Research
- Systems Engineering
- Manufacturing
- Operations

Regional cooperation

SOME EXAMPLES

- **Southern African Large Telescope is seen as an African facility**
  - MOU with Nigerian CBSS, Nsukka
- **Square Kilometre Array**
  - A regional bid to host
- **African Resource Management Satellite Constellation**
  - Discussions among SA, Algeria, Nigeria & Kenya are at an advanced stage

Space Policy & Law situation

The Department of Trade & Industry has set in motion the following initiatives:

- **POLICY DEVELOPMENT**
  - **A draft National Space Policy expected by mid 2006**
- **SPACE LAW**
  - **The Space Affairs Act will be reviewed**
- **REGULATORY AUTHORITY**
  - **A new Space Council is soon to be constituted**

Time for a Space Agency?

There is a need for a national coordinating and implementing entity to drive space activities on behalf of Government.

The Department of Science and Technology has initiated a broad consultation process for the establishment of a future South African Space Agency.

Coordinating the Algerian Space Activities

Workshop on Space Law, 21st - 24th November 2005

Contents

- Presentations of the Algerian Space Agency (ASAL) and its missions.
- The national space activities:
  - Current situation;
  - Actions in progress and perspectives;
  - The international cooperation.

Presentations of the

Algerian Space Agency (ASAL)

and its missions

Presentation of Algerian Space Agency (ASAL)

The Algerian Space Agency (ASAL) has been created by presidential decree on the 16th January 2002;

ASAL includes:

- A board of directors composed of representatives from 15 ministerial departments;
- A scientific board composed of experts in space science and technology.

Main missions of ASAL (1/2)

- Propose to the government elements of the national strategy in the space activities and ensure their implementation;

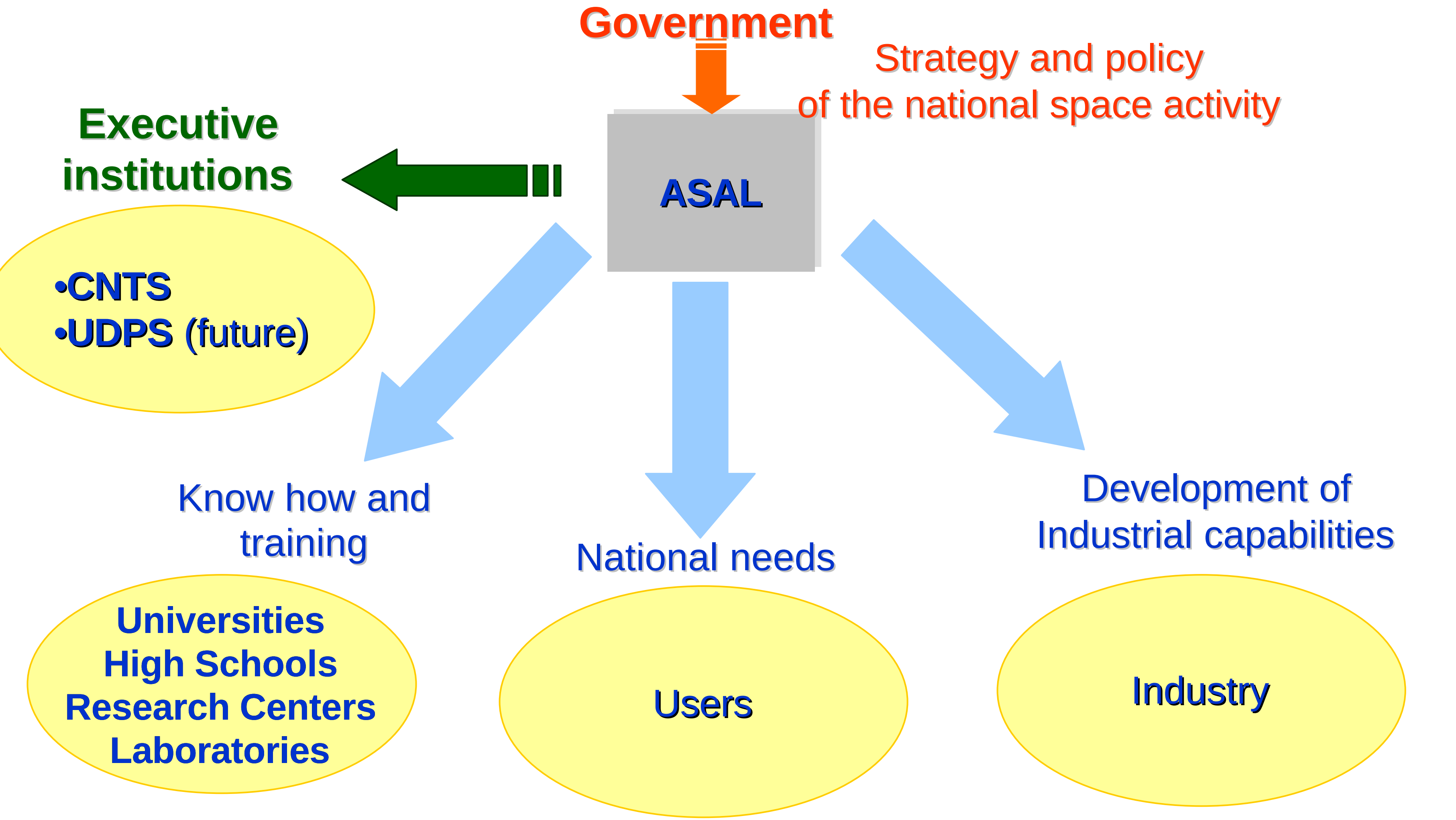
- Put in place the infrastructures that will reinforce the national capabilities;

- Put in synergy the national institutions of research, industrial development and users sectors;

Main missions of ASAL (2/2)

- Promote the exploitation and pacific use of space techniques for the benefit of economic, social and cultural development;
- Propose to the government, the politic in bilateral, regional and multilateral cooperation with regards to the national needs in space activity;
- Ensure the follow up and assessment of the engagements resulting from the government obligations with regards to regional and international agreements in space activity.

ASAL coordinates the national space activity



The current national space activities

The national activity has been intensified since the creation of the national research program (PNR) in 2000 in “space technologies and their applications”.

This PNR has contributed to:

1. The design, realisation and launch of the first Algerian satellite Alsat-1, in collaboration with Surrey Satellite Technology Limited (SSTL, United Kingdom), in November 2002;
2. The development of application projects with regards to different national requirements (natural disasters, knowledge and assessment of the natural resources,…) based on Alsat-1 image;
3. The training of high level scientific potential, which is in charge of the technological and applicative aspects of the follow up of the space program;
4. The creation of the Algerian Space Agency (ASAL) following the intensified national activity.

The National Centre of Space Techniques CNTS

The CNTS is the principal executive institution of the ASAL in the field of Space Techniques and their applications,

The CNTS implements the national research program (PNR) in “space technologies and their applications” according to the requirements of the national sectors (water resources, agriculture, telecommunications, transports, environment …)

The CNTS is organised in divisions and research groups, including a hundred of researchers involved in the following research projects:

- Space Instrumentation,
- Space Mechanics,
- Geomatics,
- Geodesy,
- Remote sensing.

National imaging requirements
and
Alsat-1 for the national development

Main satellite images requirements for Algeria 1/3

The **national research program** (PNR) has lead to the following satellite image requirements for Algeria:

- **Agriculture & rural development :**
  - Data updates and assessment of agricultural statistics.
  - Image classification of cultivated lands.
  - Diversification of the economic activity.
  - Environment protection
  - Promotion of rural and forest patrimony.
- **Energy and mining**
  - Oil industry's infrastructure and oil transport network (via pipeline) mapping.
  - Geographical information systems for industrial zones undergoing technological risks.
  - Geological mapping and mining cadastre.
  - Probable Option : Hyperspectral imaging.

Main satellite images requirements for Algeria 2/3

- **Land use and disaster monitoring**
  - Natural disasters monitoring for:
    - earthquakes,
    - Floods,
    - Forest fires,
    - Locust invasion
    - Desertification and drought
  - Decision support and assessment of environmental impacts.
- **Water resources**
  - Improvement of the Water resources knowledge.
  - Information updates about surface water quality, with yearly updated maps.
  - Frequent update of hydraulic infrastructures mapping.
  - Catchment basins protection against erosion.

Main satellite images requirements for Algeria 3/3

- **Fishing resources:**
  - Monthly and seasonal monitoring of littoral zones and maritime territories.
  - Improving the fishing potential knowledge and management.
  - Fishermen orientation towards new fishing zones.
  - Aquaculture development for the inland, humid zones, …etc.
- **Cadastre:** High resolution for the achievement the general cadastre.
- **Tourism:** Tourist zones mapping.
- **Health:** Epidemics propagation maps for: paludism, zoonotic skin leishmaniosis, Rift valley fever, cholera.

Contribution of Alsat-1 images

The Alsat-1 mission has been undertaken as a first step in fulfilling the national satellite Images requirements.

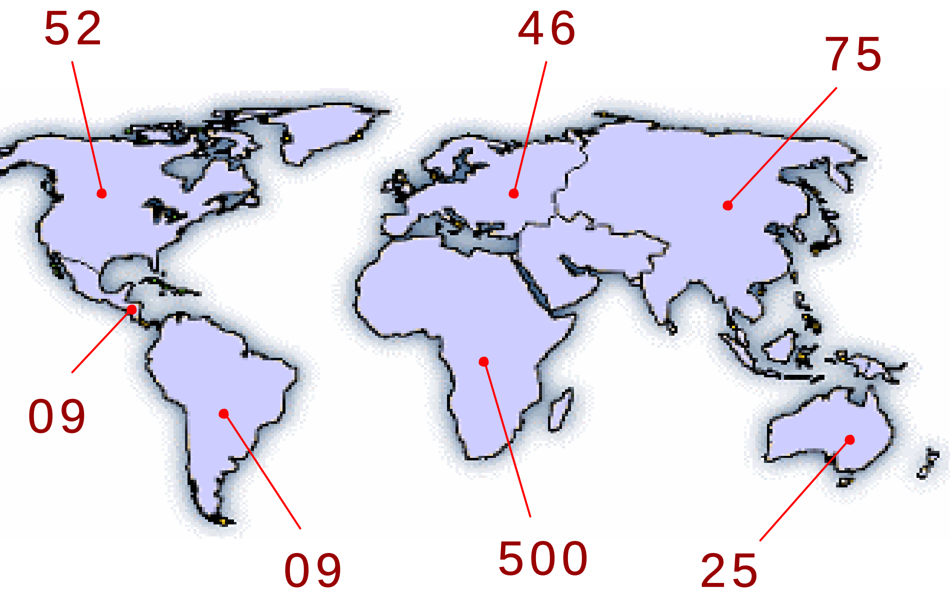
Technical Specifications of ALSAT1

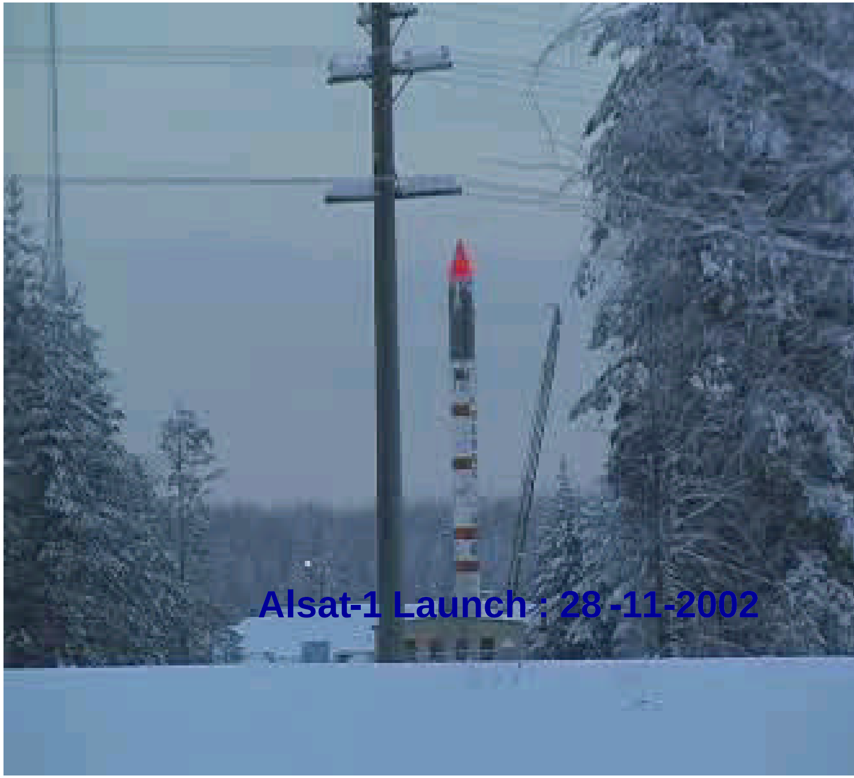
Alsat-1 is an earth observation micro-satellite.

Dimensions:	60 x 60 x 60 cm
Masse :	90 kg
Life time :	5 years
Launch :	8 November 2002 at 6:50
Orbit :	sun-synchronous
Altitude :	680 km
Swath :	600 Km

Images obtained are Multispectral (3 bands) with a resolution of 32m.

Alsat-1: 3 Years in space



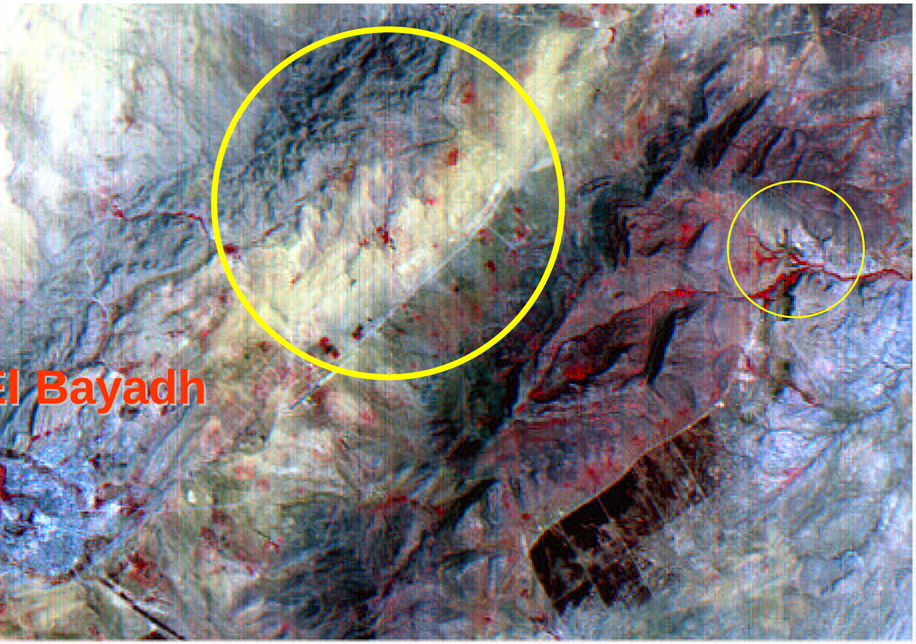


Total > 800 Scenes

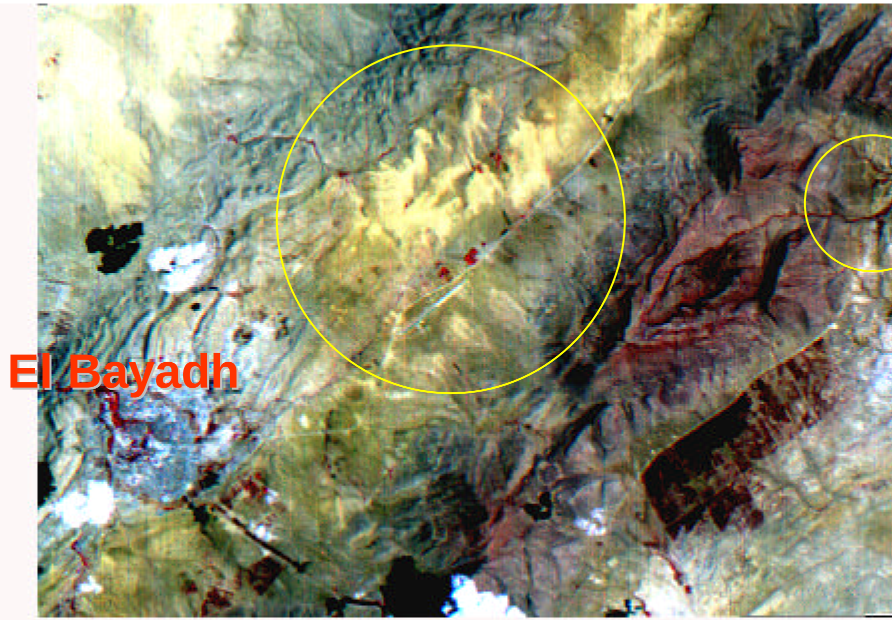
Examples of Alsat-1 Images Used by the National Development Sectors

Alsat-1 for Agricultural and rural development

Sensitive ecosystem in the steppe [HCDS]



A: Image Alsat1 acquise le 26 avril 2003

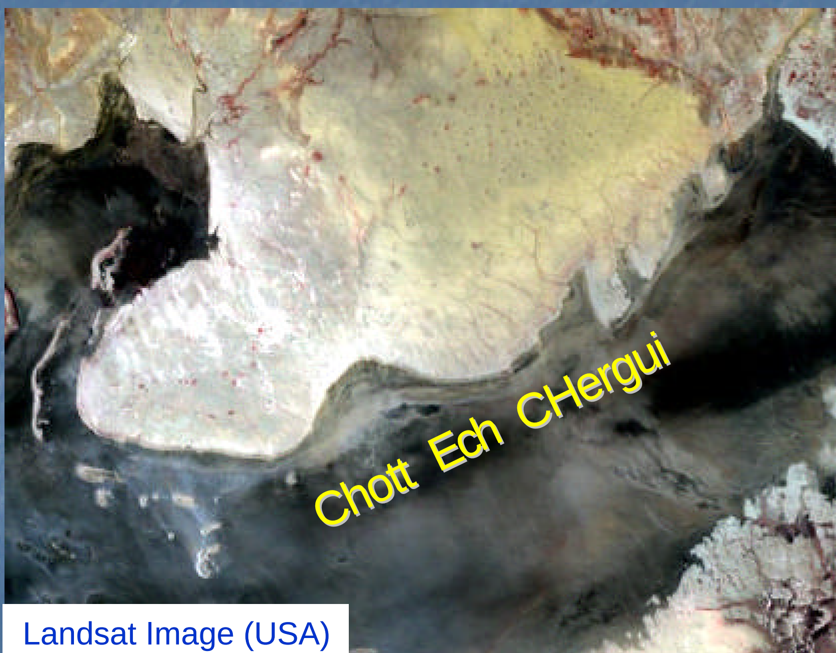


B: Image Alsat1 acquise le 09 juin2003

The revisit time allows to pursue different phenomenon such as desertification. The image taken in June shows a decrease in the vegetal area, that are in red in the image of April.

Alsat-1 for Desertification

Commune de Sidi Abderahmane (Tiaret)
Localisation du Périmètre pour la Mise en Défens / /



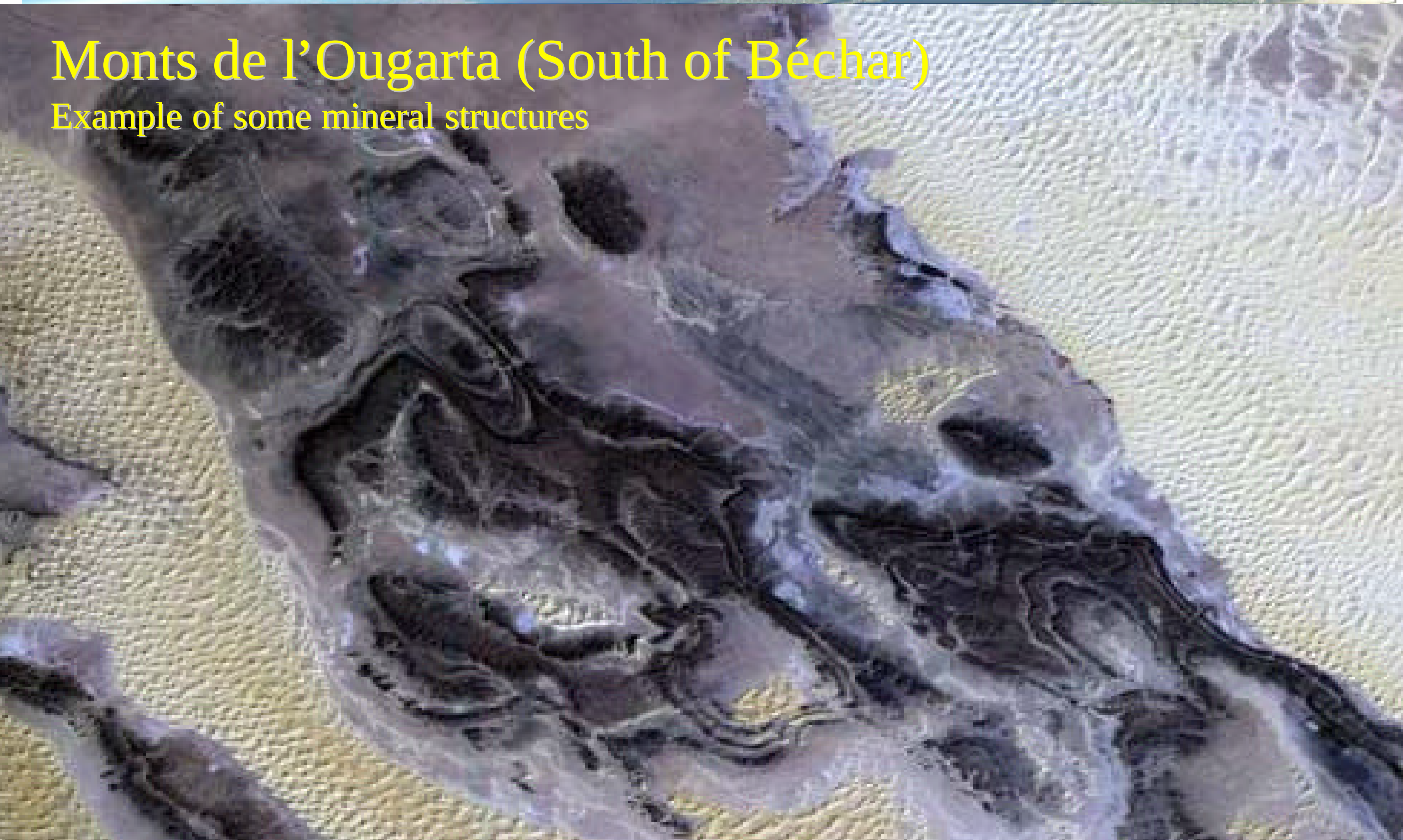
Commune de Sidi Abderahmane (Tiaret)
Mise en Défens – Alsat- (Février)

The PNDAR aims, the preservation of the steppe areas threaten by the desertification. Alsat-1 evaluates the vegetation growth. The right image (2004) shows a large increase in the vegetation (in red colour) in comparison with left image from Landsat (2001).

Alsat-1 for Oil and mine resources

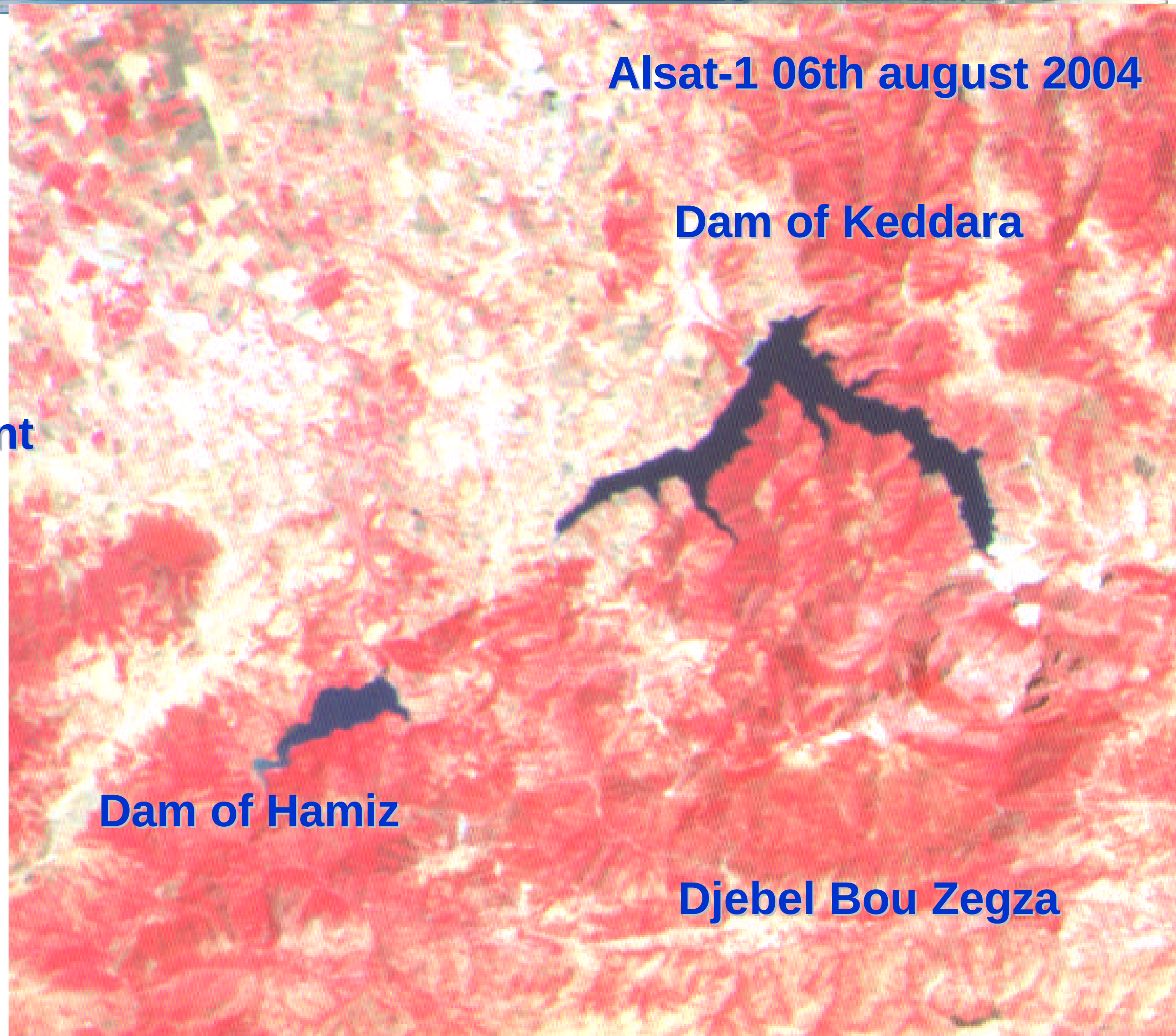
Monts de l'Ougarta (South of Béchar)

Example of some mineral structures



Alsat-1 for Water resources

Alsat-1 image (summer 2004) gives an assessment of the Dams level filling (the water is represented in dark blue)



Alsat-1 for the management and prevention of natural disasters

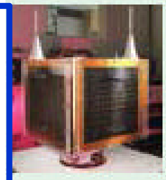
« DMC: Disaster Monitoring Constellation »

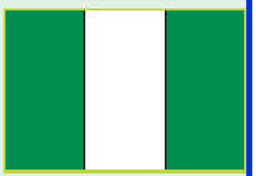
- Algeria belongs to a consortium of 5 countries, a shared exploitation of their 5 satellites for the management and prevention of the natural disasters in the world.
- the DMC has submitted its membership to the international charter « space and natural disasters», created under the recommendation of the United Nations.
- This charter defines the mobilisation conditions of the international space systems for the management of disasters (NOAA, CNES, ESA; ISRO, ASC.CONAE,…).

The DMC consortium

Alsat-1

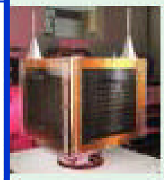
Launched on the 28th November 2002





Nigeriasat

Launched on the 27th September 2003

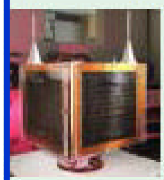


Bilsat

Launched on the 27th September 2003

UK-DMC

Launched on the 27th September 2003



China-DMC

Launched on the 27th October 2005

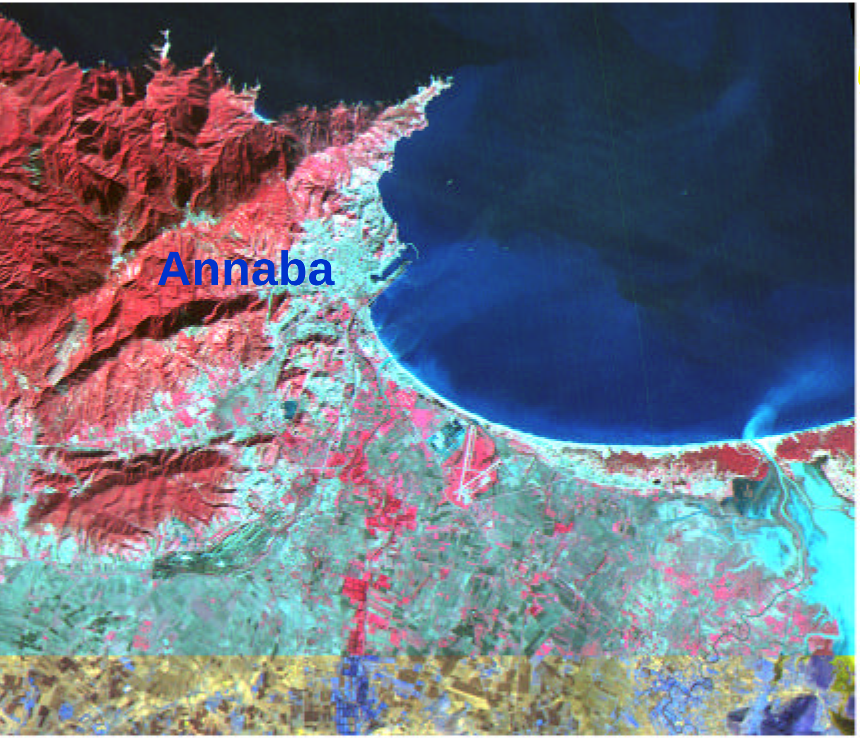
Contribution of Alsat-1 imagery in the management of natural disasters

Alsat-1 has been used in different worldwide areas in order to assess some natural disasters, such as:

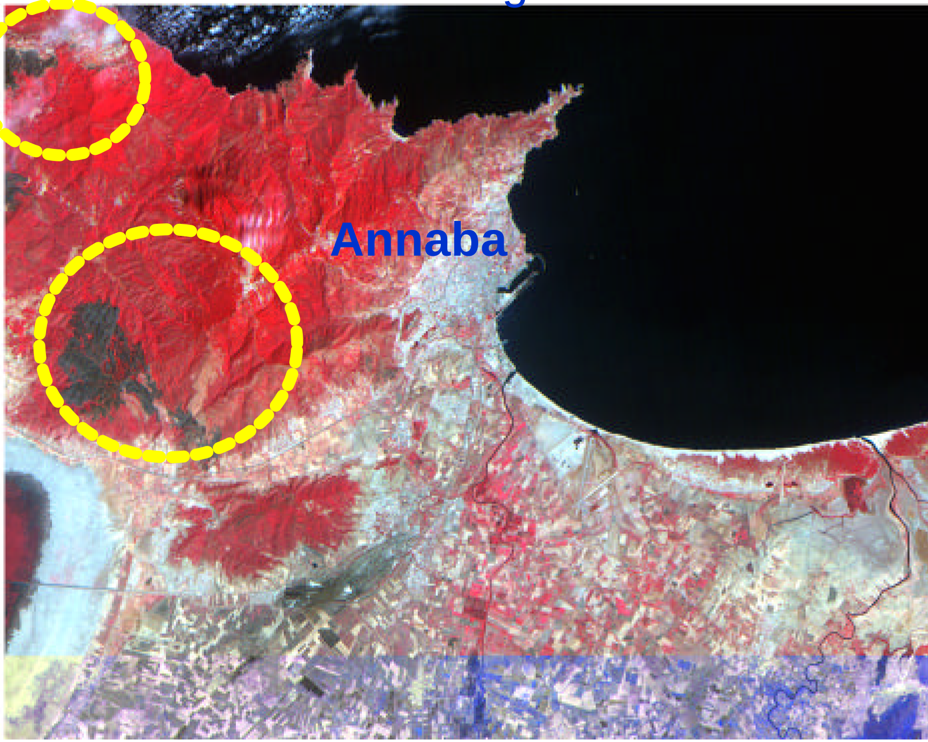
- Forest fires in Algeria,
- Forest fires in France and Portugal,
- Floods in Philippines,
- The Tsunami in South-East of Asia,
- Locust peril in Algeria,
- Locust peril in the Maghreb and Sahel regions.

Alsat-1 & Forest Fires

March 2003



August 2003



Identification of the burned areas (grey colour)

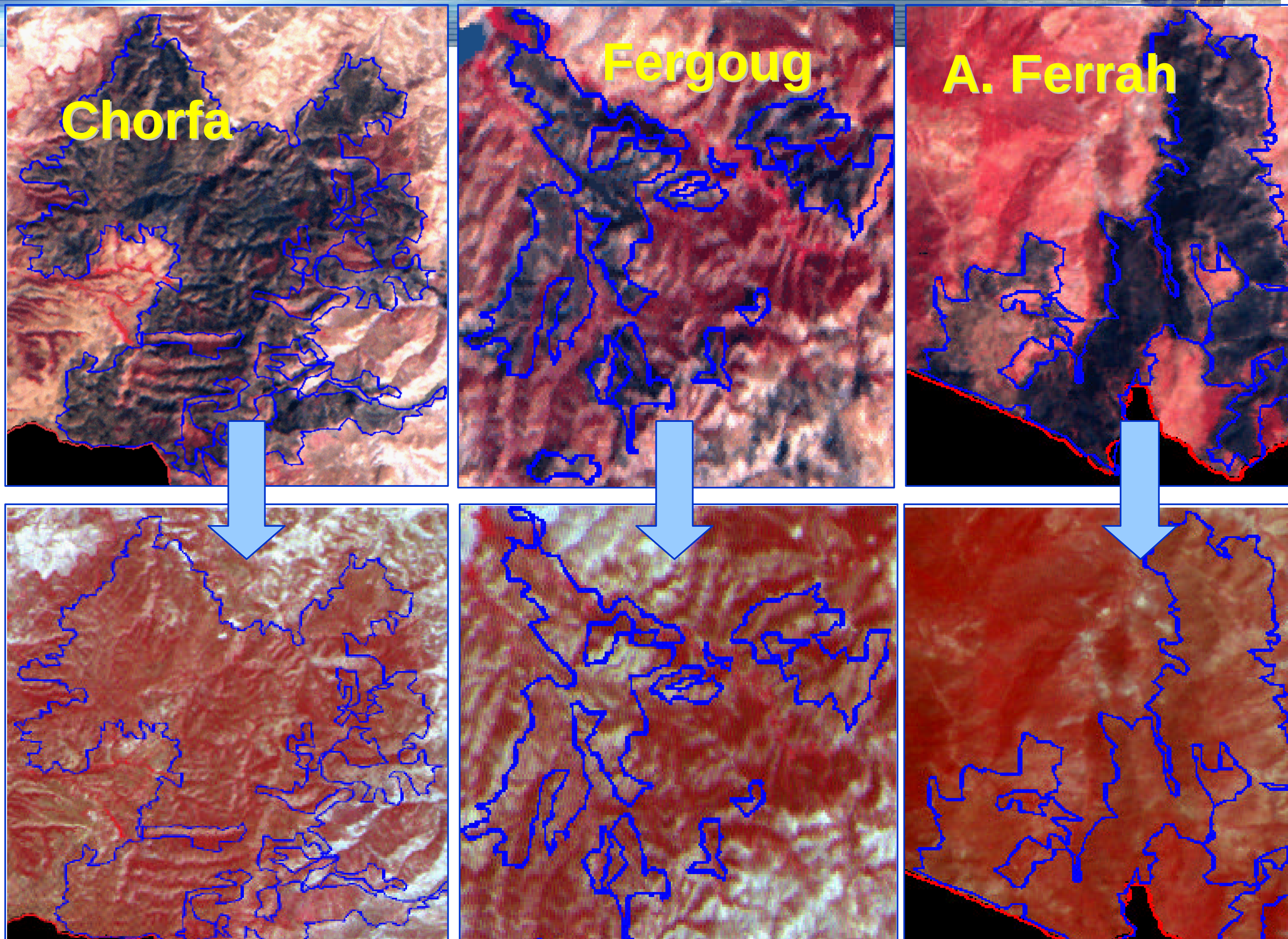
Vegetation growth & forest fires, Mascara (West of Algeria), 2004

sat-1 Images

ugust 2003

sat-1 Images

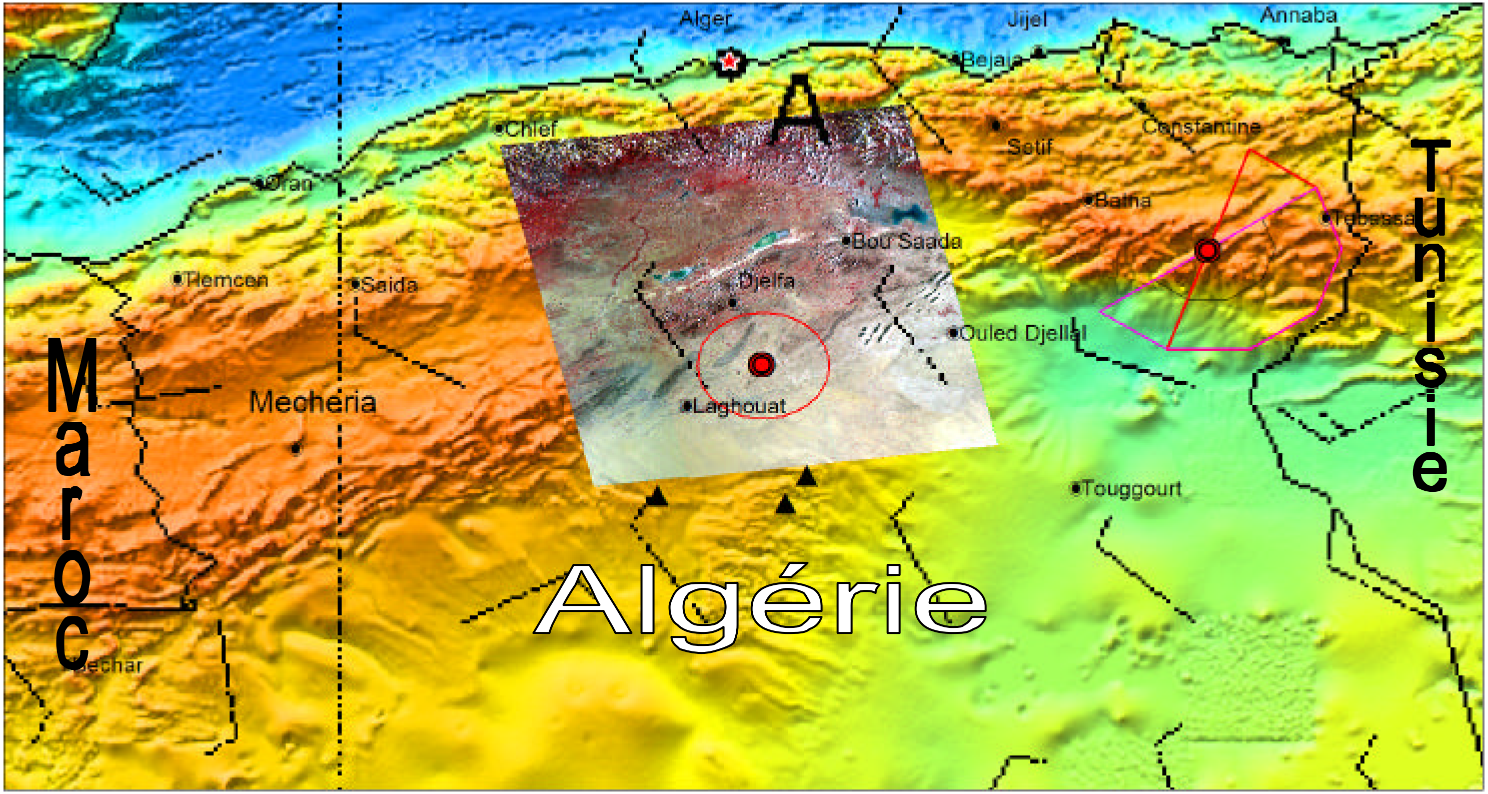
June 2004



Alsat-1 & forest fires 2004

03 fire start points in the wilaya of Tipaza:
Alsat-1 image (25 August 2004)

Alsat-1 and Locust peril



Aid and analysis system for decision (SAAD) developed by ASAL. This system combines Alsat-1 images, geomorphologic data, meteorological cast (wind direction and speed,…) for 4 days, and information about the soil.

Actions in progress and perspectives

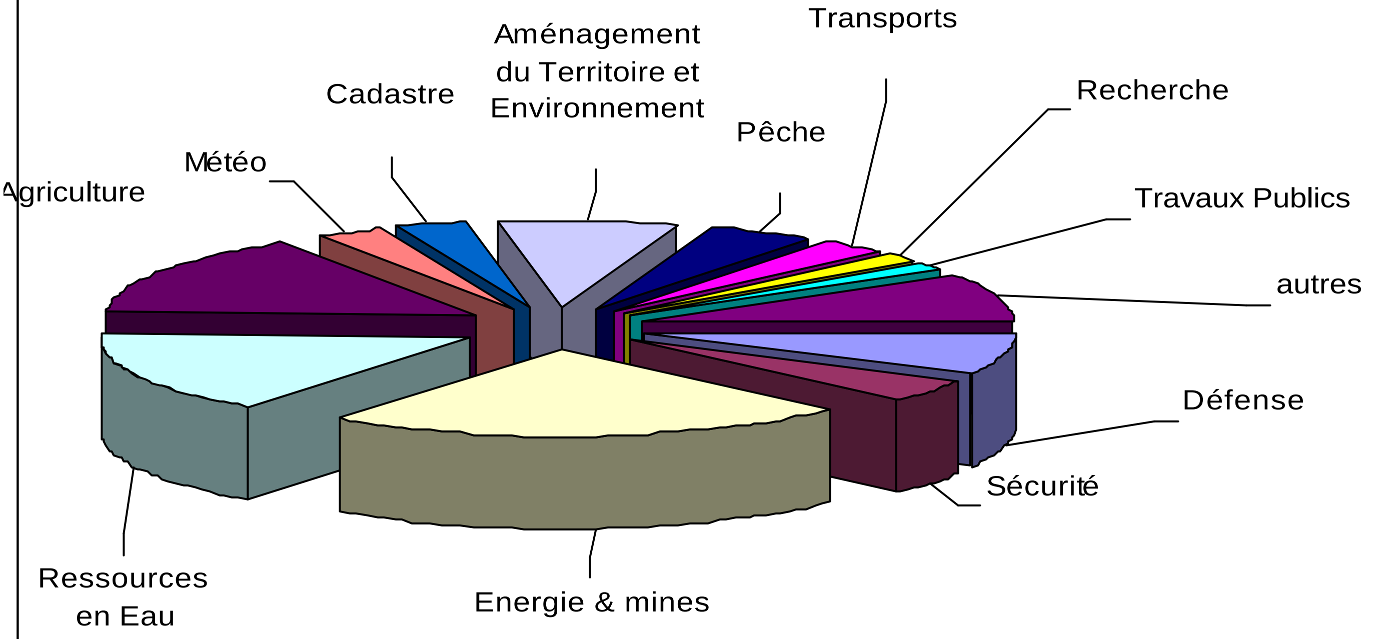
Actions in progress and perspectives

A national space program for 15 years has been established , which answers the requirements of capacity building:

1. build space infrastructures:
   - Small Satellite Development Unit (UDPS)
   - Centre of Reception and Exploitation of Satellite Image (CREIS)
   - National centre for the exploitation of telecommunications systems (CNEST)
2. design and realise space systems:
   - An Earth Observation satellite project, Alsat-2
   - A Telecommunication satellite project, Alcomsat-1
   - An African Resources Management constellation, ARM
   - An Arabic Earth Observation constellation, ASEO

Space applications

NSP actions for different sectors



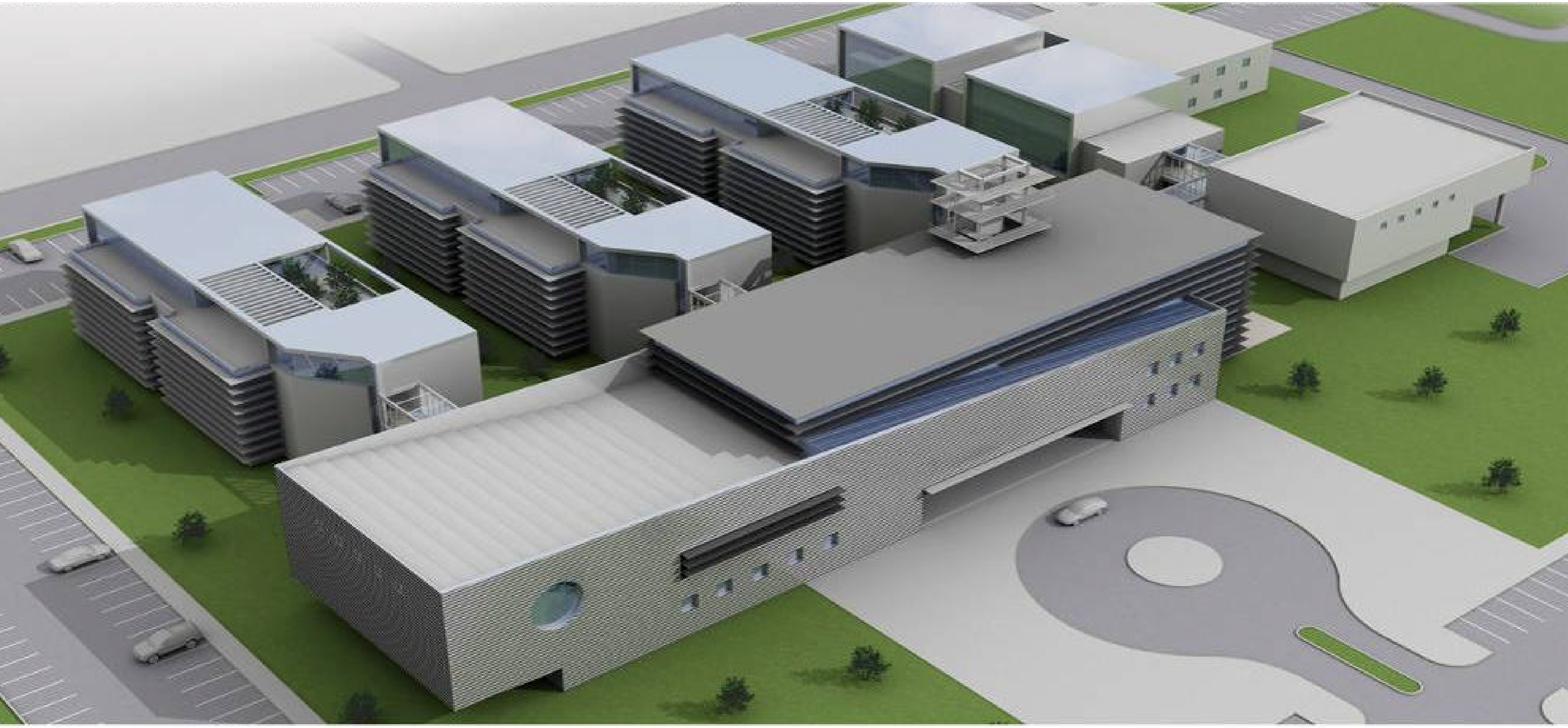
Small Satellite Development Unit (UDPS)

The Unit of Development of Small Satellites is a structure which will be dedicated to the manufacturing and integration of future space systems and sub systems of earth observation satellites and telecommunications satellites.

Among the facilities that will be available at UDPS are:

- A clean room dedicated to satellite sub-systems integration and assembly;
- A room for thermal tests;
- A room for the design of specific integrated boards;
- Rooms and equipments for antenna and radio frequency tests;
- Mechanical, electrical, electronics and optical laboratories.

Small Satellite Development Unit (UDPS)



Centre of Satellite Image Reception and Exploitation (CREIS)

The CREIS is currently under development, which comprises two distinct entities:

1. The reception centre, located at Ouargla, which will undertake the image data reception, downloaded from different earth observation satellites (Alsat-2, Alsat-3, ...);
2. The processing centre, located at Algiers, which will undertake the image processing (radiometric and geometric) as well as the applications (cartography, maps,...).

Alsat-2

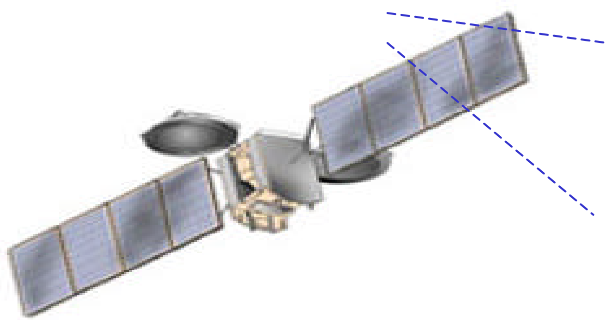
Alsat-2 is an Earth Observation satellite project, with know how transfer, dedicated to high resolution image

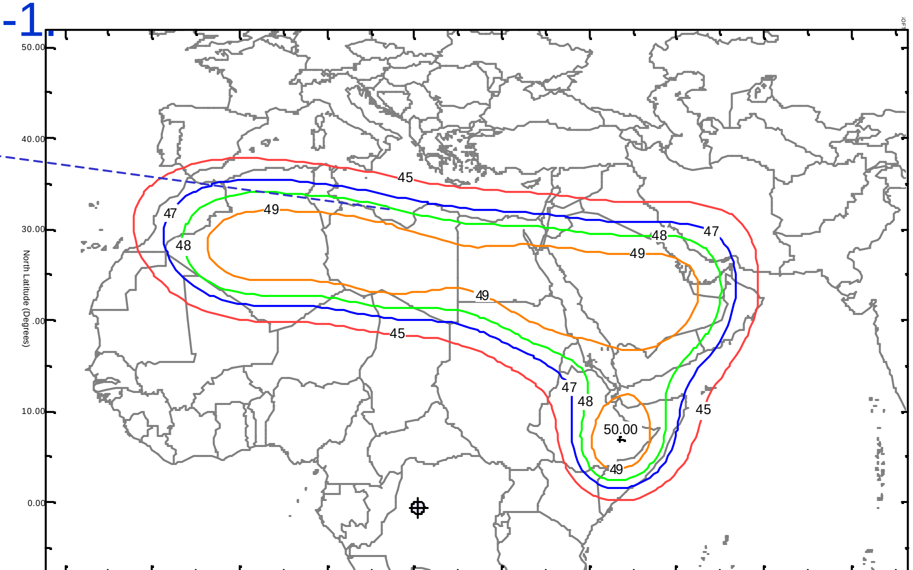
2.5 m simulated image of CNTS and Arzew

Telecommunications satellite Alcomsat-1

The access to the services offered by telecommunications satellite constitutes a priority of the NSP, for this reason the NSP envisages the launching and the exploitation of a telecommunications satellite project "**Alcomsat-1** ", to overcome the growing needs in the field of telecommunication, to reach the isolated areas ….

A group of experts coordinated by ASAL, are currently establishing the technical specifications of Alcomsat-1.





National Seminar on Space telecommunications

ASAL is organising a national seminar on space telecommunications the 20th-21st December 2005.

The purpose of this seminar is to find the approach which will be adopted to set up the technical specifications of a national space telecommunications system by :

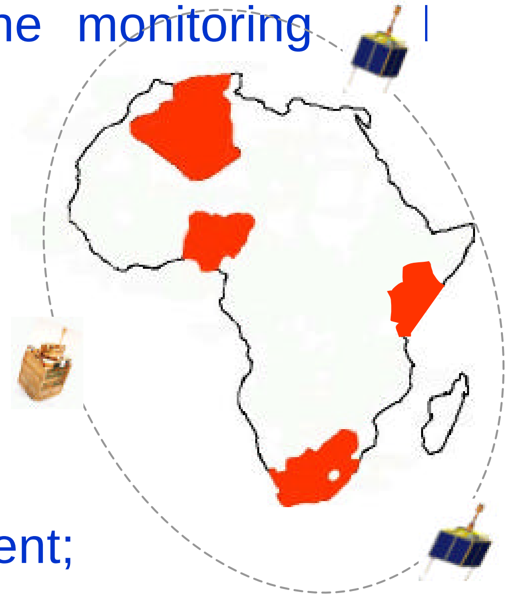
- assessing the national space telecommunications users requirements;
- having a better knowledge of the state of the art in the field of telecommunications satellites and to know the inventory of existing space telecommunications systems in the world;
- dimensioning of a national space telecommunication system project;
- making a profit of expertise with regards of telecommunications satellite project management.

National centre for exploitation of telecommunications system (CNEST)

The exploitation of the telecommunications satellite is an essential aspect with the success of the Alcomsat-1 mission. Therefore, the management and the exploitation of the satellite will be ensured by the CNEST.

African Resource Management « ARM » constellation

Four (04) African countries, namely Algeria, Nigeria, South Africa and Kenya has taken part in two ARM workshops, to discuss and assess the feasibility of a satellites constellation for the monitoring management of African resources and environment

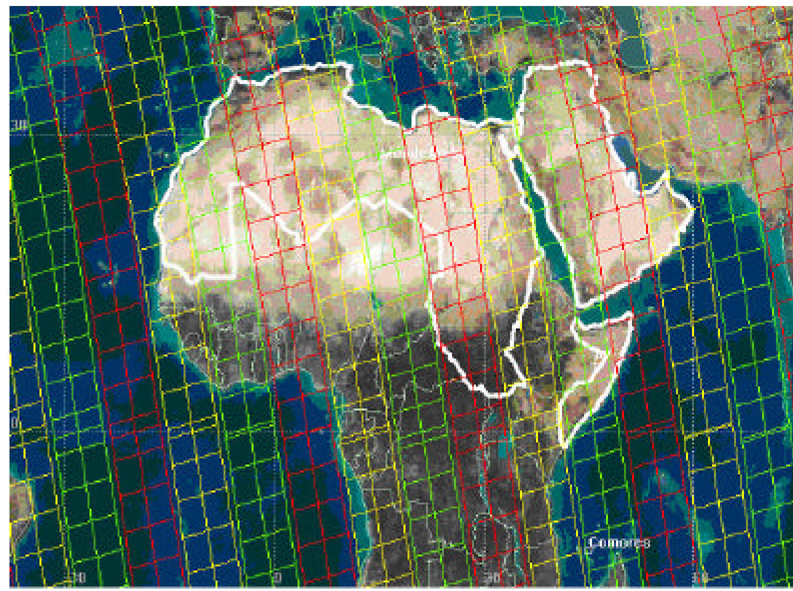


Objectives :

- Daily cover of Africa with satellite imagery
- Facilitated access to space data;
- Natural disasters effects mitigation;
- Mineral exploration;
- Fishing resources management;
- Crop forecast and agricultural resources management;
- Urban development and land use mapping;
- Knowledge and management of water resources;
- Climatic change observation;
- Rapid access to information on natural resources and environment.

Arabic satellite for earth observation

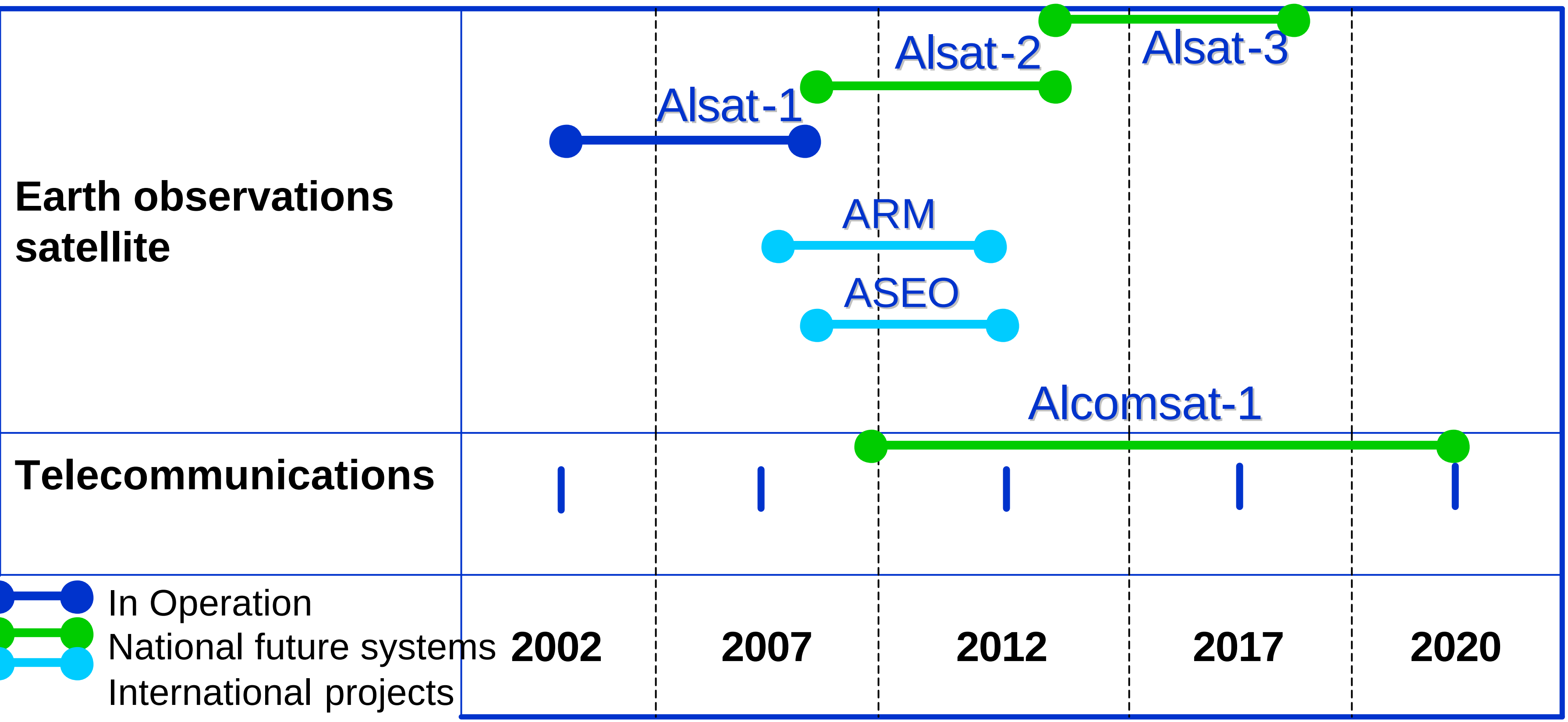
A preliminary technical study for dimensioning an Arabic earth observation satellite was carried out by a multi-sectors working group, set up by Algerian space agency



Objectives :

- regional planning;
- major environment & risks;
- water resources;
- agriculture and forests;
- mining & oil resources;
- fish resources;
- transportation.

Space systems of the NSP 2006-2020



Research activity in space technology

The activities of scientific research and technological development are based on a National Research Programme of space technologies and their applications,

The National Research Programme was defined by taking into account the objectives of the national space program, the space existing and future systems, the scientific potential and the users needs.

Thus, seven (07) research field were retained :

- nano and micro-satellites technology;
- launchers technology;
- space telecommunications;
- space instrumentation;
- space applications;
- remote sensing and satellite image processing techniques;
- information with space reference (IRS).

Scientific and Technical Human Potential

The key to the success of the NRP program is related to the reinforcement of the scientific human resources by the implementation of:

- trainings, and know how transfer,
- technological control.

For this reason, a competences education plan was elaborated, which aims at tripling the existing national scientific potential by 2010.

Institute of Space sciences and technology (ISTE)

The installation of an Institute of space sciences and technology is envisaged, which covers topics like:

- remote sensing,
- space technologies,
- geodetic sciences,
- geographical information systems,
- Meteorology.

International Cooperation

International Cooperation

The international cooperation represents an important concern for ASAL. It is based on three forms :

- Multilateral cooperation;
- Regional cooperation;
- Bilateral cooperation.

Multilateral Cooperation

Committee On the Peaceful Uses of Outer Space (COPUOS

As a permanent member of the COPUOS, Algeria participates actively at the committees work sessions (scientific, technical and juridical).

ASAL has orgonised between the 22nd - 26th May 2005 in Algiers, an international seminary on the Use of Space Technology for Prevention and Management of Natural Disasters , with the collaboration of the UN and ESA. This seminar, under the high patronage of his Excellency the President of the Republic, had as principal objectives the awareness of the decision makers to the use of space techniques and exchange the experts experience of different countries with regards to prevention and management of natural risks.

Recommendations of the international seminar on the Use of Space Technology for Prevention and Management of Natural Disasters

1. Implementation of a regional network for permanent observation using the Global Navigation Satellite System (GNSS),
2. Integration of space technology in the seismic risk regional chart development process,
3. Implementation of a regional warning and alarm system using space technologies for the risks prevention from :
   - floods,
   - drought and desertification,
   - locust peril.
4. Implementation of a “Forest Fires" warning, localisation and evaluation system,
5. Setting up a regional map of sensitivity for desertification in synergy with the programs and projects in progress (World Food program - WFP, Life - Pays-Tiers-OSS, etc.).

Multilateral Cooperation

United Nation organisation for Agriculture and Alimentation FAO

A collaboration and information exchange convention is being considered

It will consist of:

- ASAL putting forward Alsat-1 data to Maghreb and Sahel countries concerned by the locust peril;
- FAO providing the American MODIS data;
- Experience exchange in prevention and management systems with regard to locust peril.

Regional cooperation

- African Organization of Cartography and Remote Sensing (AOCRS): Initiating actions such as the North African Reference (NAFREF), part of the African Reference (AFREF) project,...

- The «Centre Régional Africain des Sciences et Technologies de l'Espace en Langue Française» (CRASTE-LF): This centre situated in Rabat and affiliated to the United Nations contributes to engineers training.

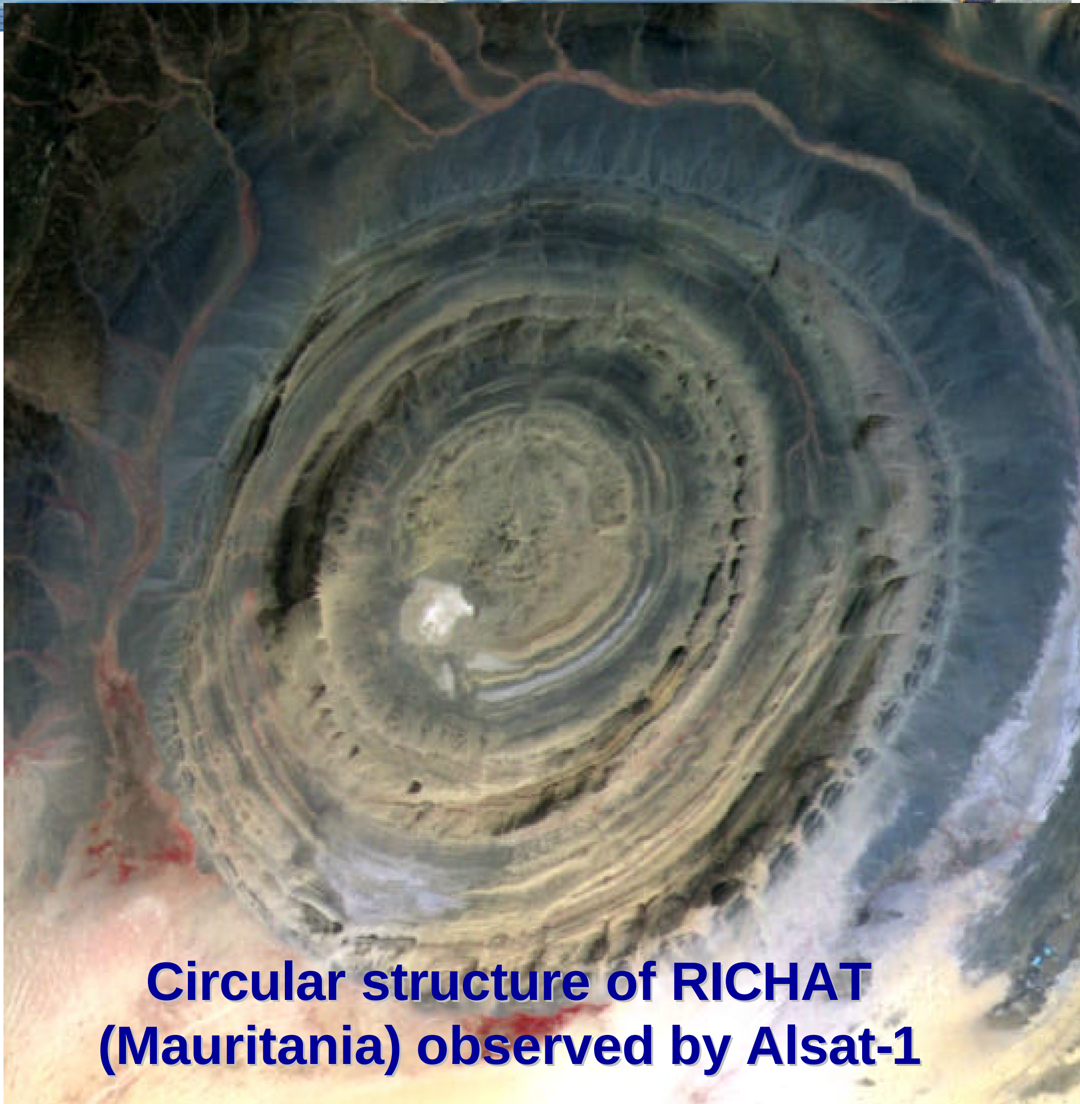
- opportunities for future regional projects such as the African Resource Management (ARM) constellation project and an Arabic satellite for earth observation.

- Use of Alsat-1 for Regional and African development.

Alsat-1 for Regional cooperation

African Oil and mine resources

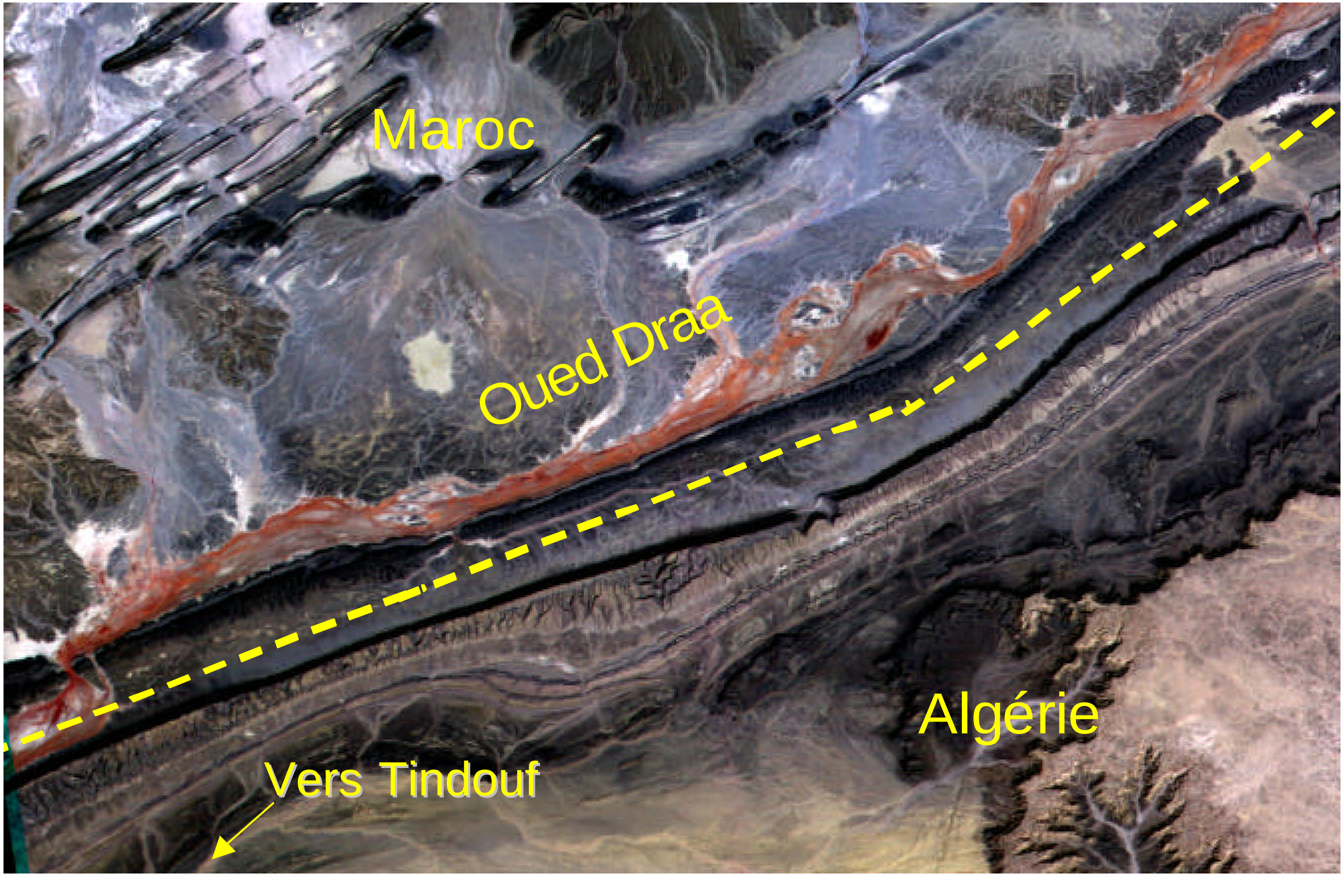
The quality of the spectral bands of the Alsat-1 images allows to distinguish different geological layers rich in minerals



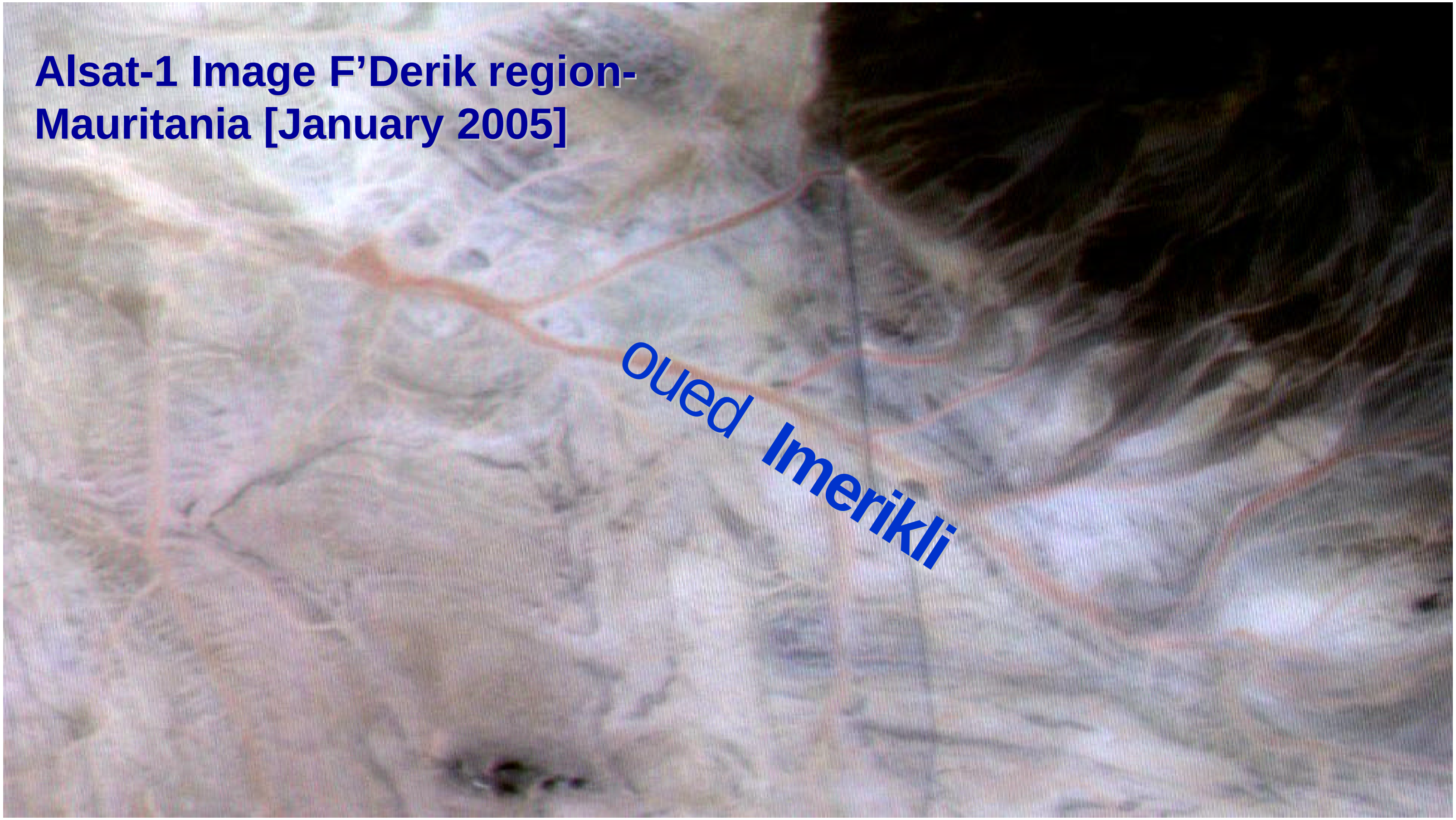
Circular structure of RICHAT (Mauritania) observed by Alsat-1

Regional issue: Locust Peril

Alsat-1 Image (December 2004) of the Algerian – Moroccan border (oued Draa) area, shows an important chlorophyll activity favorable for locust peril.



Regional issue: Locust Peril



The vegetation (in red) along the oued Imerikli is a good ecologic condition for locust reproduction.

Bilateral Cooperation

ASAL has signed a memorandums of understanding with different international partners :

- Argentina;
- France;
- Russian Federation.

Other Memorandums are being discussed with

- South Africa;
- United Kingdom;
- China.

Ways and means of coordinating national space-related activities: the African experience:
L'impact du droit de l'espace dans la coopération internationale: perspective et prospective

Hamid Tadlaoui
Professor
Morocco

Introduction

Le monde actuel est en effervescence. A tous points de vue. Que ce soit à l'échelon démographique, économique, scientifique, technologique – par canal des nouvelles technologies de l'information et de la communication (NTIC), social, culturel, virtuel, tant et si bien que les données des domaines appuyés nous tracent d'aveuglantes et pourtant éclairantes constations: attardent, balbutiements sous-économiques d'une part, évolution, puissance, paradigmes tout allant, d'autres part.

Ce constat étant, le scénique des pays les moins avancés (PAM) et les pays en voie de développement (PVD) se déroule sur le plateau des actes shakespeariens, "être ou ne pas être". C'est une phénoménologie de la survie pour la plupart des pays en voie de développement. Un problème donc du droit à la vie aux termes de déclarations universelles des droits de l'homme et de la convention européenne des droits de l'homme.

Sous cet angle, quel rôle, quelle envergure peut-il jouer le droit de l'espace?

Jamais le droit de l'espace n'a été au centre de l'actualité que présentement!

Que ce soit dans son engrangement juridique le conduisant ainsi vers l'émergence des résolutions de l'Assemblée Générale des Nations Unies ou vers des ratifications des traités et conventions émanant des propositions et projets des organes des Nations Unies. Dès lors, l'on peaufine ce parterre juridique du droit de l'espace.

I. Institutionnalisation du droit de l'espace

Du brouillard juridique, l'on passe illico à la concrétisation du droit. Ce progrès scientific-technologique collabore à l'édification du droit de l'espace. Des dates fatidiques viennent le corroborer. En effet, le 4 octobre 1957, émerveille les observateurs: physiciens, explorateurs, astronautes, juristes, sociétés internationales dont l'organisation des Nations Unies qui effet et cause de l'évènement spatial venant à se produire ce 4 octobre 1957: le lancement du premier satellite artificiel de la Terre que l'ex-URSS (Union des Républiques Socialistes Soviétiques) dénommé "SPOUTNIK" est lancé efficacement dans l'espace. Alors qu'auparavant, l'on avançait avec scepticisme un tel avènement scientifique "la technique moderne progresse décidément à une vitesse étourdissante. Voilà tout juste dix ans (avant le 4 octobre 1957) des astronomes et des professeurs de mécaniques célestes soulignaient avec scepticisme les conditions très difficiles qu'il faille remplir pour lancer un satellite artificiel de la Terre; un vrai satellite qui ne fût pas seulement un projectile ramené au sol par la pesanteur dès la fin de sa trajectoire active, mais une sorte d'astéroïde tournant autour de notre planète d'une manière sinon permanente, du moins temporaire"[1].

Imaginons l'inquiétude suscitée à l'époque notamment côté puissances européenne et américaine. N'oublions pas que nous sommes en pleine guerre froide. D'emblée, l'on pense au foisonnement de l'armement stratégique et à la course de l'exploitation de l'espace pour idée première d'une éventuelle "appropriation".

Le cas d'espèce, de l'Antarctique – s'agissant du droit de la mer – demeure fraîchement enregistré dans l'esprit des puissances stratégiques. Ça et là, avant l'instauration d'un véritable droit de l'espace, l'on essaie du moins à apaiser les inquiétudes belliqueuses. "Les victoires des techniciens soviétiques peuvent être regardées comme purement scientifique. Il n'y a pas de raison pour le moment de s'en alarmer. Sans doute, l'étude des dispositifs de lancement est-elle commune aux projectiles intercontinentaux et aux satellites; avec cette différence que les premiers sont destinés à atteindre un but terrestre et les autres, en principe, à ne pas retomber. Mais le petit astre temporaire disparaîtra du ciel comme la plus inoffensive des météorites; et il faudrait l'extrapolation d'un romancier pessimiste pour le doter déjà d'un explosif thermonucléaire ou de l'œil d'un espion-robot. La seule constatation à faire – une fois de plus – est que le progrès technique possède des ressorts d'une force incalculable, très supérieure aux forces physiques des hommes, qui le poussent en avent. Pour qu'il ne mérite jamais d'autres sentiments que l'admiration universelle, il faut que d'autres forces restent dominantes"[2]. Ainsi, la presse internationale a suivi (et suit) de très près les évolutions spatiales qui dorénavant attirent ponctuellement l'attention des observateurs de la recherche scientifique spatiale (des CNRS) et des États spatiaux, et non des moindres. Désormais, la course vers l'espace devient éveil minutieux à toute opération venant s'y opérer. Une des plus spectaculaires, celle du premier vol d'un homme dans l'espace suscite d'énormes attractions. Celles du spectaculaire et de la méfiance.

Chacun des Grands de la guerre froide (USA et ex-URSS) épie l'autre avec détermination et défiance. Les enjeux s'amplifient. Le temps, par force de stratégie militaire; se voit se rétrécir pour résorber le retard par rapport à l'autre. Présente en 1957, l'ex-URSS s'achemine vers ses "devancées' scientifiques à l'égard des États-Unis d'Amérique. Écoutons ce que la presse apportait à l'époque de ce premier vol d'un homme dans l'espace le 12 avril 1961: "Youri ALEXEIEVITECH GARGARINE, vingt-sept ans est le premier homme qui ait réalisé un voyage dans l'espace à bord d'un satellite artificiel. Il a tourné pendant quatre-vingt-neuf minutes autour de la Terre, à une altitude variant entre 175 et 380 kilomètres, avant de se poser sans encombre "à l'endroit prévu". La nouvelle était certes attendue, et nul n'ignorait que selon toute probabilité le premier astronaute serait soviétique. Elle n'en a pas moins provoqué dans le monde entier, et bien entendu en Union Soviétique (ex) un très vif enthousiasme devant cette nouvelle conquête de la science et de la technique: elle ouvre la porte à d'immenses recherches.

"Le voyage spatial de Gargarine, même si des considérations militaires et de propagande n'en sont pas exclues, constitue à la fois un exploit dont l'URSS (ex) peut s'enorgueillir et un acte

[1] Bulletin de l'Étranger (6-7 octobre 1957), le Monde l'Histoire, la Découverte, 1987. "Au jour le jour, 1944-1985"

[2] Bulletin de l'Étranger (6-7 octobre 1957), le Monde l'Histoire, la Découverte, 1987. "Au jour le jour, 1944-1985".

de courage personnel qui mérite tous les hommages"[3]. Bien entendu, les commentaires fusèrent, à l'époque de toutes parts. La conquête de l'espace est maintenant ouverte.

Les résolutions et propositions des conventions et traités s'avèrent urgente, nécessité pour réglementer l'exploitation de l'espace extra-atmosphérique.

L'Organisation des Nations Unies s'atèle à faire forger l'arsenal juridique aux fins d'institutionnaliser ses instruments réglementaires en vue d'une utilisation pacifique auréolée d'une coopération internationale vouée à l'élévation "degrale" du niveau de vie des pays démunis et d'amorcer pauvreté, famine, pandémie et autres nouvelles menaces pour l'humanité que nous traiterons dans notre infra à faciès de droit au développement.

Saisir l'importance de l'existence et du développement du droit de l'espace, c'est établir et s'intéresser de très près à l'agenda déjà effectué de la conquête de l'espace avec ses années d'aventures fort enrichissantes:

Année 1974

- **26 mars:** L'URSS de l'époque lance sur orbite son premier satellite géostationnaire autour de la Terre pour télécommunication soit environ dix ans après les États-Unis.

- **29 mars:** Mariner-10, après avoir frôlé Vénus le 5 février 1974, passe à 700 kilomètres de Mercure et la contourne.

- **19 décembre:** Lancement de Symphonie, premier satellite de télécommunication expérimental franco-allemand.

Année 1975

- **15 avril:** Création de l'ESA (Agence Spatiale Européenne) qui succède à l'ELDO et à l'ESRO.

- **15 juillet:** Début du vol conjoint américano-soviétique

Année 1976

- **20 juillet :** Viking-1 (États-Unis) se pose sur Mars. Les expériences biologiques sur le sol martien rendent improbable l'existence d'une vie sur la planète.

- **20 août:** Lancement de la sonde américaine Voyager-2 en direction de Jupiter, Saturne et Uranus, suivie de Voyager-1 le 5 septembre.

Année 1977

- **29 septembre:** Lancement de Saliout-6, station orbitale soviétique, qui se désintègre le 29 juillet 1982, après quatre ans et dix mois de service et trente cinq amarrages de vaisseaux pilotés ou automatiques.

[3] Le Monde du 13 avril 1961-"L'Histoire au jour le jour"du quotidien le Monde, la découverte, 1987, Paris p. 224, voir aussi "les messages de Youri Gargarine".

- **23 novembre:** Météosat-1, premier satellite météorologique européen, transmet ses premières images de la Terre le 16 décembre 1977.

Année 1978

- **20 janvier:** Progress-1, premier satellite cargo soviétique, chargé de ravitailler la station Saliout.

- **2 mars:** Lancement de Soyouz-28 (URSS), emportant un soviétique et un tchèque, Vladimir Remek. C'est le premier cosmonaute étranger à prendre part à une mission habitée soviétique. Dix autres suivront, dont un français, Jean-Loup Chrétien.

Année 1979

- **5 mars:** Voyager-1 (États-Unis), photographier Jupiter.

- **1er septembre:** Premier survol de Saturne par une sonde pionnière (Etats-Unis).

- **24 décembre:** Premier tir de la fusée européenne Ariane.

Année 1980

- **18 juillet:** Premier lancement d'un satellite indien Rohini, à l'aide de la fusée SLV-3.

- **12 novembre:** La sonde Voyager-1 survole Saturne.

Année 1981

- **12 avril:** STS-1 (Columbia), premier des quatre vols d'essais orbitaux de la navette spatiale.

- **20 décembre:** MARECS-1 (ESA), lancement du premier satellite européen de télécommunication maritime, devient opérationnel le 1er mai 1982.

Année 1982

- **24 juin:** Soyouz-T6 (URSS) emporte à son bord le cosmonaute français jean-loup Chrétien.

- **11 novembre:** STS-5 (Columbia), première mission opérationnelle de la navette américaine et mise en orbite de deux satellites de télécommunication, SBS-3 (Etats-Unis) et Annick-C3 (Canada), à partir de la navette.

Année 1983

- **13 juin:** La sonde Pionner-10, lancée le 3 mars 1972 quitte le système solaire.

- **16 juin:** ECS-1 (ESA), premier satellite de télécommunication européen opérationnel lancé par la fusée Ariane dont c'est le premier tir commercial.

Année 1984

- **8 avril:** La fusée Longue-Marche place sur orbite le premier satellite géostationnaire chinois.

- **4 août:** Lancement par la fusée européenne Ariane -3 de Télécom-1, premier satellite de télécommunication spécialisé français.

- **6 septembre:** Kizim et Sohoniev battent le record de durée d'un séjour en orbite: 211 jours, 9 heures et 5 minutes. Record porté le 2 octobre à 236 jours, 22 heures et 50 minutes.

- **8 novembre:** STS-14 (Etats-Unis), récupération du satellite indonésien Palafa-B2 et du satellite américain Westar-6 avec un harpon de 2 mètres de long.

Année 1985

- **24 janvier:** Premier vol militaire de la navette spatiale américaine.

- **13 avril:** La navette Discovery perd un satellite.

L'espace se lance donc dans le quotidien. Et tout quotidien mérite un instrument juridique. Car l'espace n'appartient à quiconque ou plutôt, il est à l'appartenance de l'humanité, pour les intérêts communs de la planète. Á cet égard, ne fallait-il pas s'activer pour légiférer toutes ces activités spatiales?

L'Assemblée Générale en a apporté les premiers matériaux nécessaires aux fins d'éviter aussi l'anarchie de ces activités et faire entrer toutes ces puissances de la conquête spatiale dans un moule juridique qui les mettraient au diapason du droit international général, et partant dans la sphère du droit de l'espace. Et ce, au sein d'une cordiale entente caractérisée par le processus de la coopération internationale. Ladite coopération ayant pour tentacules le bien commun planétaire et l'émergence des pays démunis.

II. Les instruments juridiques : innovation créatrice

L'évènementiel de l'avènement spatial a propulsé les synergies de la communauté internationale pour débattre de la problématique afin de pouvoir légiférer sur une réglementation qui établira une sorte de consensus amenant les acteurs des activités spatiales à accorder leur volontarisme aux propositions juridiques à venir. Ainsi, en 1958, courant la 13ème session de l'Assemblée Générale des Nations Unies, le Secrétariat Général a impulsé l'idée d'une création d'un "Comité-ad Hoc" pour l'utilisation pacifique de l'espace extra-atmosphérique.

L'année suivante, c'est-à-dire en 1959, après étude et débats étant réglés quant à la participation, le Comité a vu le jour. Notons que l'URSS a finalement accepté d'y participer.

Le Comité aura pour substantif : le "Comité pour l'utilisation pacifique de l'espace extra-atmosphérique" CUPEEA respectivement intitulé COPUOS dans la linguistique anglaise. Le CUPEEA (COPUOS), aura deux sous-comités : le sous-comité scientifique et technique et le sous-comité juridique. L'ensemble de ces organes est considéré comme organes permanents de l'Assemblée Générale des Nations Unies.

Composition :

L'effectif du Comité CUPEEA (COPUOS) a été progressivement étoffé :

- 1959: il comptait 24 membres;
- 1961: 28 membres par résolution 1721 (XVI) de l'Assemblée Générale;
- 1963: 37 membres par résolution 3182 (XXVIII) A. G.;
- 1977: 47 membres par résolution 32/1953 A. G.; et
- 1980: 53 membres par résolution 35/16A. G.

L'année 2002 a vu le nombre s'élever à 61 États membres.

Outre ces membres attitrés, des membres observateurs alimentent la composition du Comité CUPEEA (COPUOS); telles les organisations gouvernementales et non gouvernementales comme :

- Le Comité de la Recherche Spatiale (COSPAR);
- Le Conseil International des Unions Scientifiques (CIUS), tous deux en 1961;
- L'Agence Spatiale Européenne (ESA) (1975) qui s'est substituée au centre européen de construction de lanceurs d'engins spatiaux (CECLES) auxquels le statut d'observateur avait été accordé en 1972 ;
- La Fédération International d'Astronautique (FIA) (1976) ;
- L'Organisation Internationale de Télécommunications par satellite (INTELSAT) (1985);
- Le Système International et l'Organisation de Télécommunications Spatiales (INTERSPUTNIK) (1985);
- L'Organisation Internationale de Télécommunications Maritimes par Satellite (1986);
- Le Conseil de coopération internationale en matière d'étude et d'utilisation de l'espace extra-atmosphérique (INTERCOSMOS) (1989);
- L'Association de Droit International (ADI) (1990); et
- La Société Internationale de photo-grammètre et de télédétection (SIPT) (1990).

Le secrétariat du Comité et de ses sous-comités est assuré par le Bureau des Affaires Spatiales (BAS), dont le siège se trouve à Vienne.

En outre, plusieurs organismes des Nations Unies concernés par les activités relatives à l'espace participent régulièrement aux réunions du Comité et des sous-comités.

III. Fonctionnement

Le Comité CUPEEA (COPUOS) ainsi que ses deux sous-comités : sous-comité scientifique et technique et sous-comité juridique sont dans leur généralité des organes subsidiaires de l'Assemblée Générale des Nations Unies.

"Le Comité et ses deux sous-comités se réunissent chaque année pour examiner les questions qui leur sont renvoyées par l'Assemblée Générale des Nations Unies, les rapports qui leur sont présentés et les problèmes évoqués devant eux par les États membres"[4]. Le Comité CUPEEA (COPUOS) appuyé par ses deux sous-comités, examine les dits questions et rapports et

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[4] Activités spatiales des Nations Unies et d'autres organismes internationaux, Nations Unies, New York, 1993.

peut élaborer un projet qu'il soumet à l'Assemblée Générale des Nations Unies pour vote. Là, nous sommes en présence de deux dispositions: proposition d'une résolution ou bien d'un projet de convention sujette à ratification des États. Sachons toutefois qu'il y existe une particularité fondamentale: la question du consensus. Intéressant sur le fond du fait de l'efficacité de ce dernier au sein du fonctionnement du CUPEEA (COPUOS) et de ses deux sous-comités scientifique et technique et juridique, entraînant à fortiori l'adoption par consensus de l'Assemblée Générale des Nations Unies. Á signaler qu'il est parfois très difficile de le faire dégager.

Tout à fait à son début, lors des décennies soixante et soixante dix, le CUPEEA et les deux sous-comités ont réussi à présenter plusieurs textes, desquels un texte (le premier) faisant l'objet d'une résolution [Res. A.G. 1962 (XVIII -1963)] donnant stature au traité fondateur de 1967 qui contient les principes juridiques, essentiels qui régissent les activités des États dans le domaine de l'exploration et l'utilisation de l'espace extra-atmosphérique. Dans la mesure où peu de temps après l'aventure spatiale, il s'en est suivi la constitution de la base instrumentale du droit de l'espace) partir de la proposition, par le CUPEEA (COPUOS), à ratification des États, les conventions traitant des activités spatiales[5].

Citons quelques réalisations constituant le parterre juridique du droit de l'espace:

- Le traité sur les principes régissant les activités des États en matière d'exploration et d'utilisation de l'espace extra-atmosphérique y compris la Lune et les autres corps célestes, a été adopté le 19 décembre 1966, ouvert à la signature le 27 janvier 1967. Il est entré en vigueur le 10 octobre 1967;
- L'accord sur le sauvetage des astronautes, le retour des astronautes et la restitution des objets lancés dans l'espace extra-atmosphérique, a été adopté le 19/12/1967, ouvert à la signature le 22 avril 1968, entré en vigueur le 3 décembre 1968;
- La convention sur la responsabilité internationale pour les dommages causés par les objets spatiaux, a été adoptée le 29 novembre 1971, ouverte à la signature le 29 mars 1972, entrée en vigueur le 1er septembre 1972;
- La convention sur l'immatriculation des objets lancés dans l'espace extra-atmosphérique a été adoptée le 12 novembre 1974, ouverte à la signature le 15 janvier 1975, entrée en vigueur le 15 septembre 1976; et
- L'accord régissant les activités des États sur la Lune et les autres corps célestes a été adopté le 5 décembre 1979, ouvert à la signature le 18 décembre 1979, entré en vigueur le 11 janvier 1984.

Observations

En droit international général, nous relevons le domaine volontariste des États. Ce qui pose une problématique de l'applicabilité exécutoire des résolutions onusiennes. Demeurent constamment en souffrance les ratifications des États d'une pléthore de traités et de conventions internationaux de manière générale. Il en est de même pour le droit de l'espace.

Sur proposition du CUPEEA (COPUOS) – hormis l'élaboration des projets de conventions – l'Assemblée Générale a édicté des résolutions servant de base juridique dans les domaines qu'elle traite. Sur cette lancée, des résolutions, l'une d'elle concernant les dispositions touchant la Télévision par Satellite a provoqué l'adoption des règles majoritaires en usage à l'ONU. Les États occidentaux se montrèrent réticents au consensus empêchant ainsi la

[5] Cf. Vladimir Kopal; United Nations Space treaties: achievements and further development, Colloque de Peruge, ESA, 1999, p.265.

reconnaissance d'une "quelconque opinion juris" tout en annihilant l'efficience de l'efficacité du consensus. Ce qui relate le bien-fondé de la "règle non écrite du consensus".

Il en résulte que la préférence adéquate se penche plutôt vers les résolutions et déclarations que sur les projets de conventions. Une affaire d'efficacité dans la souplesse et dans le temps.

Le consensus s'avère plus effectif que la ratification des Etats qui tarde à venir et teintée, la plupart du temps, de réticence dont celle des États-Unis, pourtant les plus directement concernés. On avance, à cet égard, la sensible jalousie réservée à la souveraineté des États sous le parapluie volontariste.

Bon gré, mal gré, l'on persévère dans le domaine des résolutions dont les espérances décisoires demeurent dans la détermination de l'Assemblée Générale et de ses organes subsidiaires. Force est de relever:

- Rés. AG. 37/92 adoptée à la majorité le 10 décembre 1982: principes régissant l'utilisation de satellites artificiels de la Terre en vue de la télévision directe internationale;
- Rés. AG. 41/65: principe sur la télédétection adoptée par consensus le 3 décembre 1986;
- Rés. AG. 51/122: déclaration sur la coopération internationale en matière d'exploration et d'utilisation de l'espace au profit et dans l'intérêt de tous les États, compte tenu en particulier des besoins des pays en développement, adoptée par consensus le 13 décembre 1996[6]; et
- Rés. AG. 47/68: principes relatifs à l'utilisation des sources d'énergie nucléaires dans l'espace.

Le Sous-comité Juridique s'est énergiquement déployé pour étudier toutes ces questions relatives à cette utilisation. En 1992, le CUPEEA a recommandé à l'Assemblée Générale l'adoption de certains principes à la suite de la concrétisation de certains accords. Il n'en demeure pas moins l'existence de risques apparents à la suite de l'exposition accidentelle du public à des rayonnements dangereux ou à des matières radioactives. Les principes qui recommandent la préservation du public contre ces risques forts fâcheux, demeurent avertisseurs à l'encontre de ces maux radioactifs. "Selon ces principes, la conception des systèmes utilisant des sources d'énergie nucléaires devrait faire appel à la redondance, aux dispositifs de correction des défauts de fonctionnement, au confinement des composants afin d'empêcher ou de réduire au minimum l'exposition du public aux rayonnements. Les réacteurs nucléaires devraient être conçus de manière à ne pas atteindre l'état critique avant de parvenir à l'orbite opérationnelle et devraient être garés après utilisation sur une orbite suffisamment haute et avoir une durée de vie en orbite suffisamment longue pour garantir que la radioactivité tombe à un niveau sûr avant le retour du système dans l'atmosphère. Les générateurs isotopiques devraient être conçus pour pouvoir résister aux sollicitations liées à la rentrée dans l'atmosphère et à l'impact à la surface de la Terre sans disperser de matières radioactives dans l'environnement. Les principes prévoient également qu'un État lanceur d'une source d'énergie nucléaire devrait établir une évaluation de sûreté du système qui soit rendue publique, et qu'en cas de défaut de fonctionnement provoquant le retour du système dans l'atmosphère, l'État en question devrait informer les autres et fournir l'assistance

[6] Cf. "Traités et principes des Nations Unies relatifs à l'espace extra-atmosphérique", Doc. A/AC. 105/722, New York, Nations Unies, 1999.

technique nécessaire pour éliminer tout effet préjudiciable éventuel; il devrait être tenu responsable des dommages infligés le cas échéant. Il a été convenu que les principes énoncés ne seraient pas applicables aux systèmes à propulsion nucléaire ou à d'autres techniques nucléaires nouvelles et que la question resterait à l'ordre du jour du sous-comité juridique de façon à pouvoir examiner les modifications que pourraient exiger l'apparition de nouvelles applications nucléaires et l'évolution des normes de protection radioactives"[7].

Á propos de tous ces risques de retombées radiologiques, citons les conséquences provoquées par le satellite soviétique Cosmos 954, qui a fait l'objet de pollution de la Terre depuis l'espace. En effet, suite à l'écrasement de ce satellite dans le Grand-Nord canadien (le 24 janvier 1978), une grave pollution a infesté une étendue de 600 km^2. L'URSS a dû indemniser le Canada pour les dommages subits aux termes des articles VI et VII du traité sur l'espace. En outre, la responsabilité est appuyée par les principes 8 et 9 de la résolution[8].

Comme nous l'avons déjà signalé en substance, le déroulement du CUPEEA manifeste quelques difficultés concernant le consensus vu le nombre excessif des États au sein du Comité d'une part et de la politisation des problèmes qui affectent l'obtention du consensus causée par une sorte de repli sur soi-même de la part des ténors au sein des groupes du CUPEEA.

Parallèlement, l'aperçu sur le document des Nations Unies en date de février 1999, A. AG. 105/722, nous renseigne sur l'état du manque à l'effectivité des ratifications:

- Traité fondateur de 1967: 95 ratifications, 27 signatures sans ratification;
- Accord sur les astronautes: 85 ratifications, 26 signatures sans ratification et une déclaration d'acceptation par une organisation internationale;
- Convention sur la responsabilité: respectivement 80, 26 et 2 déclarations;
- Convention sur l'immatriculation: respectivement 40, 4 et 2 déclarations; et
- Accord sur la Lune: respectivement 9 et 5.

En réaction à l'encontre de cette désaffection de ratification des États, la proposition du Mexique invite le sous-comité juridique à solliciter l'Assemblée Générale qui mettrait cette question de ratification des traités à l'ordre du jour. Nonobstant, il demeure l'interrogatif sur les amendements de ces traités dont l'étoffe négligée serait manquement à l'actualisation juridique desdits traités. Aussi, l'on constate un déplacement du lieu d'élaboration du droit et une modification des acteurs. "Malgré leur responsabilité essentielle, les États laissent, de plus en plus leurs agences nationales ou internationales et même leurs entreprises privées établir des règles de conduite ou des accords qui pallient le manque de réglementation internationale. Ce faisant, ils excluent très largement les États les plus pauvres qui ne participent que très peu à ces activités"[9].

Voici donc la confection juridique qui permettrait la facilitation de la coopération internationale à tous les niveaux.

[7] Cf. "Activités spatiales des Nations Unies" cité plus haut.
[8] Pour plus d'informations, voir Paul Fauteux, "Sources d'énergie nucléaire dans l'espace: bilan réglementaire et incertitudes américaines, annales de droit aérien et spatial, 1991, pp. 267-30.
[9] Armel Kerrest, Pr. Des Facultés de Droit, Université de Bretagne Occidentale, Président de l'Association pour le Développement du Droit de l'Espace (ADDEF).

IV. La valeur des traités, résolutions et conventions

Le traité sur les principes juridiques a été examiné par le sous-comité juridique et adopté le 19 décembre 1966 [Res. 2222 (XXI)]. Ledit traité régit également l'exploration et l'utilisation de la Lune et les autres cors célestes. Soumis à la signature le 27 janvier 1967, il est entré en vigueur le 10 octobre 1967. A faire rappeler la résolution précédente: AG. 1963 [Res. 1962 (XVIII)]. Les États qui procédèrent à l'ouverture de sa signature étaient: l'URSS, le Royaume-Uni et les États-Unis.

- *Base de la législation internationale de l'espace*: principes:

    - L'exploration et l'utilisation de l'espace se font pour le bien et dans l'intérêt de tous les pays;
    - L'espace peut être exploré et utilisé librement par tous les États;
    - Il ne peut faire l'objet d'appropriation nationale par proclamation de souveraineté, ni par voie d'utilisation ou d'occupation;
    - Les États partis au traité fondateur s'engagent à ne placer sur orbite aucune arme nucléaire ou tout autre type d'arme de destruction massive et à n'installer d'aucune façon de telles armes sur des corps célestes ou de l'espace;
    - Ils utiliseront la Lune et les autres corps célestes exclusivement à des fins pacifiques;
    - Ils considèreront les astronautes comme des envoyés de l'humanité;
    - Ils sont responsables des activités spatiales nationales, entreprises par des entités tant gouvernementales que non gouvernementales;
    - Ils assument la responsabilité des dommages causés par leurs objets spatiaux et ils sont tenus d'éviter toute contamination dangereuse de l'espace et des corps célestes. En 1993, 91 ratifications des États ont été enregistrées;
    - L'accord sur le sauvetage des astronautes a été étudié et négocié par le sous-comité juridique de 1962 à 1967; le texte en a été approuvé à l'Assemblée Générale en 1967 (19 décembre), ouvert à la signature le 22 avril 1968, et entré en vigueur le 3 décembre 1968. En se fondant sur des éléments des articles 5 et 8 du traité fondateur sur les principes juridiques, l'accord prévoit que les États devront prendre toutes les mesures possibles pour porter secours et offrir leur assistance aux astronautes en détresse et les remettre rapidement à l'Etat de lancement, qu'ils devront en outre, sur sa demande, fournir leur aide aux États de lancement pour récupérer les objets spatiaux retombés sur Terre en dehors des limites territoriales desdits États. L'accord sur le sauvetage a été ratifié par 80 États [Res. 2345 (XXII)];
    - La convention sur la responsabilité internationale pour les dommages causés par les objets lancés dans l'espace extra-atmosphérique, étudiée, négociée par le sous-comité juridique de 1963 à 1971, texte approuvé par l'Assemblé Générale le 29 novembre 1971, ouvert à la signature le 29 mars 1972, entré en vigueur le 1er septembre 1972, [Res. 2777 (XXXVI)]. Article 7 du traité de 1967 sur les principes juridiques : réparation pour le dommage causé par son objet spatial à la surface de la Terre ou aux aéronefs en vol (ratification par 73 Etats en 1993);
    - La convention sur l'immatriculation des objets lancés dans l'espace extra-atmosphérique étudiée, négociée par le sous-comité juridique de 1969 à 1974; texte approuvé à l'Assemblée Générale le 12 novembre 1974, ouvert à la signature le 15 janvier 1975, entré en vigueur le 15 septembre 1976 [Res. 3235 (XXIX)]. Destinée à faciliter l'application des dispositions en matière de

responsabilité, de restitution et d'obligations du traité sur les principes juridiques de l'accord sur le sauvetage et de la convention sur la responsabilité, la convention prévoit que les États qui lancent des objets dans l'espace doivent fournir les informations nécessaires pour le registre des Nations Unies des renseignements sur les objets en question notamment la date et le lieu du lancement, les paramètres de l'orbite et de la fonction générale. La convention sur l'immatriculation des objets lancés dans l'espace extra-atmosphérique n'a eu que 36 ratifications des Etats en 1993; et

- L'accord régissant les activités des États sur la Lune et les autres corps célestes, étudié et mis au point par le sous-comité juridique de 1972 à 1979; texte approuvé à l'Assemblée Générale le 5 décembre 1979, ouvert à la signature le 18 décembre 1979, entré en vigueur le 11 juillet 1987 [Res. 34/68]. Il a fallu attendre jusqu'en juin 1984 sa ratification par le cinquième pays -l'Autriche- autorisant ainsi son entrée en vigueur en juillet 1984. L'accord en question réaffirme et développe maintes dispositions du traité fondateur de 1967 sur les principes juridiques, appliqués à la Lune et aux autres corps célestes à condition que lesdits corps célestes soient utilisés exclusivement à des fins pacifiques, que leurs milieux ne soient pas perturbés et que les Nations Unies veillent sur l'applicabilité de ces principes juridiques concernant le domaine. En outre, l'accord précise que la Lune et ses ressources naturelles constituent le patrimoine commun de l'humanité et qu'il conviendrait d'établir un régime international régissant l'exploitation des ressources naturelles de la Lune, dès lors que cette exploitation sera sur le point de devenir possible. L'accord régissant les activités des États sur la Lune et sur les autres corps célestes a été ratifié par 8 États à la date de 1993.

Ainsi, l'on revient toujours sur la question fondamentale qu'est le domaine du comportement volontariste des États eu égards aux considérations qui peuvent être prises en compte pour l'applicabilité des résolutions des Nations Unies via l'Assemblée Générale ainsi en ce qui concerne la phénoménologie juridique des ratifications des États s'agissant des traités, conventions et accords sensibles. D'où le dilemme juridique de l'effectivité de la valeur des traités et, somme toute, de toutes les œuvres juridiques émanant de l'Assemblée Générale des Nations Unies. Nombreux sont les comportements et attitudes des puissances notamment qui en manifestent hésitations, précautions des fois excessives, voire des réticences en prétextant constamment le sacro-saint de la souveraineté des Etats.

Preuve probante en est le labeur de CUPEEA par truchement de son sous-comité juridique qui a abordé, en 1974, l'examen de l'élaboration de principes régissant l'utilisation des satellites aux fins de l'effectivité de la télévision directe internationale. En 1982, un accord provisoire avait été dégagé sur un certain nombre de principes, mais les vues des États membres touchant la libre circulation de l'information et la souveraineté des États demeuraient inconciliables. Faute d'accord au sein du CUPEEA (COPUOS), qui avait toujours pris tous ses projets à l'unanimité, l'Assemblée Générale s'est saisie de la question en 1982 et a adopté à la majorité les principes régissant l'utilisation par les Etats des satellites artificiels aux fins de la télévision directe internationale [Res. 37/92].

Quelques dispositions à cet égard:

- Activités dans le domaine de la télévision directe internationale;
- Les droits souverains des Etats;

- Le droit de toute personne de rechercher, de recevoir et de répandre des informations et des idées;
- L’accès à la technique ouvert à tous les Etats; et
- Les activités dans le domaine de la télévision par satellite devraient être menées conformément au droit international notamment à la convention internationale des télécommunications et au règlement des radiocommunications, et ces mêmes activités devraient être fondées sur le principe de la coopération internationale en tenant spécialement compte du besoin que les pays en développement ont d'utiliser la technologie pour assurer leur développement national.

V. Qu'en est-il du domaine de la télédétection ?

Le sous-comité juridique a étudié et mis en point de 1972 à 1986 une série de principes relatifs à la télé observation de la Terre à partir de l'espace, qui ont été adoptés par l'Assemblée Générale en 1986 [Res. 41/65]. Ces principes sont les suivants: les activités de télédétection devraient être menées pour le bien et dans l'intérêt de tous les pays, en tenant compte particulièrement des besoins des pays en développement, et devraient impliquer un effort de coopération internationale et des possibilités d'assistance technique; elles devraient promouvoir la protection de l'environnement, ainsi que la protection de l'humanité contre les catastrophes naturelles ; et lorsqu'un pays acquiert des données concernant un autre pays, l'État observé devrait avoir accès à ces informations sans discrimination et à des conditions de prix raisonnables. Pour avantages qu'ils soient – de télédétection – il est souhaitable que les États puissent s'entendre pour faire fructifier la coopération régionale riche en matière de création et d'exploitation d'installations de réception, d'archivage, de traitement et d'interprétation des données. Une fois encore, la souffrance de l'application desdits principes se répercute sur l'épiphénoménisme de telles concrétisations au cœur de la coopération internationale.

VI. Prospective juridique de l'espace

Jamais le droit de l'espace n'a été aussi actuel que présentement. Cela ne veut pas dire qu'il n'était pas au centre d'intérêt international par auparavant.

L'association de droit international avait sérieusement planché sur son devenir en son sein en tant que Comité du droit de l'espace lors des conférences bi-annuelles menées par les comités chargés des différents domaines du droit international public et privé. Le Comité du droit spatial offre un cadre d'étude du corpus de réglementation spatiale et pour les échanges d'informations sur les développements futurs et perspectifs dans ce domaine. Sur cette base, le Comité du droit spatial établit des résolutions et des projets d'instruments touchant à d'importants domaines du droit spatial et de leur adoption formelle par la conférence de l'Association de Droit International (ADI). Laquelle ADI avait pour substantif premier l'Association pour la réforme et la codification des lois dont la création a été l'œuvre d'une conférence qui s'est tenue à Bruxelles en 1873. La conférence de Bruxelles de 1895 a instauré le nom actuel qu'est ADI.

Suite à l'acceptation par le Conseil exécutif de l'ADI du choix du droit de l'espace en tant que sujet d'étude au sein d'un Comité international de l'Organisation, le Comité du droit de l'espace, sous l'autorité de son premier Président, le Pr. GOEDHUIS, a commencé ses activités au début de la décennie soixante. Le Pr. BÖEKSTIEGEL lui a succédé en 1988. En 1990, le CUPEEA a accordé à l’ADI, représenté par son Comité du droit spatial, le statut d'Observateur permanent.

Préalablement, en 1958, (début de la conquête de l'espace), à la conférence de New York, l'ADI a étudié pour la première fois la question du statut juridique de l'espace. Différents sujets ont été traités : tout d'abord au sein du comité du droit aérien, et depuis la conférence de Bruxelles de 1962, au sein du Comité du droit de l'espace[10]:

- Questions générales concernant le régime juridique de l'espace (depuis 1960, rapporteur Pr. D. GOEDHUIS);
- Technologie spatiale et droit des organisations internationales (1960, rapporteur Pr. L. LIPSON);
- Statut juridique des véhicules spatiaux (1960, rapporteur, Pr. R. Y. JENNINGS, Prof. P. de la PRADELLE);
- Règles de responsabilité des dommages corporels ou matériels provoqués par la mise en œuvre de véhicules spatiaux (1960, rapporteur Pr. C. BEREZOWSKI);
- Implications juridiques de la demande de radiodiffusion directe (1976);
- Télédétection par satellite (1975);
- Le règlement des litiges de droit de l'espace (1978, rapporteur Pr. K. H. BÖEKSTIEGEL); et
- Les conflits d'interprétation des principes directeurs du traité des Nations Unies sur l'espace extra-atmosphérique (1982, rapporteur Pr.D. GOEDHUIS).

Ainsi évolue le droit de l'espace. Avec une rapidité vertigineuse. D'une conférence à l'autre de l'Association de droit international, le droit de l'espace prend de plus en plus d'étoffe. Les domaines sur lesquels il se penche demeurent sensibles: météorologie, télédétection, problématique de le désertification, la photogrammétrie, télécommunications par satellite, télécommunications maritimes par satellite, recherche spatiale dans toute sa globalité, la question demeurant ponctuelle qu'est l'environnement; capital énorme et fondamental pour toute l'humanité…

L'environnement? N'est-ce pas l'affaire de tout le monde? N'est-ce pas le souhait pour toute personne de vivre dans un climat environnemental dans le souhaitable du "Bon vivre"? Sans pollution et sans conséquences des débris d'objets spatiaux !!!

Plusieurs colloques et conférences ont eu lieu de par le monde pour attirer l'attention sur l'impact de l'environnement quant à l'avenir de la population mondiale.

Á la suite de réunion de Séoul en 1986, la question des risques que l'activité spatiale fait peser sur l'environnement a été étudiée au XXX$^{\text{ème}}$ colloque sur le droit de l'espace extra-atmosphérique (institut International de droit spatiale à tenu à Brighton (Royaume Uni) en octobre 1987)[11].

En mai 1988, le Pr. BÖEKSTIEGEL a accueilli un colloque international organisé dans le cadre de la commémoration du 60$^{\text{ème}}$ anniversaire de l'Université de Cologne, consacré spécifiquement à la question des débris spatiaux et de la pollution. Á cet occasion, les membres du Comité du droit de l'espace et de l'Institut International de Droit Spatial (la plupart d'entre eux appartenaient conjointement à ces deux instances) ont étudié cette question avec des experts et des spécialistes du domaine des sciences naturelles et de la technologie spatiale, suivant une approche réellement interdisciplinaire[12]

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[10] Pour plus de détails, voir "Activités spatiales des Nations Unies", New York, 1993.
[11] Cf. "Activités spatiales des Nations Unies", New York, 1993.
[12] Cf. "Activités spatiales des Nations Unies", New York, 1993.

En mars 1989, sur le thème "Conséquences et responsabilités du point de vue de l'environnement et utilisation de l'espace extra-atmosphérique", un membre du Comité du droit de l'espace, le Pr. N. M. MATTE, s'est adressé au Sous-Comité Juridique du CUPEEA, au sein de son groupe de travail d'experts attaché à cette question[13].

Une réunion de travail sur les débris spatiaux et sur les conséquences à tirer sur le plan de l'action, s'est tenue en avril 1989 à Colorado Springs (États-Unis), sous les auspices du Bureau d'évaluation des technologies du Congrès des États-Unis et de la Fondation pour l'espace des Etats-Unis[14].

D'autres échanges de vue à ce sujet ont eu lieu à Malaga (Torremolinos, Espagne), en octobre 1989, lors d'une réunion de l'Institut international du droit spatial et d'une réunion informelle de membres du Comité du droit spatial de l'Association de droit international. La question a été examinée de différents points de vues. Le Pr. BÖEKSTIEGEL a présenté une communication sur la marche à suivre pour dégager les idées maîtresses du droit en ce qui concerne l'incidence sur l'environnement des activités entreprises dans l'espace et les réflexions présentées dans ce document comptent parmi les plus avancées à ce sujet. Le Pr. COCCA a souligné la nécessité de considérer la protection de l'environnement au même titre que les droits de l'homme et différents membres du comité de droit de l'espace de l'ADI ont présenté des contributions écrites et orales sur cette question. L'étude de M. PEREK intitulée "Impact sur l'environnement des activités spatiales" qui a représenté un document de référence depuis la distribution du premier questionnaire au début de 1987, a été cité à maintes reprises. En conclusion de la réunion de Malaga (Espagne) organisée à l'invitation du Pr. BÖEKSTIEGEL, deux spécialistes éminents de la question des débris spatiaux, les Professeurs PEREK et REX ont accepté de jouer le rôle de conseillers dans le cadre des activités futures du Comité sur ce thème.

Or, le thème évoqué ci-dessus ne figure pas à l'ordre du jour du CUPEEA. Une proposition visant à l'inscrire à l'ordre du jour de la session de 1990 du sous-comité scientifique et technique n'a pas été adoptée, principalement faute du soutien de certains pays industrialisés. Aussi, est-il suggéré que le Comité du droit de l'espace poursuive les efforts qu'il a déployés dans ce sens, en particulier compte tenu de la résolution II de la Conférence de Varsovie (1988) recommandant de "prendre des mesures propres a suggéré que l'on envisage l'inscription du sujet en question à l'ordre du jour du Comité des utilisations pacifiques de l'espace extra-atmosphérique"[15]. En 1990, le Président et le rapporteur du Comité du droit de l'espace de l'Association de droit international avaient reçu un ensemble de nombre encourageant de réponses au questionnaire d'août 1989. Les résultats obtenus reflétaient une intéressante diversité d'opinions tenant compte des réalités. Par ailleurs, les points de vue exprimés – en dépit de leurs divergences, en particulier quant à la nature du droit international coutumier, de certains devoirs, notamment, celui d'informer, de recueillir des avis consultatifs et de négocier – traduisent néanmoins dans tous les cas la nécessité de parvenir à une plus grand précision dans ce domaine, soit par la définition de principes directeurs, soit par l'élaboration d'une protocole distinct; il existe en effet de sérieux risques de détérioration de l'environnement, tant que les anciennes dispositions légales ne sont pas adoptées et que de nouvelles dispositions ne sont pas créées de façon à suivre le rythme des progrès des sciences et des techniques spatiales[16].

[13] Cf. "Activités spatiales des Nations Unies", New York, 1993.
[14] Ibid.
[15] Ibid.
[16] Ibid.

Notons ici l'importance du droit coutumier en tant que source du droit international! La coutume prend bel et bien une place radicale dans la sphère du droit de l'espace. L'euphorie de l'éclosion de ces nouvelles techniques de l'espace a, certes, laissé libre recours de circulation dans l'espace. C'est de bon augure tout à fait au début de la conquête de l'espace. Nombreux sont les États non-spaciaux qui n'ont peut-être pas mesuré les véritables "enjeux" de cette entreprise qui allait livrer conscience dans les domaines de l'information, des divers renseignements technologiques dans les domaines des télécommunications par satellites, des radio-télécommunications, de la télévision directe internationale par satellite, de la météorologie mondiale, de la télédétection par satellite. De ces "multiples enjeux", il en a découlé la prise en compte des diverses données juridiques mentionnant au passage, les différences majeures entre les principes touchant la libre circulation dans un espace international sensiblement reconnu et l'espace aérien. Le Pr. Armel KERREST appuie la thèse qu'"en dehors de ce point essentiel le processus a surtout suivi l'élaboration et l'adoption des conventions internationales pour en compléter la portée juridique. Les dispositions des traités les plus largement ratifiés et des résolutions adoptées par consensus peuvent souvent être regardées comme liant tous les États du fait de leur caractère coutumier. Le processus coutumier se heurte à des difficultés particulières en droit de l'espace, spécialement pour deux raisons. La première est la rapidité de l'évolution des activités spatiales qui rend particulièrement difficile la reconnaissance de coutumes dans ce domaine. Pour ne prendre qu'un exemple, dans le domaine de la télévision par satellite ou de la télédétection, les conditions techniques modifient constamment les données mêmes de cette activité et rendent très difficiles l'élaboration d'une règle coutumière. Une autre difficulté tient à la distinction entre les États spatiaux et les États non-spatiaux. La notion "d'États principalement intéressés" proposée par le CIJ dans son célèbre arrêt sur le plateau continental de la Mer du Nord ne peut exclure les États qui n'interviennent pas directement dans une activité. C'est la raison pour laquelle le processus volontariste d'élaboration du droit dans le cadre des Nations Unies a pris une place essentielle"[17].

Á partir de cette étendue juridique, dont le droit de l'espace se trouve auréolé, nous présageons un avenir florissant d'édification de code de l'espace juridique. Nous pourrions avancer qu'il se fomente en échafaud du droit d'autant qu'il est dorénavant instrumentalisé par une charpente qui prend aisance dans une sorte de consolidation qui est en train de s'armenter d'un droit positif international.

Preuve en est que l'arsenal de l'information émanant des télécommunications fait du droit de l'espace un champ de technicité du droit sur lequel les principes essentiels du traité fondateur de 1967 s'articulent autour de l'espace de l'environnement dont l'élément moteur concerne toute la population mondiale.

Intéressons-nous à ce staff (qui n'est pas du moindre) pour comprendre la responsabilité de toute la communauté internationale quant à l'avenir du développement des pays en développement à charge de la conscience des grandes puissances économiques, voire actuellement les puissances en tant qu'États spatiaux.

Á l'appui de la force probante juridique à faire forger aux moyens instrumentaux de la coopération internationale spatiale, la conférence de l'ADI, tenue en Australie à Queensland, du 9 au 15 août 1990, trace l'éventail de la préservation de l'environnement comme étant le patrimoine universel de l'humanité.

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[17] Cf. Pr. Armel Kerrest, Atelier sur le droit spatial, Rabat, 14-15 février 2002 "Les sources et principes du droit de l'espace".

«Considérant la décision prise par la conférence de Séoul (1986) tenue par l'Association en 1986 de confier au Comité du droit de l'espace la question des débris et de la pollution dus aux activités menées dans l'espace atmosphérique.

Considérant que la conférence tenue à Varsovie en 1988 a décidé que le comité du droit de l'espace entreprenne un échange de vues visant à définir les règles et principes directeurs en ce qui concerne les dangers auxquels les activités spatiales exposent l'environnement, de façon à ce qu'ils soient soumis à l'examen de la session du droit de l'espace de la conférence de 1990, conformément à ces instructions, le Président et le rapporteur du Comité du droit de l'espace ont rédigé et distribué un questionnaire aux membres du comité du droit de l'espace concernant une évaluation de l'état actuel de la législation et des suggestions pour l'avenir, et considérant que su la base des réponses obtenues aux dites questions et des délibérations ayant eu lieu au sein de différentes instances, telles que l'Institut international de droit spatial (1988-1989), l'Institut Ibéro-américain du droit de l'aéronautique et de l'espace et de l'aviation commerciale (1988), le colloque de Cologne sur les incidences de la pollution sur l'environnement des activités spatiales (1988) et la réunion d'experts d'Ottawa sur la protection de l'atmosphère (1989, le rapporteur du Comité a rédigé un rapport communiqué aux membres avant la tenue de la présente conférence.

Considérant que de nouveaux échanges de vues à ce sujet fondés sur ce rapport, ce sot déroulés à Queensland en 1990, au cours d'une session de la 64ème conférence,

Recommande que la Comité du droit de l'espace, sur la base de travaux effectués jusqu'à présent, entreprenne l'élaboration d'un instrument international à examiner hors de la conférence de 1992,

Recommande également qu'à cette occasion le Comité tienne compte des règles et principes directeurs suivants:

1- L'obligation générale de coopérer en ce qui concerne l'étude des risques pour l'environnement imputables aux activités spatiales et de négocier de bonne heure et de bon foie;
2- L'obligation de veiller à ce que les activités spatiales n'infligent aucun dommages aux personnes aux biens ou à l'environnement des autres États ou à l'environnement dans les zones ne relevant pas de juridictions nationales;
3- En particulier, l'obligation d'échanger des renseignements, de prendre des avis consultatifs et de coopérer avec les autres États et les organisations internationales, afin de réduire le nombre actuel de débris spatiaux et d'empêcher d'en produire à l'avenir dans toute la mesure du possible; et
4- L'obligation de s'employer par tous les moyens à régler les différends éventuels de manière rapide et à l'amiable, et à défaut de pouvoir procéder ainsi, de recourir à des arbitrages ou à des décisions judiciaires de façon à obtenir un règlement définitif et ayant force exécutoire.

Par ailleurs, la coopération se poursuit et ne cesse de se développer entre les différentes instances et les autres organisations régionales et internationales. De ce point de vue, le comité du droit de l'espace de l'ADI demeure très actif. Il entretient d'étroits contacts avec l'Institut international de droit spatial de la Fédération internationale astronautique. En outre, des échanges ininterrompus s'effectuent en matière d'informations entre l'ADI et l'Institut International de Droit Spatial. La présence au colloque annuel de l'Institut International est toujours effective de la part de l'ADI.

Notons que cette coopération internationale s'enrichit par d'intenses activités de l'Institut du Droit de l'Espace de Cologne (Allemagne) ayant pour thèmes d'intérêts spécifiques pour le Comité du droit de l'espace. En exemple: le règlement des différends du droit de l'espace (1979) et le colloque sur les répercussions pour l'environnement des activités dans l'espace extra-atmosphérique.

SUPPORT BIBLIOGRAPHIQUE

- Traité sur les principes régissant les activités des États en matière d'exploration de d'utilisation de l'espace extra-atmosphérique y compris la Lune et les autres corps célestes.

- Principes sur la télédétection.

- CHARTE relative à une coopération visant à l'utilisation coordonnée des moyens spatiaux en cas de situations de catastrophes naturelles ou technologiques.

- Comité des utilisations pacifiques de l'espace extra-atmosphérique (sous-comité juridique, quarante et unième session), Vienne, 2-12 avril 2002 – Point 8 de l'ordre du jour provisoire (A/AC.105/C. 2/L.230) – UNIDROIT.

- Convention relative aux garanties internationales portant sur des matériels d'équipement mobiles (signée au cap le 16 novembre 2001).

- Activités spatiales des Nations Unies et d'autres organismes internationaux, New York, Nations Unies.

- Les rapports bisannuels de l'Association de droit international, Londres, WCIB 5 DR. (Royaume Uni).

- Compte-rendus des congrès de la Fédération Internationale d'Astronautique, le revue de l'Académie, Acta Astronautica.

- Vladimir Kopal: United Nations space treaties: achievements and further development, Colloque de Peruge, ESA, 1999.

- Le Monde, Histoire au jour le jour, 1944-19845, La découverte, 1987.

Space Related Activities in Egypt

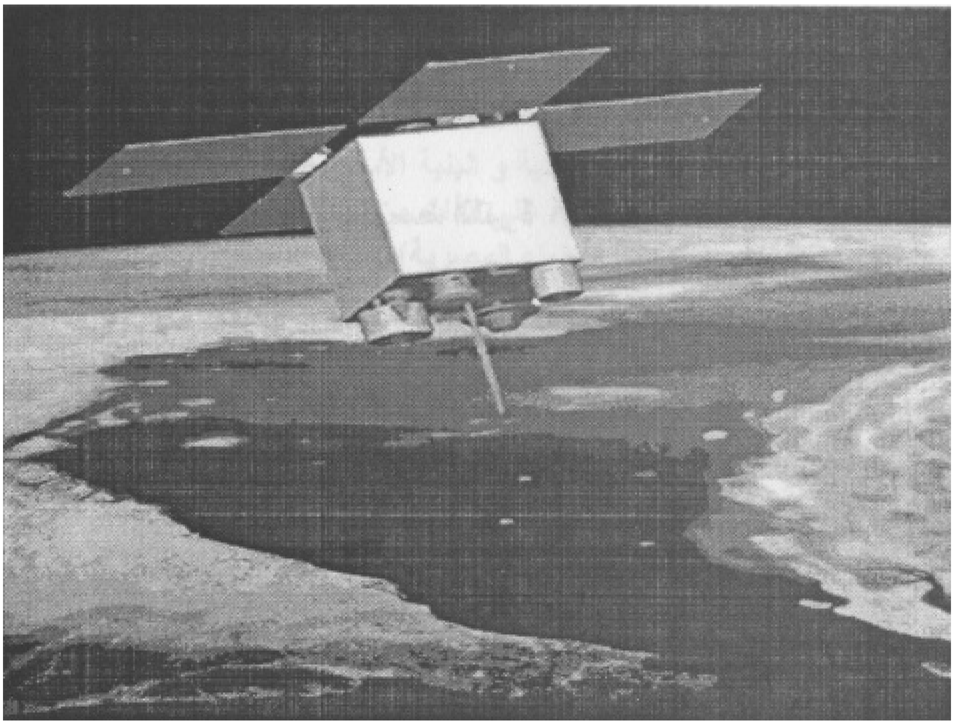
Research work:

1- National authority of remote sensing and space research

a. Projects:

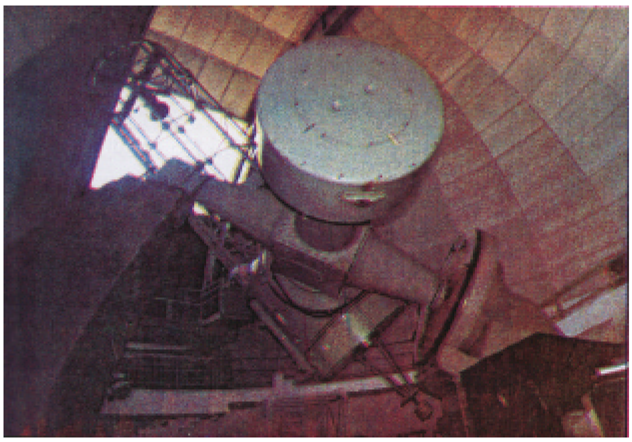
Environment – Agriculture – Water resources – Urban activities – Meteorology – Pollution

b. Egypt sat 1



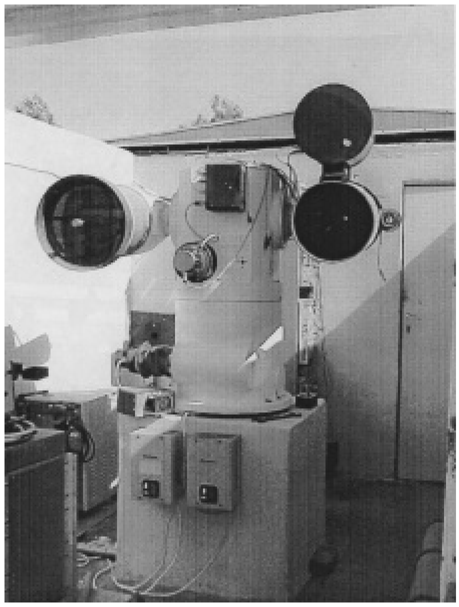
2- National research institute of astronomy and geophysics

- Solar physics and space dept.
- Astronomy department
- Geomagnetism and Geoelectricity
- Seismology dept.
- Crustal movements



Education:

1- Astronomy and meteorology dept. / Cairo univ.
2- Astronomy and meteorology dept. / Al-Azhar univ.



National space-related activities, education and institutions in Africa: Space-related activities in Ghana

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Introduction

I wish to thank the Organizers, especially the United Nations Office for Outer Space in Vienna and the Government of Nigeria for inviting and sponsoring me to attend this very important International Workshop on Space Law and Policy. The topics discussed are relevant as Ghana intends to deepen her space-related activities.

Presentation Outline

This Paper will present the following topics:

I. State of Affairs of Space Science and Technology in Ghana
II. National Policy on Space Science, Technology and Law
III. Institutional Arrangements for Coordinating Space-related Programmes
IV. Priority Action Plans on Space Applications
V. Proposed Implementation Schedule of Action Plans
VI. Conclusions

I. State of affairs of Space Science and Technology in Ghana

The current Science and Technology Policy of Ghana has been framed to exploit all the "Sciences" for the benefit of Society, and Space Science and Technology (SST) is considered necessary and relevant for ensuring sustainable development of the country.

In the past, SST has not been mainstreamed into the National Development Agenda, until the recent worldwide occurrences of natural disasters dawned on us of the need for establishing Earth observation and early warning systems for:

- Effective and efficient management of natural resources; especially, control of deforestation, desertification, soil erosion, protection of watershed and bio-diversity, etc;
- Disaster responsiveness in case of floods, hurricanes, Earthquakes, landslides, bush fires, etc; and
- Mitigating climate change, global warming and drought.

To realize the above strategies, Industry, Natural & Social Sciences Sector (INSS) of the Council for Scientific and Industrial Research (CSIR) and Prime Minister of Ministry of Environment and Science (MES) have initiated discussions to develop a national policy on SST application.

The SST Policy Document would serve as a framework for coordinating and harmonizing nationwide the programmes and activities by all Government Ministries, Departments and Agencies (MDAS), Non-Governmental Organizations (NGOs), Private Sector and other Businesses, Individuals and Civil Society to bring the benefits of Space Technology to bear on national development.

1. International obligations

For meeting *international obligations*, Ghana has endorsed the agenda and goals of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and of Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) and is a State party, by signature only, to the following treaties governing peaceful activities in outer space:

- Outer Space Treaty of 1967;
- Rescue Agreement of 1968;
- Liability Convention of 1972

However, Ghana has not acceded to or is not party to:

- Registration Convention and
- Moon Agreement.

Ghana has also ratified four of the eleven UN Agreements, namely:

- Treaty banning nuclear weapon tests in the atmosphere, in outer space and under water;
- Agreement relating to the International Telecommunications Satellite Organization;
- Convention on the International Mobile Satellite Organization; and
- International Telecommunication Constitution and Convention

From the presentations and discussions at the workshop, there were misgivings about countries that have not ratified the treaties and other agreements, and in the case of Ghana efforts will be made by the Ministry of Environment and Science to present the necessary documents to the Parliament to ratify the conventions.

2. Domestic needs

In addressing the *domestic needs* in Ghana, there are ongoing programmes on Space Applications, Research and Education.

(a) The three (3) crucial areas of space applications in Ghana are:

- Remote Sensing and Earth Observation for monitoring agriculture/crop production, forest and bio-resources, water resources, environmental pollution, human settlement, climate change, etc;
- Telecommunication and Broadcasting; and
- Meteorology and Weather Forecasting.

(b) Research in Space Science & Technology is limited in scope, but significant initiatives involve:

- Ghana Atomic Energy Commission with capacity for multi-elemental analysis of unidentified falling objects from space, such as meteorites and lightning rocks, by using Instrumental Nuclear Activated Analysis. The methodology had been applied to analyze two articles of space debris;
- Remote Sensing and Geographical Information Systems for monitoring the ecology and hydrology of the Volta Basin (which is the main national energy source) and coastal pollution (such as oil spills) by the Centre for Remote Sensing and GIS (CERSGIS) and the Council for Scientific and Industrial Research (CSIR). The ownership and control of primary data remains problematic; and
- Tracking of Low Earth Orbit Satellites (LEOSATs) under the TRINET Project by CSIR and Partners in Ireland for data transfer and information retrieval for rural development, especially in remote communities.

(c) Education and training at universities are modest, except for the following few basic space science courses at undergraduate levels:

- University of Cape Coast offers courses in Atmospheric Physics, Meteorology, and is a partner in African Virtual University Satellite-based distance education;
- University of Ghana runs programmes in Remote Sensing and geographical information for spatial data;
- Kwame Nkrumah University of Science and Technology offers undergraduate degree programme in Aerospace Engineering.

There is the need to upgrade the programmes to graduate level to train critical manpower for technology transfer and adaptation. Additional resources required are laboratory facilities and in particular an observatory to generate interest in space activities. In consultation with the Legal Reforms Committee, initiatives will be undertaken to incorporate Air and Space Law into the curricula of the Ghana Law School.

3. Regional cooperation

On *regional cooperation*, Ghana will collaborate with the African Regional Centre for Space Science and Technology Education (ARCSST) at Ile-Ife on capacity development and, with the National Space Research and Development Agency (NASRDA) in Abuja, on capacity utilization. The influence of these two organizations should be felt more in the sub-region. At the first African Leadership Conference on Space Science and Technology for Sustainable Development (with the theme: Space – an indispensable tool for Africa's development and growth), discussions were held with the Director of ARCSST, and the Director-General of NASRDA agreed to recognize MES and CSIR as focal points on SST programmes in Ghana and to pay an official visit to Ghana to arrange for collaboration and the dissemination of information on the two institutions and the lessons to be learnt by Ghana.

4. Public awareness

Unfortunately, the public awareness of space activities appears non-existent and the perception is suspicious because of the apparent contradiction with religious beliefs that "space is the abode of the deities". There are on-going national programmes of science acculturation to overcome such misconceptions.

II. National Policy on Space Science, Technology and Law

A National Space Science and Technology Policy is being developed to ensure coordination and harmonization of all space-related activities nationwide.

The objective is that the policy guideline will serve as a “roadmap” for promoting research, development and training in applications of space technologies. Additionally, the policy will also serve to incorporate space laws into the national legislation.

The goal will be to establish the Ghana Space Agency (GhSA) to coordinate nationwide programmes of all implementing groups, and setup the framework for Ghana to undertake space-related activities under the agenda of UNISPACE III and COPUOS.

The Policy thrust will be to use space technology to promote economic growth in specific areas of:

- Sustainable development (capacity building and utilization in water resources, land use, mapping, etc.);
- Earth observation, early warning systems and disaster management;
- Tele-Medicine and Health (surveillance of endemic diseases such as guinea worm, cholera and meningitis);
- Satellite communication and broadcasting;
- Distance education and learning; and
- International Collaboration.

For the legal framework, the Parliamentary Act on Space Policy will incorporate Space Laws in the National Legislation.

III. Institutional Arrangements for Coordinating Space-related Activities

For the establishment of the GhSA, the implementing Ministry shall be the MES, while the Coordinating Agency will be the CSIR. The Agency will be hosted by CSIR.

The collaborating MDAs will consist of:

- Ministry of Justice (Laws Reforms Committee)
- Ministry of Communication
- Ministry of Defence
- Ministry of Agriculture
- Ministry of Education
- Ministry of Rural Development
- Ministry of Finance and Economic Planning
- Universities and Research Institutions (R&D)
- National Communication Board
- Civil Aviation (traffic Control)
- Metrological Services (weather forecast)
- Survey Department (Cartography mapping)
- CERSGIS – Remote sensing and GIS
- CSIR – Spatial Data

Other private individuals and business engaged in space-related industries shall be co-opted.

IV. Priority Action Plans on Space Applications

Priority setting in SST Programmes in Ghana will be based on socio-economic development through:

- SST Infrastructure development for Education and training
- Commercialization and applications of Space technologies (based on trend analysis)
- National Space Legislation (Policy changes will lead to new legislation and regulations.

The plans envisage:

- Monitoring and Management of environment and natural resources;
- Human Resources development and training;
- Awareness among citizens, decision makers and politicians of the relevance of space science and technology; and
- Sourcing funding from local and donor sources.

V. Proposed Implementation Schedule of Action Plans.

1. January – March 2006: Draft Policy submitted to the Ministry of Environment and Science for consideration and approval;

2. April – June 2006: Stakeholders Forum to vet policy document;

3. June - September 2006: Policy document submitted to Parliament for consideration by Select committee on Science for enactment;

4. September – December 2006:
   - SST Capacity and Infrastructure assessment and links with industry undertaken;
   - National Workshop on Space Applications in Ghana to be held;
   - Development of curricula and educational programmes in Space Sciences and Space Laws;
   - Public awareness and sensitization programmes (Radio, TV, Print Media).

5. January – December 2007: In conjunction with the Ministry of Justice, MES will prepare national space laws.

6. Budget allocation has been made by government to implement the activities listed above and additional funding will be sought form bilateral and multilateral sources.

Conclusions

Ghana is keen to adopt and apply Space Science and Technology for socio-economic development, environmental and resources management and communication, but will need international assistance and other donor support, especially in education and training, establishment of an observatory and incorporation of Air and Space Laws in to the national legislation.

The forthcoming incident of the eclipse of the Sun in March 2006 will serve as opportunity to create awareness of Space Science in Ghana, and the UN Office for Outer Space Affairs must assist CSIR to undertake public education on the phenomena.

National space-related activities, education and institutions in Africa: Space-related activities in Kenya

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Abstract

Space science and technology can enhance socio-economic development and has the potential to provide cost effective solutions to many of humanity's pressing needs. This can be exemplified by the fact that space science and technology has been applied globally for the benefit of mankind in areas such as communication, meteorology, surveys and mapping, exploration and exploitation of natural resources, management and monitoring of the environment. Today, all parts of the world are being united by communication satellites while space-based sensor systems are continually monitoring the globe. These technologies are providing the support needed for sustainable development.

Natural disasters have been a common phenomenon in the history of mankind and many times have resulted in the destruction of both life and human settlements. Natural disasters include: floods, Earthquakes, extreme weather conditions, volcanic eruptions, forest fires, tsunamis, drought, desertification, and famine. Application of space science and technology can be essential in the management of national disasters.

To sustain the efficient and informed application of any technology, there must always be a critical mass of trained personnel in the field. This, therefore, calls for enhanced capacity building in space science and technology through space education to support monitoring and management of disasters such as natural hazards in order to provide services related to emergency response, search and rescue efforts among others.

Capacity building for disaster management can be considered to be important for early warning, prevention, mitigation, response, recovery, development and planning in order to manage natural calamities. Capacity building would entail both human resources development and development of infrastructure within institutions.

In Kenya, space education is undertaken by a limited number of institutions of higher learning and specialized bodies and there is, therefore, the need to promote the teaching of space science and technology at all levels, including primary and secondary schools. Necessary infrastructure should also be put in place to support these efforts. Expertise existing in well-established government institutions, such as the Survey of Kenya, the Department of Resource Surveys and Remote Sensing and the Kenya Meteorological Department, should be tapped for the purpose of creating capacity in space science and technology. Regional institutions, such as the Regional Centre for Mapping of Resources for Development and the IGAD Climate Prediction and Application Centre and the San Marco Project in Malindi, Kenya, could also play a complementary role.

Space Education and Capacity Building for Sustainable Development[1]

Introduction

Space science and technology has been applied globally for the benefit of man in areas such as communications, meteorology, surveys, mapping as well as exploitation and management of natural resources. These technologies are providing support necessary for development activities.

The objectives of capacity building in space education in Kenya would include, among others, the following: contribution to capacity building in space sciences and technology in Kenya; promotion of the utilization of satellite data and technology towards environmental applications; preparation of scientists and professionals in Kenya to take a more active role in developing equipment, software and application techniques specifically adapted to the needs of the country; promotion of the utilization of meteorological and other satellite data for natural disaster mitigation; education of specialists from Kenya in satellite applications in support of socio-economic development, natural disaster management, and well-being promotion of the utilization of remote sensing satellite data and technology towards environmental applications.

I. Natural Disaster Management

A natural disaster is a serious disruption of the functioning of a society causing widespread human, material and or environmental losses, which exceed the ability of the affected society to cope, using its own resources. Natural disasters can be caused by floods, Earthquakes, fires, tsunami, drought and famine.

The components of coping and managing natural disasters include the following: early warning, prevention, mitigation, response and recovery (relief, rehabilitation and reconstruction, development and planning).

Capacity building in space education is necessary since it can equip the professionals in the area of space science with knowledge and skills and equipment necessary to manage and mitigate the impacts of natural disasters.

In Kenya, there is an insufficient number of both well-trained experts and professionals, of the necessary infrastructure, including specialized equipment in the field of space science and technology laboratories, equipment and institutions that can be used to teach and demonstrate several aspects of space science.

There is, therefore, the need for space science education through capacity building in space science and technology. This entails both human resources development and provision of the relevant equipment.

[1] Paper presented at the 15th United Nations/International Federation Workshop on "Space Education and Capacity Building for Sustainable development", 14-15 October 2005, Kitakyushu city, Japan

II. Applications of Remote Sensing Technology

1. Natural Disaster Reduction and Economic Planning

Remote sensing can be used to prepare hazard maps, determine locations and spatial distribution of disaster affected areas; identify population at risk from disasters, design and implement natural disaster planning.

Remote sensing technologies are continuing in ways that will increase their value to resource managers. Because these systems will enable users to discriminate a greater number of features more quickly, they will enhance the decision-making process. Simultaneously, research continues into new ways in which remote sensing technologies can be used to facilitate strategic planning for environmental and development issues.

GIS technologies also continue to evolve as more powerful computer hardware and software systems are developed.

Powerful computers can make it easier to integrate remote sensing data into a GIS, perform modelling and statistical analysis and convert larger volumes of data into customized information. Hence, in economic planning, it should be possible to identify optimal sites prone to environmental vulnerability.

2. Water and Coastal Zone Management

Remote sensing and GIS can be used to estimate water supplies and upgrade knowledge of hydrographic systems, map flood plains, inventory lakes and wetlands; measure soil moisture, estimate snow-melt run-off; assess regional water demands and supplies; develop plans for more efficient use of surface and ground water resources; and investigate sources of water contamination and develop appropriate prevention mechanisms.

Constraints

The commitment of the Kenyan Government towards the establishment of facilities related to space science and technology has underlined the Government's determination in the exploitation of space science and technology for provision of impetus towards rapid national development.

While this is a major step in the right direction, a number of issues have hindered the full exploitation and optimization of the benefits that can be accrued from this effort. These issues are:

(a) Lack of a space policy aimed at guiding and giving direction towards development of all space science and technology related matters.
(b) Lack of a comprehensive training curriculum, equipment and facilities in many tertiary institutions.
(c) Inadequate facilities for reception, processing and interpretation of space data
(d) Lack of co-ordination in space related matters between different government departments and agencies dealing with space science and technology.

III. Institutional Framework

There are a few institutions in Kenya involved in day-to-day applications of remote sensing techniques. They include the Department of Resource Surveys and Remote Sensing (DRSRS), the Kenya Meteorological Department, the Regional Center for Mapping of Resources for Development and the San Marco Project in Malindi etc.

1. Department of Resource Surveys and Remote Sensing (DRSRS)

The DRSRS was established in 1976 with the funding from the Government of Kenya and the Canadian International Development Agency (CIDA). Its main function was to monitor the condition and trend of rangelands through livestock, wildlife and vegetation surveys using remote sensing, aerial surveys and background sampling techniques. This was a response to the 1972 Stockholm Conference, which created the United Nations Environment Programme (UNEP).

The DRSRS is mandated with the collection, storage, analysis and dissemination of geospatial information on natural resources to facilitate informed decision making for sustainable management and development with the major aim of alleviating poverty and environmental degradation. The data collected by the department forms the basis for preparation of polices and development plans for decision-making.

Since its inception, the main task was, among others, to monitor the conditions and trends of land resources within the country. This is executed through aerial surveys of livestock and wildlife, assessment of environmental attributes regarding vegetation, plant production, land and land degradation and others. All this information, together with human activities, are analyzed and used in development plans geared towards poverty reduction.

The department programmes and activities are executed in six major areas, namely: aerial surveys, ground surveys, remote sensing, data management, publications and trainings and air services programme.

2. Kenya Meteorological Department

Kenya’s Meteorological Department is the pillar in the worldwide efforts to monitor, understand and predict weather and climate for the implementation of reliable and suitable development initiative.

In addition to meteorological and hydrological services, the Kenya Meteorological Department also provides oceanographic and other environmental data including vegetation-monitoring services. Public services include the daily weather forecasts for public welfare, aviation and marine users and weather related hazards. Short range, medium and long-range weather forecasts are integrated into the national economic planning and management programmes.

The Department uses data from meteorological satellites to assist in weather prediction and monitoring.

3. Regional Center for Mapping of Resources for Development (RCMR.D)

The RCMR.D, previously called the Regional Center for services in Surveying, Mapping and Remote Sensing (RCSSMR.S), was established in Nairobi, Kenya, in 1975 under the auspices of the United Nations Economic Commission for Africa. This is an intergovernmental organization and is managed by the Member States. Currently the Center has 15 contracting Member States.

Objectives

The RCMR.D has the following objectives: to develop and constantly update harmonized and standardized land resources and urban development digital data and information infrastructure for the region based on demand; to develop a regional early warning system for food security, environmental monitoring and disaster management using mainly satellite data; to undertake projects to create spatial information systems suitable for development planning at regional and community levels; to strengthen and harmonize the fragments of regional and African data using accurate geodetic GPS techniques and research in the field and data processing methodologies; to develop capacity and capability in the maintenance of surveying and mapping equipment and offer advisory and maintenance services to the member States; to undertake research and training in the application of geo-information in land resources and urban development mapping and assessment for sustainable development.

Achievements

Since the Center was established, it has been very instrumental in capacity building in resource surveys, mapping, remote sensing, GIS and natural resources assessment and management in Africa. So far, the Center has trained about 3000 technical officers from its Member States and other African countries in these fields. The Center has also implemented numerous projects on behalf of its Member States and development partners.

The Center's Core Programmes

The RCMR.D has the following core programmes: resource mapping; remote sensing and environmental management; engineering services; human resources development and training.

Resource Mapping Programme

The Center's objective is: to generate resource-data and information that are demand-driven and of immediate use for development; to be in a position to advise users on the options and optimum applications of such information; and to participate in advising planners in member States on the implications of the use of this information in the national development process. Three programmes will also focus on the generation of land information through GPS and other survey and mapping techniques.

Remote Sensing and Environmental Management Programme

This programme seeks to increase the awareness of environmental concerns and the new development in environmental information technology. The programme will, through such activities as environmental data archiving; maintenance of early warning systems for food security; monitoring of the environment; collection, compilation and utilization of remote sensing data from environmental assessment; provision of support to remote sensing and GIS sections in member States; and research in environmental assessment and management, address the urgent environmental problems in the member States.

Engineering Services Programme

In line with the current trend of equipment design which is based on the application of digital and microprocessor technologies, this programme aims at expanding the Center's capacity and capability to service and maintain automated equipment and hardware utilized in resource mapping and environmental management. This programme is expected to become fully fledged and technically dynamic providing service and maintenance solutions to all types of equipment, both old and modern, used for mapping and remote sensing. It is expected to constantly update its capability and keep abreast with the changes in technology.

Under this programme, the Center also plans to develop fast Internet links that will enhance the receiving and distribution of digital databases [i.e. satellite data, digital terrain model (DTM)] between the international distributors and the Center. The Center will archive, process and distribute the data (on CD) in the African region based on customer needs.

Human Resources Development Programme

The San-Marco project, Malindi, has the following segments:

a) The sea segment with five platforms

The sea segment is equipped with launch facilities able to accomplish orbital and sub-orbital (sounding rockets) launches for scientific payloads. It is made up of five platforms (three floatable and two fixed).

b) The Land segment

The land segment has three ground stations for satellite data acquisition, receiving and recording and real-time relay transmission. One of the three stations is dedicated to remote sensing data acquisition and processing.

The San-Marco project also has a ground station dedicated to the acquisition of the scientific satellite SAX for X-ray astronomy.

4. IGAD Climate Prediction and Application Center (ICPAC)

The major goal of the ICPAC includes improved and enhanced sub-regional and national capacities for the use of climate knowledge towards providing c*limate information, prediction products and services, early warning, and related applications, as a contribution to sustainable development in the IGAD sub-region.*

The three parallel objectives, which, taken together capture ICPAC's capacity to perform sound scientific work and apply the results through collaboration with an expanding and educated base of users are as follows:

- To improve the technical capacity of producers and users of climatic information, in order to enhance the input into and use of climate monitoring, production and early warning products;

- To develop an improved, proactive, timely, broad-based system of information and product dissemination and feedback, at both sub-regional and national scales through national partners.
- To expand the knowledge base within the sub-region in order to facilitate informed decision making, through a clear understanding of climatic and climate-related processes, enhanced research and development, and a well managed reference archive of data and information products.

ICPAC products

Monitoring of past climate:

The recent past climate over the Horn of Africa is monitored on decadal (ten day), monthly and seasonal time scales in order to detect the evolution of any significant anomalies that could impact negatively on the socio-economic activities of the region as follows:

- Decadal, monthly and seasonal summaries of rainfall and drought severity;
- Monthly temperature anomalies.

Current State of Climate

The current State of climate is monitored and assessed using climate diagnostics and modelling techniques. These are derived from information on the State of the Sea Surface Temperature anomalies over all the major oceans basins, surface and upper air anomalies of pressure, winds and other climate parameters.

Prediction Products

These are derived from statistical models run at the Center and dynamical model outputs from advanced centres on decadal, monthly and seasonal time scales. The Center has recently acquired a super computer to enhance its dynamical modelling capability and is in the process of calibrating a regional spectral climate model for the Horn of Africa that will be implemented in the near future. The prediction products are provided through outlooks for a decadal, month and season. Consensus on pre-season climate outlook is also organized in conjunction with the major climate centres worldwide in order to derive a single consensus forecast for the region.

Impacts

An assessment of the vulnerability together with the current and potential socio-economic conditions and inputs (both negative and positive) associated with the observed and projected climate anomalies is also made on decadal, monthly and seasonal time scales.

These products are disseminated to all national meteorological and hydrological services of the participating countries to provide early warning information and to provide information for policy makers and planners, for the health, energy, agricultural and water resource sectors, and for farmers as well as research institutions.

5. The National Disaster Operations Center

The National Disaster Operations Center was founded in January 1998 under the Office of the President. The Center is involved in planning and response coordination in the event of a disaster.

Before the establishment of the Center, disasters in Kenya were dealt with as they occurred and mostly in response to the disaster.

The Center has initiated the following activities:

- Redrafted a policy and Bill for disaster management
- Commenced hazard and vulnerability mapping
- Formed provincial and district disaster management committees all linked to the National Disaster Operations Center
- Carried out a thorough inventory for planning and targeting for mobilization on nationwide awareness campaigns
- Remoulded individual ministerial and departmental responsibilities refocusing on when they may be required to act collectively.
- Some government departments such as Department of Defence, Police, Airport and Ports Authorities have formed specific sub departments with a responsibility for planning and disaster response
- Intensified networking.

In order to harmonize the above-mentioned activities, a Minister of State in the Office of the President handles disaster management in Kenya.

At present, the Center is inadequately funded and understaffed and lacks capacity to handle remotely sensed data.

IV. Capacity Building in Space Science and Technology in Kenya

In order to sustain the efficient and informed application of any technology, there must always be a critical mass of trained personnel in the particular discipline. Likewise, to sustain the space industry, there is need for experts in the applied as well as in the pure science aspects of space technology. Specifically, the space industry has specialists in areas such as astronomy, astrophysics, astronautics, remote sensing, engineering, computer science, aeronautic engineering, as well as experts in the fields of natural sciences, Earth sciences, and appeal sciences.

1 Space Science Education

Remote Sensing and GIS are important components of space science and technology education. This is because remotely sensed data is important for providing an ideal view of the Earth for various studies needing synoptic or period observations such as geology, forests, water resources, agriculture, range management, floods fires, volcanic eruptions.

Lack of qualified teachers in primary and secondary schools, and tertiary institutions, such as universities, polytechnics and institutes of technology, poses a serious problem to the country as far as the development of basic science and technology is concerned.

In order to cope and manage natural disasters, there is a need to develop adequate capacity in space science and technology through education, training, the provision of equipment in the field of space science, and the development of infrastructure.

In order to provide opportunities for students in space science and technology to gain the necessary knowledge, experience and application skills in space science and technology, the curricula should be developed to teach space science-based subjects. Additional curricula should also be prepared for training experts and professionals in space science and technology.

The curricula should also have modules that will expose students to important aspects of space science. Subjects taught in space science may include the following: physical principles of remote sensing; satellite orbital characteristics; operational sensor systems; satellites and ground based communications; Global Positioning Systems (GPS); Geographic Information Systems (GIS); and a demonstration of selected environmental applications.

Other programmes in space education should include elements of aerial photo interpretation, digital image processing and remote sensing applications in natural resources surveys and environment.

Space based communication is the most effective medium for reaching out to the world. Teaching satellite communication is also important since it provides students with skills to appreciate the full potential of the satellite technology.

Capacity building in space education should be able to provide the country with professional scientists, engineers and technicians in the country who are capable of handling and interpreting space based data and information.

Equipment required for space based activities include the following: disaster monitoring satellite; micro-computers with modems and CD ROM players; internet capability data analysis workstations; image processing workstations; GIS terminals; laser and colour printers; graphic analysis and display; radiometers; 35 mm cameras; GPS receivers; topographic maps; mirror stereoscopes; HRPT ground system; and automated AVHRR.

2 Institutional Capacity Building

There are several institutions both in the public and private sectors in Kenya involved in either training or provision of services in the area of space science and especially remote sensing and Geographical Information Sciences. These institutions include the following: the Department of Resource Surveys and Remote Sensing (DRSRS); the Survey of Kenya Institute of Surveying and Development, (CETRAD); the Survey of Kenya (Kenya Institute of Surveying and Mapping), the Kenya Meteorological Department (KMD), ICPAC; the Regional Center for the Mapping of Resources for Development (RCMR.D); the San-Marco Project, Malindi, national universities, and polytechnics.

In many cases, these institutions lack capacity in terms of qualified personnel and the necessary infrastructure to facilitate acquisition, storage, processing and interpretation of remotely sensed data. It is therefore necessary to strengthen and encourage these institutions to diversify their training programmes in the space science and technology.

3 Constraints

The limited application of space technology in the country has to a great extent been contributed to by the lack of a sufficient base of qualified personnel and of the necessary infrastructure. There are presently a reasonable number of Kenyans with expertise in certain aspects of space technology, such as in remote sensing, telecommunications, meteorology, and mapping and positioning. However, there are practically no dedicated experts in space science as such. Further, there are limited facilities for studies in the applied space sciences, but even these are often very limited in scope, and continuously do suffer from lack of adequate facilities.

There is, therefore, a clear need for a coordinated programme for the training of experts in the area of space sciences and technology in Kenya. This will call for the expansion of already existing facilities for training in space-related sciences in the country. The applied space science areas that will need to be considered include remote sensing, meteorology, surveying and mapping (positioning and navigation) etc.

It is acknowledged that reasonable training in fields, which utilize information from satellites, is being undertaken by a number of institutions in the country.

V. Recommendations

1 Training Programme

The following training programme has been suggested in order to enhance capacity in space science and technology for natural disaster management in Kenya.

Technicians

The objective is to produce technicians with adequate theoretical background and practical skills in remote sensing technology.

No institution in Kenya presently provides training that meets all the requirements of training for technicians.

Basic and Applied Sciences

The objective is to produce high-level manpower that can interpret, analyze and apply data and information provided by satellites and to conduct advanced scientific research in their respective areas of expertise.

Resources Surveys and Remote Sensing

The objective is to provide for education and research in the application of aerial photography and other remote sensing techniques to forestry, soil survey, ecology, resource management, rural survey, urban planning, environmental management, water resources and natural disaster management.

Meteorology and Atmospheric Sciences

The objective is to provide for education and research in the physical processes and dynamics of the atmosphere and their interaction with the Earth's surface ecosystems and climate change process.

Other space-related legal issues

Legal and regulatory developments in Aeronautical Communications and Navigation

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Introduction

We will recall, it was Stated at the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space convened in 1981, that:

> "ICAO is responsible for developing the position of international civil aviation on all matters related to the study of questions involving the use of space technology for air navigation purposes, including the determination of international civil aviation's particular requirements in respect of space technology".[1]

Consequently, the Special Committee on Future Air Navigation Systems (FANS) was established in 1983 by the International Civil Aviation Organization (ICAO) Council as a subsidiary body. The Council defined the terms of reference of the FANS Committee as follows:

> "To study technical, operational, institutional and economic questions, including cost/benefit effects, relating to the future potential air navigation systems; to identify and assess new concepts and new technology, including satellite technology, which may have future benefits for the development of international civil aviation including the likely implications they would have for users and providers of such systems; and to make recommendations thereon for an overall long term projection for the co-ordinated evolutionary development of air navigation for international civil aviation over a period of twenty-five years".[2]

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[1] ICAO UNISPACE II Report on the Civil Aviation interests in the Use of Outer Space, Background Paper, 1.A/CONF.101/BP/IGO/1 (1981). See also, the ICAO Assembly Resolution A15-1 adopted in 1965, at its 15th Session (now superseded and re-named as Resolution A29-11).

[2] See ICAO Doc. 9527 – C/1078 C Min 110 and C-Min 110/9 (1983); ICAO Doc. FANS/1-Report 1-1(9-13 July 1984); International Maritime Satellite Organization, *On the Air* in *Never Beyond Reach - The World of Mobile Satellite Communications*, (ed. Brendan Gallagher) 1989, ISBN 09514469 08, at page 146. For a discussion of events leading up to this decision, see B.D.K. Henaku, *The Law on Global Air Navigation by Satellite: A Legal Analysis of the CNS/ATM System*, 1998, at pages 66 to 70; Guldimann W. Kaiser S. *Future Air Navigation Systems - Legal and Institutional aspects*. Martinus Nijhoff Publishers, 1993 at page 148; Henri Wassenbergh, *Principles of Space Law in Hindsight*, Martinus Nijhoff, 1991, at page 110 to 119; Athar Husain Khan, *Aeronautical Communication, Navigation and Surveillance By Satellite – Towards a Global Framework for Civil Aviation*, in *De Lege Ferenda, Essays in Honour of Henri A. Wassenbergh,* (eds. Tanja Masson-Zwaan and Pablo M.J. Mendes De Leon, Martinus Nijhoff

Furthermore, at the 10th Air Navigation Conference convened in 1991, the conference considered Agenda Item 2 - *Consideration of the future air navigation systems (FANS) concept for the future air navigation system, and its capability of correcting the shortcomings of the present communications, navigation, and surveillance (CNS) system*. That conference was presented with an overview of the FANS concept for the future air navigation system, consequent upon which a communication, navigation, and surveillance (CNS) and air traffic management (ATM) concept for FANS was endorsed and developed.[3]

This paper addresses the most recent legal and regulatory developments applicable to the communications and navigation elements of the global CNS/ATM plan for international civil aviation[4]. Note that the communications element in CNS/ATM systems, as envisaged by ICAO, encompasses the complementary use of satellite-based and terrestrial-based technology to provide global coverage in the exchange of aeronautical data and voice communication between users and/or automated systems. Such communications may be of a “Fixed” or “Mobile[5]” nature intended for “safety” or “non-safety” purposes. In addition, designed to provide accurate, reliable and seamless position determination capability, worldwide, by means of satellite-based aeronautical navigation, the navigation element of the CNS/ATM systems is characterised by the progressive introduction of area navigation (RNAV) capabilities along with the global navigation satellite system (GNSS)[6].

Therefore, Section II and III of this paper dwell on some of the pertinent and current legal/regulatory issues arising as a result of technological developments and competition in the

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Publishers, 1992, at pages 43 to 51; Milde M.: Legal Aspects of Future Air Navigation Systems, *Annals of Air & Space Law*, Vol XII, 1987 at pages 87-98; Milde M.: Legal Aspects of Global Air-Ground Communication in G.R. Bacelli (Ed.), *Liber Amicorum Honouring Nicolas Mateesco Matte – Beyond Boundaries*, Paris 1989, pages 215 – 218; Stofel W.: Legal Aspects of Aeronautical Mobile Satellite Services – The ICAO FANS Concept, Proceedings *of the 36th Colloquium of the International Institute for Space Law*, 1993, pages 116-121; Hong-kyun S.: & Soon-Kil H.: Legal Aspects of Space Activities of ICAO in implementing FANS, *Proceedings of the 36th Colloquium of the International Institute for Space Law*, 1993, pages 98-115.

3 See ICAO Doc. 9524 – FANS (2-20 May 1988); ICAO Doc. 9583 – AN-CONF/10 (5-20 September 1991), Recommendation 9/1 at 9-3; V.P. Galotti Jr, *The Future Air Navigation System (FANS)*, Ashgate, 1997 at pages 4 to 5; Alessandra A.L. Andre, *The Global Navigation Satellite System*, Ashgate, 2001, at pages 3 to 4.

4 For a discussion on the use of satellite communications and navigation for international maritime purposes, see the 1979 *Convention on the Establishment of the International Maritime Satellite Organization*; Stephen Doyle, *INMARSAT: The International Maritime Satellite Organization – Origins and Structure,* 5 J. SPACE L. (1977) at pages 45 to 63; Nandasiri Jasentuliyana *The International Maritime Satellite System* in *Manual on Space Law* (eds. N. Jasentuliyana and R. Lee) 1979, Oceana Publications, at pages 439 to 465; Francis Lyall, *Law and Space Telecommunications*, Dartmouth Publishing Company Limited, 1989, at pages 209 to 243; David Sagar, *GNSS and Maritime Navigation*, Proceedings of the International Bar Association Conference, 2000, The Netherlands, 17-22 September 2000.

5 ICAO has identified Air traffic services, Aeronautical operational control, Aeronautical administrative communications, and Aeronautical Public Correspondence as the 4 (four) types of aeronautical satellite communications within the Aeronautical Mobile Satellite Service (AMSS) category which can be conducted to and from aircraft. See Guldimann W, Kaiser S. op. cit. at page 154; Henri Wassenbergh, op. cit., at page 114.

6 See UN Doc. A/AC.105/846, 30 March 2005, at page 5 (Report on the United Nations/United States of America International Meeting on the Use And Applications of Global Navigation Satellite Systems).

provision of non-safety[7] aeronautical mobile satellite services (AMSS)[8] as well as the perceived institutional/legal issues pertaining to the provision of navigation services to civil aviation. Section IV considers both elements (i.e., non-safety communications and navigation) of the CNS/ATM system especially in the African context and concludes the paper with some recommendations.

I. Regulating the Provision of Non-Safety Aeronautical Mobile Satellite Communications[9]

The provision of non-safety aeronautical communications is subject to the interpretation, application and national implementation by States, of a fair number of treaties and other international instruments governing activities in national airspaces, polar and oceanic air spaces as well as outer space. A common theme underlying the compliance with most of these instruments is the influence and effect of the national legal systems of sovereign States. The basis for this is that, firstly, States are deemed responsible for the authorization, certification or the provision of services in the airspace for which they are accountable, in addition, to having complete and exclusive sovereignty in their territory and the airspace above it[10]. Secondly, States retain the responsibility and right to control and regulate telecommunications taking place within their respective territories[11]. The consequences of the two observations made hereinbefore is, that there is no *a priori* freedom to operate radio transmitters for telecommunications within the territory of a foreign State[12].

Generally speaking, the pertinent international instruments applicable to non-safety aeronautical communications relate namely to the regulation of satellite telecommunications; international civil aviation; trade in services and the protection of copyrights[13], subject to compliance with the provisions of *inter alia*, Articles III, VI, VII, and VIII, of the 1967 Outer

[7] Going by ICAO definitions in note 6 supra, non-safety aeronautical communications would be classified as "Aeronautical Public Correspondence".
[8] See Definitions provided in Article 1 paragraph 27 and paragraph 35 of the ITU Radio Regulations. Edition of 2001, adopted by the World Radio Conference 1995 (Geneva), revised and adopted by World Radio Conference 1997 (Geneva) and World Radio Conference 2000 (Istanbul).
[9] Tare Brisibe, Convergence and Technology Acceleration in non-safety Aeronautical Satellite Communications: Policy for the 21st Century, Space Policy, Vol. 21 Issue 3, August 2005, at pages 185 - 194.
[10] On State sovereignty in airspace, see: Article 1 to the 1944 International Convention on Civil Aviation, Chicago, done 7 December 1944, entered into force 4 April 1947; 15 UNTS 296; Bin Cheng, *The Law of International Air Transport*, 1962, at page 122; Peter Haanappel, *The Law and Policy of Air Space and Outer Space, A Comparative Approach*, Kluwer Law International, The Netherlands, 2003 at page 15; Guldimann W, Kaiser S. op. cit. at page 9; Tare Brisibe, *State Sovereignty and Aeronautical Public Correspondence by Satellite*, JALC Vol. 69 Part IV, 2005.
[11] See Preamble to the Constitution and Convention of the International Telecommunication Union, Decisions, Resolutions and Recommendations, Final Acts of the Plenipotentiary Conference of the International Telecommunication Union (Kyoto, 1994), Instruments amending the Constitution and Convention of the International Telecommunication Union (Geneva, 1992) ITU, Geneva, 1995, ISBN 92-61005521-4
[12] Henri Wassenbergh, op. cit., at page 110
[13] The scope of this paper is limited to legal regulatory issues arising from international instruments regulating satellite telecommunications and international civil aviation. For discussions on the regimen relating to international trade in telecommunications services (including satellite based services) as well as the protection of copyrights, see: Andreas F. Lowenfeld, *International Economic Law*, Oxford University Press, 2002, at pages 125 to 131; World Intellectual Property organization: Intellectual Property Handbook.

Space Treaty[14], the combined effect of which impose responsibility on States Parties to the Treaty to ensure that any space activities performed by non-governmental entities are authorized and continually supervised by that State Party, in accordance with international law[15]. It was Stated[16] in 2003, that approximately 3,000 (three thousand) aircraft have been equipped with satellite communications systems. The majority being configured for *inter alia* non-safety aeronautical communications. In effect, the State of the art allows for the connection of onboard facilities with existing fixed networks e.g. domestic telephone networks, in addition to permitting the switching of connections to other aeronautical passenger facilities, thus enabling personal communications by/for passengers and crew. The range of communications services includes voice, and high-speed data communications. It is anticipated that this portfolio will be extended to include audio-visual services.

On the current State of the Regimen, one must therefore consider balancing the rights of sovereign States to regulate telecommunications conducted in their respective territories (including airspace), within the framework of their national laws and policies, against the need for satellite operators and their service providers of non-safety aeronautical communications service providers to comply with international as well as national legal and regulatory frameworks. This equilibrium ought to be achieved bearing in mind the fact that operators and their service providers deserve to gain competitive access to national markets under transparent and non-discriminatory regulatory procedures[17].

Bearing the above in mind, what has been defined by the International Telecommunication Union (ITU) as the AMSS offers digital voice and data services and was traditionally provided through the mobile satellite service radio-frequency bands 1 545 MHz - 1 555 MHz and 1 646.5 - 1 656.5 MHz. At the World Radio Conference (WRC) 2000 a Resolution 216 (*Possible broadening of the Secondary allocation to the mobile-satellite service (Earth-to-space) in the band 14-14.5 GHz to cover aeronautical applications*) to:

> …"Examine the possibility of broadening the secondary allocation to the mobile-satellite service (Earth-to-space), except aeronautical mobile-satellite, in the 14-14.5GHz band to include aeronautical use, if the ITU Radiocommunications Sector studies demonstrate that such a secondary service can be operated without causing interference to the primary services".

Technical studies conducted by the ITU concluded that appropriately designed AMSS systems can operate on a secondary basis in the 14-14.5 GHz band without causing harmful

[14] *Treaty on principles Governing Activities in the Exploration and Use of Outer Space, including the Moon and other Celestial bodies* (hereinafter Outer Space Treaty), London/Moscow/Washington, adopted 19 December 1966, opened for signature 27 January 1967, entered into force 10 October 1967, 610 UNTS 205.

[15] For a discussion on the extent to which the Outer Space Treaty and national law impacts on the activities of private entities, see Henri Wassenbergh, op. cit., at pages 22 to 31; Phillip Dan, *The Future Role of Municipal Law in Regulating Space Related Activities*, in *Space Law: Views of the Future,* (eds. Tanja L. Zwaan and Walter W.C. De Vries) Kluwer Law and Taxation Publishers, 1988, at pages 125 to 134; Frans G. Von der Dunk, *Public Space and Private Enterprise – The Fitness of International Space Law Instruments for Private Space Activities*, 1999 Proceedings of the Project 2001 – Workshop on Legal Issues of Privatising Space Activities, at page 12

[16] See ICAO Doc. AN-Conf/11-IP/1.AAgenda Item 7

[17] Tare Brisibe, *Policy and Regulatory Developments in Asia-Pacific after the GMPCS-MoU and the WTO General Agreement on Trade in services: A Case for GMPCS System Operators*, PTR, Volume 21 No. 3, 1st Quarter 2000.

interference to services having primary allocations in the band. Additional studies also showed the feasibility of AMSS systems sharing with services operating under secondary allocations in the said band. Consequently, a draft new Recommendation (ITU-R M.1643)[18] was approved at the WRC 2003. What is relevant to the thrust of this paper is that the Recommendation provides technical guidelines for operation and licensing of AMSS networks by States within the framework of their national laws and policies to ensure compatible operations with other services operating in the band.

With respect to the provision of audio-visual services[19] to aircraft we will recall that as far back as the 1960's, the medium of television gave rise to what has been described as an international awareness of both immense potential advantages that would permit the acceleration of national programmes of integration, economic development, health, agriculture, education, communal development and culture as well as potentially serious problems in the form of:

- Programmes deliberately transmitted from one State to another in order to achieve certain political objectives, e.g. propaganda, incitement and interference with internal affairs of another State;
- Programmes, which while not unfriendly, contain material or employ techniques that would be prohibited in the receiving States. This could include programmes containing violence or obscenity or even commercial advertising messages, particularly where subliminal advertising techniques might be employed;
- Programmes that are unwanted largely because they are foreign. This could include news or public information programmes that depict events from the viewpoint of the originating State. It could include programmes that serve to depict a foreign way of life in such a manner as to glorify that way of life or belittle the culture of others or to raise expectations in the receiving country.

At present, there is a deadlock in the process of developing international instruments to govern DBS. [20]

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[18] *Technical and Operational requirements for aircraft earth stations of aeronautical mobile-satellite service including those using fixed-satellite service network transponders in the band 14-14.5 GHz (Earth-to-space).*

[19] Also known as Direct broadcast satellite services) (DBS), are considered as "a radiocomunication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public. In the broadcasting satellite service, the term direct reception shall encompass both individual and community reception". See Article 1 paragraph 38, ITU Radio Regulations.

[20] *The Distribution of Programme Carrying Signals Transmitted By Satellite*, in *Manual on Space Law* (eds. N. Jasentuliyana and R. Lee) 1979, Oceana Publications, at pages 239 to 253; Jan Busak, *The Need for an International Agreement on Direct Broadcasting By Satellites*, 1 J. SPACE L. (1973) at pages 139-154; Aldo Armando Cocca, *The Supreme Interests of Mankind Vis-a Vis The Emergence of Direct Broadcast*; 2 J. SPACE L. (1974) at pages 83 to 94; Carl Christol, *The 1974 Brussels Convention relating to the Distribution of Programme Carrying Signals Transmitted By Satellite: An Aspect of Human Rights*, 6 J. SPACE L. (1977) at pages 19 to 35; P. Rainer, D. Gregory, R.V. Harvey, A. Jennings, *Satellite Broadcasting*, John Wiley & Sons, 1985, at pages 242 to 266; David Fisher, *Prior Consent to International Direct Satellite Broadcasting*, Martinus Nijhoff Publishers, 1990, pages 152 to 186; Carl Christol, *Space Law – Past, Present and Future*, Kluwer Law, 1991, at pages 115 to 130; M. Lesueur Stewart, *To See The World – The Global Dimension in International Direct Television Broadcasting By Satellite*, Martinus Nijhoff, 1991, pages 3 to 100.

As far as international civil aviation is concerned, non-safety aeronautical communications is subject to the provisions of the 1944 Chicago Convention as well as ICAO Assembly Resolution 36/1 (now known as Resolution A29-19) adopted at the 29th Session in 1992.More specifically, the Chicago Convention's Article 30(a) provides that:

> "Aircraft of each contracting State may, in or over the territory of other contracting States, carry radio transmitting apparatus only if a license to install and operate such apparatus has been issued by the appropriate authorities of the State in which the Aircraft is registered. The use of radio transmitting apparatus in the territory of the Contracting State whose territory is flown over shall be in accordance with regulations prescribed by that State".

Furthermore, Article 30(b) of the Chicago Convention provides that:

> "Radio transmitting apparatus may be used only by members States of the flight crew who are provided with a special license for the purpose, issued by the appropriate authorities of the State in which the aircraft is registered".

Previous attempts at interpreting[21] the provisions of Article 30(a) and 30(b) of the Chicago Convention and how these Articles apply to S-APC were made in 1989. The results of a comprehensive study led to the passing of ICAO Assembly Resolution 36/1 (now known as Resolution A29-19) adopted at the 29th Session in 1992 referred to hereinbefore. The issue therefore is whether the said Articles of the 1944 Chicago Convention and the relevant ICAO Assembly Resolution constitute the most appropriate international legal basis for States to implement national laws regulating non-safety aeronautical communications, considering advances in technology prevailing in the new millennium.

II. Institutional and Legal Issues relating to Navigation[22]

Future and current navigation providers include the Global Positioning System (GPS) (United States), the Global Navigation Satellite System (GLONASS) (Russian Federation) and Galileo (European Union). Regional or augmentation system providers include GPS AND Geo-Augmented Navigation System (GAGAN) (India), the European Geostationary Navigation Overlay Service (EGNOS) (European Union), the Wide-Area Augmentation System (WAAS) (United States), the Multi-Transport Satellite-Based Augmentation System (MSAS) (Japan), Beidou (China)[23].

In this regard, the ICAO Assembly Resolution A32-20, paragraph 5, had instructed the Council and the Secretary General, within their respective competencies, and beginning with a Secretariat Study Group, to:

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[21] See ICAO Doc. LC/28-WP/4-1 4/11/91. Report of the Rapporteur on the Legal Aspects of the Global Air-Ground Communications; Milde M. *United Nations Convention on the Law of the Sea – Possible implications for International Air Law*, Annals of Air & Space Law, 1983, Vol. VIII, pages 167 – 200.

[22] See generally, Paul B. Larsen, *Global Navigation Satellite Systems: Universal Technology Under Divisive Legal Regimes*, Vol. XXVII Annals of Air & Space Law, 2002 at pages 387 to 399; Michael Milde, *Institutional and Legal Problems of the Global Navigation Satellite System (GNSS): Solutions in Search of a Problem*, in *The Utilization of the World's Air Space and Free Outer Space in the 21st Century*, (eds. Chia-Jui Cheng and Doo Hwan Kim), Kluwer Law International, 2000, pag. 337 to 357.

[23] UN Doc. A/AC.105/846, 30 March 2005, at page 5. (Report on the United Nations/United States of America International Meeting on the Use And Applications of Global Navigation Satellite Systems).

a) Ensure the expedited follow-up of the recommendations of the Worldwide CNS/ATM Systems implementation Conference, as well as those formulated by the Panel of Legal and Technical Experts on the Establishment of a Legal Framework with Regards to GNSS especially those concerning institutional issues and questions of liability; and
b) Consider the elaboration of an appropriate long-term legal 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 consideration by the next ordinary session of the Assembly.

It is on record that the Secretariat Study Group on Legal Aspects of CNS/ATM Systems held five meetings between April 1999 and March 2001[24]. Based upon the progress report described above at the 33rd Session, it was decided *inter alia*:

a) That further work on the legal aspects of CNS/ATM systems be carried out so as to finalize the concept of a contractual framework for CNS/ATM as an interim framework and provide a path toward its implementation, including the consideration of an international convention, having regard to the following guidance to:
   1) be mindful of States' reliance on others to provide all or part of their CNS/ATM services;
   2) consider carefully the kinds of relationships States should have with providers of services or elements of services; and
   3) ensure that States retain full responsibility under the Chicago Convention for services provided on their behalf; and

b) That a report be presented to the next ordinary session of the Assembly.

Pursuant to this decision, the Secretariat Study Group on Legal Aspects of CNS/ATM systems finalized its work in January 2004. It reports to have reviewed the current legal framework applicable to CNS/ATM systems, identified certain inadequacies, discussed in detail a contractual framework for the systems, and studied the possibility of an international convention for this purpose[25]. Specific details of progress made to date include the production of a *Charter on the Rights and Obligations of States Relating to GNSS Services* (Assembly Resolution A32-19) and a *Statement of ICAO Policy on CNS/ATM Systems Implementation and Operation* (approved by the Council on 9 March 1994). The report noted the general agreement that there is no legal obstacle to implementation of CNS/ATM and that nothing in the concept is inconsistent with the Chicago Convention. The Group also found no substantive gaps in the major national liability[26]

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[24] ICAO Doc. A33-WP/34, Progress Report on the Establishment of a Legal Framework with regard to CNS/ATM Systems including GNSS

[25] The final report on the work of the Secretariat Study Group on Legal Aspects of CNS/ATM systems is set out in *Final Report on the Work of the Secretariat Study Group on Legal Aspects of CNS/ATM Systems*, the Appendix to Doc. A35-WP/75, 28/07/04.

[26] Cf discussions pertaining to possible liability scenarios for satellite navigation services, by: Francis P. Schubert, *An International Convention on GNSS Liability: When Does Desirable Become Necessary?*, Vol. XXIV Annals of Air & Space Law, (1999) at page 245; Michael Milde, op. cit., Supra note 23 at pages 354 to 356; Frans G. von der Dunk, *Galileo and Liability: Towards a Coherent System*, IBA Newsletter of Outer Space Committee of the Section on Business Law, Vol 5 No. 2, August 2003 at pages 5 to 15; Frans G. von der Dunk, *Liability for Global Navigation Satellite Services: A Comparative Analysis of GPS and Galileo*, 30 J. SPACE L. (2004) at pages 129 to 167.

systems it studied to the exception of two specific and limited procedural concerns having to do with sovereign immunity and inconvenient forums for claims in some countries.

In addition, the Report reflects consideration of a contractual framework involving detailed discussions aimed at concluding a set of contractual clauses in the form of a "*Draft Contractual Framework Relating to the Provision of GNSS Services*". No consensus was reached on this issue. With regards to an international convention it is Stated that there were two schools of thought in the Study Group regarding an international convention as a long-term legal framework to govern the operation of GNSS systems. One was that, at present, not enough experience had been gained with the implementation of CNS/ATM systems, and GNSS in particular, and that it was therefore premature at this point to elaborate and draft an international convention. The other was that an international convention was necessary and desirable. Whether or not an international convention is necessary at this time remains moot.

Conclusions

It is submitted that the global nature of non-safety aeronautical communications and navigation can only be efficiently regulated within a framework that is uniform on as wide a scale as possible. Furthermore, technological developments, in the non-safety aeronautical communications service sector of the mobile-satellite industry is witnessing the coming together of what were previously thought of as separate actors, namely, telecommunications, information technology and media. This development has brought to the forefront a challenge to law and regulation. Both the *International Agreement on the Use of INMARSAT Ship Earth Stations within the Territorial Sea and Ports of 1985*[27] as well as the *Global Mobile Personal Communications By Satellite Memorandum of Understanding & Arrangements*[28] have enabled a fair amount of success in providing a uniform framework for the respective services which they seek to regulate, i.e. maritime mobile-satellite services and land mobile-satellite services, respectively. It is therefore appropriate for this author to recommend that a specific and comprehensive multilateral instrument formulated specifically for non-safety aeronautical mobile-satellite services, within the remit of an appropriate institutional authority of a binding nature, supplemented by national laws, would provide lasting solutions.

With respect to GNSS, it is also submitted that what may be of immediate relevance to the African region is the feasibility of harmonising the provision of GNSS systems (in the context of the global CNS/ATM plan) applications under "one African Sky" similar to the "Single European Sky" as recommended by the Action team on GNSS established pursuant to the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III)[29]. According to Article 28 of the Chicago Convention, States are required to provide air navigation facilities, systems and procedures within their territory. In pursuance hereof, States are responsible for the provision and maintenance of air navigation facilities. Likewise, States bear responsibility for the utilization of those facilities to provide air navigation services to aircraft flying over, into or out of their airspace. While States have retained

[27] The primary objective of the contracting parties was the stipulation of reciprocal rights and duties with a view to facilitating the circulation of satellite communications terminals employed on maritime platforms.
[28] Under the GMPCS MoU and Arrangements the States participating in the Agreement undertook primarily to adjust their national laws and practices to international licensing standards, through the mutual recognition of type approval procedures between States in order to achieve uniformity in the field of facilitation of mobile-satellite services.
[29] UN Doc. A/AC.105/846, 30 March 2005, at page 9. (Report on the United Nations/United States of America International Meeting on the Use And Applications of Global Navigation Satellite Systems).

their sovereignty different types of international organizations have been set up over the years to undertake specific activities.

The FANS II defined three major institutional concepts which had a bearing on the level of acceptability of the CNS/ATM system and consequently on the level of global implementation of the identified options. The three concepts identified were ownership, control and operation.

a) FANS considered ownership to be the quality to have or hold CNS/ATM including GNSS space segment or ground based infrastructure as property, which provides the owner with a number of rights and obligations, within the boundaries of laws, regulations and agreements.
b) Control, on the other hand, was perceived as providing the competence to exert control over policy and to define the framework for operations. Exerting control means, for example to influence standard-setting, and to define procedures and financing arrangements.
c) Operation is the provision of a CNS/ATM including GNSS system and the related services in compliance with ICAO Standards and Recommended Practices. The operator of the space or ground based infrastructure is tasked with day to day management responsibilities. The operational functions may include technical management, financial management and commercial management.

What can be distilled from the FANS implementation options is that although ownership of the GNSS system is not the most essential element, dependence on an inaccurate and single State system is not conducive to safety of international air navigation nor acceptable to States. An effort could therefore be made to ensure a global civil owned and accurate GNSS system. Alternatively, or as a transitional measure, regional augmentation systems could be implemented and eventually interconnected to achieve the ultimate goal of a seamless airspace. A number of implementation options are therefore left open to African States without prejudice to the functions of ASECNA (The Agency for Air Navigation Security in Africa and Madagascar) of which 16 African countries are members States.

Legal and Regulatory Considerations in Aeronautical Communications and Navigation

Tare Brisibe

National Space Research and Development Agency
Nigeria

November 2005

Summary

- PART I – Overview of the Global CNS/ATM System
- PART II - Mobile Satellite Services
  - Aeronautical Mobile Satellite Services (AMSS)
  - Legal and Regulatory Issues
- PART III – Global Navigation Satellite Services (GNSS)
  - Operators
  - Legal and Regulatory Issues
- PART IV - Recommendations

A Brief Survey of Remote Sensing Law Around the World

U.N./Nigeria Workshop on Space Law

Presented by
Prof. Joanne Irene Gabrynowicz

23 November 2005

National Remote Sensing and Space Law Center
University of Mississippi School of Law
www.spacelaw.olemiss.edu

Legal Regimes Considered

- Argentina
- Australia
- Bangladesh
- Canada
- Chile
- China
- Europe (ESA)
- France
- Germany
- India
- Israel
- Japan
- Malaysia
- Russian Federation (CIS)
- South Africa
- Sweden
- Ukraine
- United Kingdom

Overview

- Preliminary findings
  - Research needed
- General, global observations
- Major remote sensing nations
  - Canada, Europe, France, India, Japan, Russian Federation
- Non-remote sensing nation
  - Ground segment focused law: UK
- Emerging space law with no remote sensing specifics
- Emerging remote sensing specifics

General Observations

- **Most**
  - General space laws
  - Launch, safety, sovereignty and liability
- **Few**
  - Address remote sensing/EO and data issues
  - More often through policy directives or something similar
  - Not legislation
- **All**
  - Express agreement and compliance with UN treaties and affect on domestic space activities, laws and policies

General Observations

- Those with no or pending legislation
  - Driving force of legislation initiatives are compliance with treaties and international obligations
- U.S. law is apparent standard
  - Not to the "letter" of the law but with due consideration
- Hybrid public - private environment
  - Law will not change this
- Space segment vs. ground segment
  - Satellite vs. data focus
    - U.S. vs. Europe, for example

Canada

- Operations and data
  - Access Control Policy
    - Government intends to give legal effect to new regulatory regime for commercial systems operations
- *Radarsat* private sector partner contractually obligated to comply with policy pending legislative enactment
- Bill C-25 received Royal Assent on 25 November 2005
  - Now law
  - Opponents have connected it to missile defense issues
- Very similar to U.S. regulations
  - Case-by-case review; "shutter control"; tasking records; notify re: substantial foreign agreements and change in operational characteristics; need permission to transfer ownership,etc.

Europe

- **Operations and data inextricably intertwined**
  - No private systems or licensing, per se
  - "commercial" means <u>what</u> is done, not <u>who</u> does it
  - Hybrid public - commercial systems
    - Government systems operate commercially
- Data driven, not space segment
  - E.g.: satellite image = "data base"
  - Database Protection Directive
  - Stresses user payment for operations
- Multilateral agreements on satellite-by-satellite basis

France

- Contractual and administrative legal regime
  - No legislation
  - National common law, both public and private
  - Legal terms and conditions in a departmental report
- "Commercial" systems could be addressed by legal framework when "relevant"
  - *SPOT* is "privatized" not "commercial"
- Data driven
  - Focus: return on investment of public funds
  - Open civil regime
    - May be temporarily or permanently classified for national security
      - Case-by-case review

India

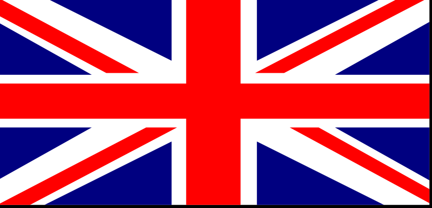
- Remote sensing data policy, no law
  - Comprehensive
  - Acquisition and distribution from Indian and foreign satellites for civilian users in India
  - Data is a public good
  - No provisions for operating licenses
- Allows sale of commercial 1-m imagery
  - Controls distribution
  - Military sites removed from Ikonos images before domestic distribution
- Same requirement for 5.8-meter imagery from India’s own satellites

Japan

- U.N. Principles
  - Only legal instrument directly related to Earth observations
- Applicable relevant national laws
  - All space activities limited to exclusively peaceful purposes
- Commercial operators
  - No legal restrictions
  - No licenses required
  - No reporting requirements
- Data rights
  - NASDA retains all IP rights to government data
    - Dissemination not to interfere with commercial activities

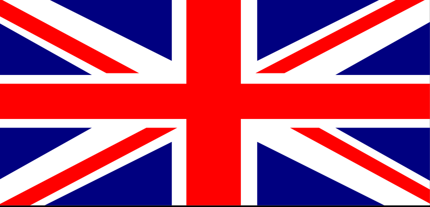
Russian Federation (CIS)

- Operations
  - Broad federal legislation
  - Licensing, certification, liability, safety, insurance and government control
  - License is required, few specifics: insurance
  - Protects IP and commercial secrets of foreign entities operating under Federation's jurisdiction
  - Remote sensing includes environmental monitoring and meteorology
- Sale of high resolution satellite imagery
  - Conflicts between intelligence and commerce
  - Requests for lists of available images and image orders have been denied, delayed and canceled due to national secrecy
    - Particularly pre - 1992
- Different rules over time



United Kingdom

- Ground-segment focus
  - Space segment focus follows later
- House of Lords
  - "Main effort should be ground and user segment"
  - Specialize in radar
  - National data distribution network
  - Support postgraduate education in remote sensing and digital cartography
- National legislation
  - No mention of remote sensing
  - Authorizes government to require licenses



United Kingdom

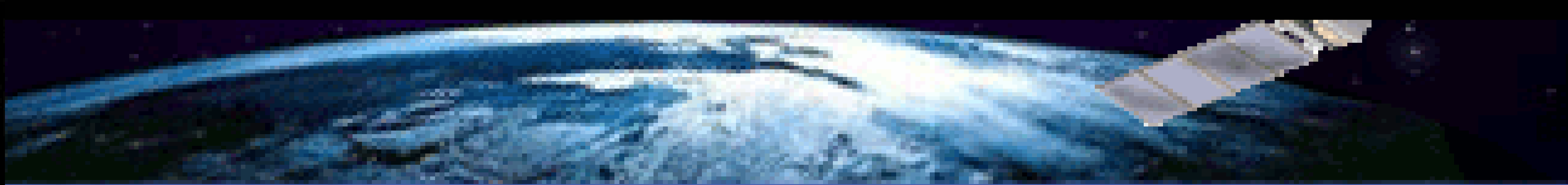
- Recent move to establish licensing for launching and operating "space objects"
  - Goal: no cost to government
  - New Challenge: Virgin Galactic/Branson
- Licensee must
  - Allow inspection and testing of facilities and equipment
  - Provide requested info on nature, conduct, location, and results of activities
  - Get approval to change orbital parameters
  - Notify regarding unintended deviations

Emerging Space Law
No Remote Sensing Specifics

- Argentina
  - Existing legislation
- Chile
  - Executive orders
- Germany
  - Internal discussion paper; regulations most likely will not include remote sensing
- South Africa
  - Authority exists to promulgate regulations

Emerging Remote Sensing Specifics

- Australia: primarily launch activities, new remote sensing regulations being formulated
- Bangladesh: remote sensing is "peaceful use"
  - Requires prior government "sanction'
  - Allows distribution of data
  - Seeks international cooperation with and policy models of other nations
- Sweden: operating licenses required



Bi and Multilateral Agreements

- Important source of customary law
- Evolving on satellite by satellite basis
  - Initial Joint Polar System/Joint Polar System
  - Radarsat
  - Envisat
  - ERS 1
  - ERS 2
  - Eumetsat series
  - Disaster Monitoring Constellation

A New Trend:
Developing Nations as Sensing States

- Stark dichotomy that always coupled "sensing State" with "developed nation" and "sensed State" with "developing nation" has shifted
- *African nations are now sensing states*
  – Nigeria, Algeria
- Other developing nation/sensing states include Argentina, Brazil, India, Turkey

A New Trend: Growing Global Monitoring Activities

- Group on Earth Observations (GEO)
- Global Monitoring for Environment and Security (GMES)
- U.N. Space Technology Disaster Management (STDM) program
- All intend to build upon the Disasters Charter
  - 84 responses since 2000
  - Nations changed satellite tasking
  - Provided timely, critical data
  - At no cost
  - To nations suffering hurricanes, floods, oil spills, earthquakes, landslides and volcanic eruptions
  - Activated by/for Algeria, Austria, Canada, Congo-DRC, Eastern Namibia, France, Germany, Italy, Morocco, Russia, Senegal, Sri Lanka, Sweden, Switzerland, U.S., among others
  - Building evidence of practice

A New Trend:Growing Global Monitoring Activities

- Disaster Monitoring Constellation now a Charter member
  - Algeria, Nigeria, Turkey, UK
- Adds to the growing presence of developing nations as sensing States
- Significantly, ***25% of the satellites to which Charter members have access are from developing nations***
- Approximately 63% of the activations have been for the benefit of developing nations

Significance of the Trends Together

- As sensing states, ***developing nations can now influence the development of the law***
- Can use sensing state status to
  - take action to establish evidence of State practice
    - to enhance and protect the right to access data from other sensing states
    - influence and establish evidence of State practice regarding sensing practices

Significance of the Trends Together

- **Establishing evidence of State practice**
  - **Present *regular, consistent, formal claims* to appropriate officials of sensing States and companies**
    - **letter from head of the sensed State's Foreign Ministry, State Department, or other appropriate official**
      - ***invoke the UN Principles and claim* any imagery/data collected regarding the territory under the sensed State's jurisdiction.**
      - ***Repeat official inquiries* two or three times a year, or whatever interval is deemed appropriate**
  - **Engage in bilateral, multilateral and regional agreements designed to establish evidence of State practice in accessing data by *creating a record of access and defining terms and practices***

UNITED NATIONS WORKSHOP ON SPACE LAW

ITU Regulations and Procedures

Presentation by

Shola TAYLOR

CEO, Kemilinks International

23 November 2005

Outline of Presentation

- Introduction to Kemilinks International
- The ITU

The ITU in brief

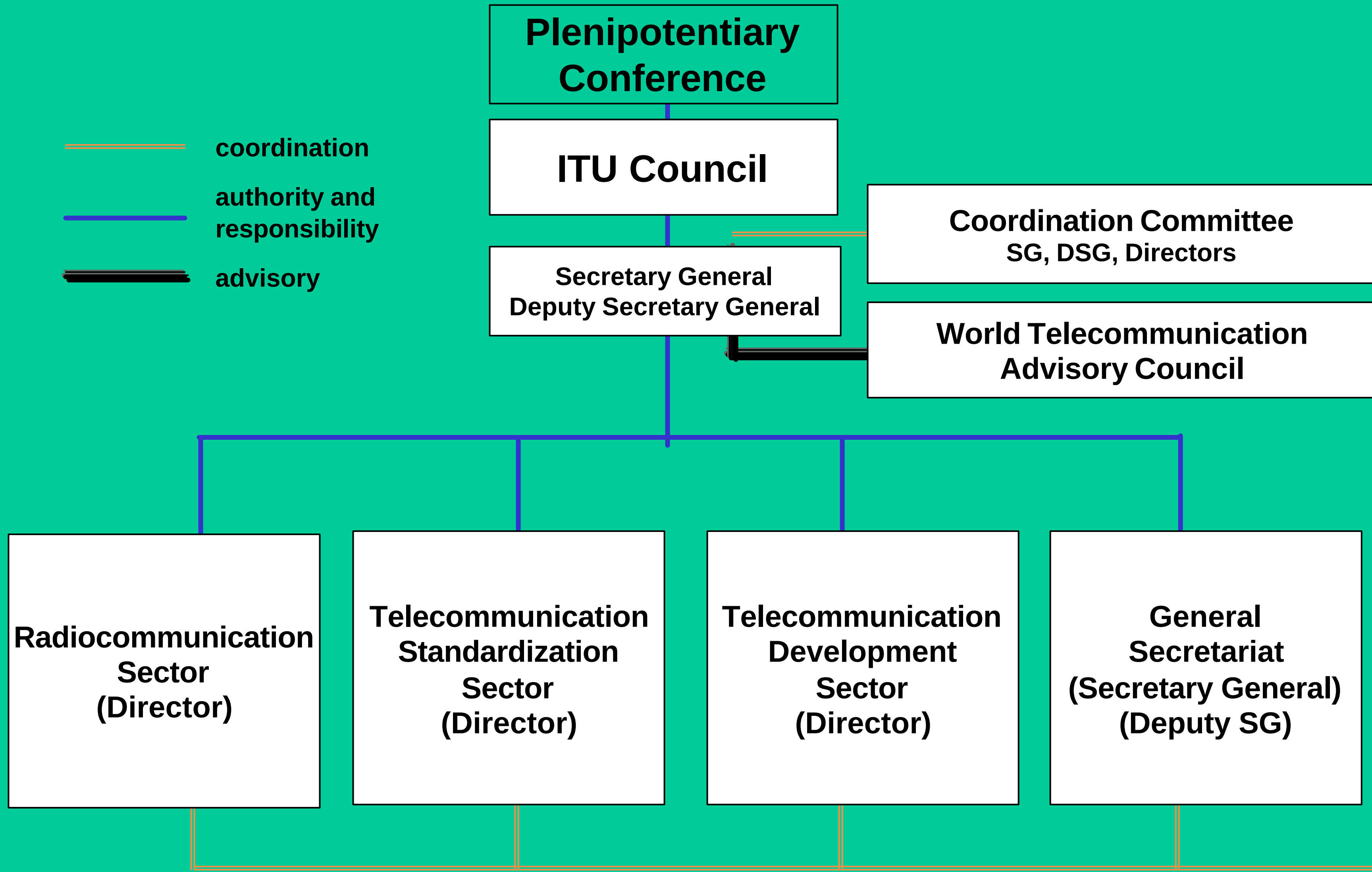
- Founded 17 May 1865
- Specialised United Nations (UN) agency
- Coordination of telecom networks & services globally
- Currently 189 Member States
- Plus 650 Sector Members (mainly private organisations)
- 750 staff / 71 nationalities

ITU Structure (I)

- Plenipotentiary Conference
- ITU Council
- ITU Sectors :
  - Telecom Development Bureau (BDT)
  - Bureau for Standardisation (TSB)
  - Radiocommunication Bureau (BR)
- General Secretariat

ITU Structure (II)

- World Radiocommunication Conferences/Regional RadioCommunication Confernces
- Radiocommunication Assemblies and Study Groups
- Telecommunication Standardization Assembly
- World Development Conference/Regional Preparatory Conferences



Plenipotentiary Conference
ITU Council
coordination
authority and responsibility
advisory
Coordination Committee
SG, DSG, Directors
Secretary General
Deputy Secretary General
World Telecommunication Advisory Council
Radiocommunication Sector (Director)
Telecommunication Standardization Sector (Director)
Telecommunication Development Sector (Director)
General Secretariat (Secretary General) (Deputy SG)

Legal Framework

- United Nations Outer Space Treaty (1967) - Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space , including the Moon and Other Celestial Bodies 20.01.1967
- ITU

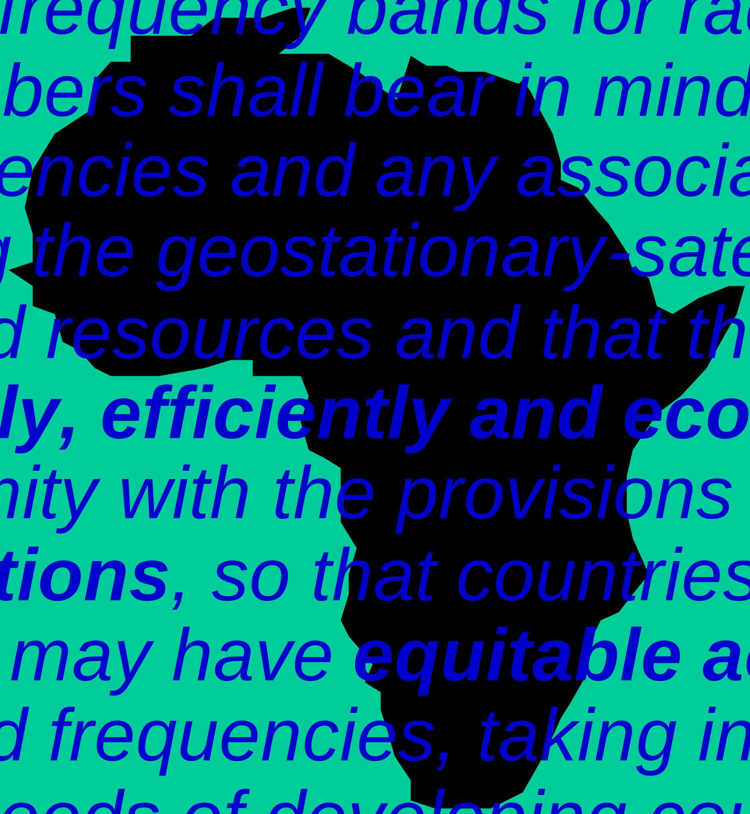
UN Outer Space Treaty 1967

- free for exploitation and use by all States
- not subject to national regulations
- use in conformity with international regulations
- no individual ownership; it is a common natural resource
- States retain jurisdiction and control over objects they have launched into outer space
- basis for ITU Regulations

ITU Legal Framework

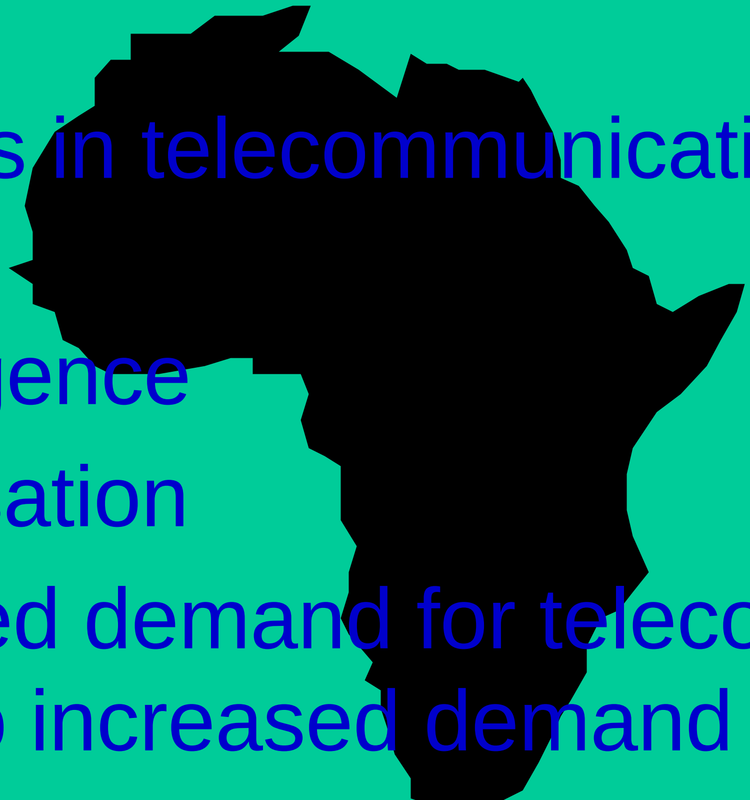
- ITU Constitution
- ITU Convention
- ITU Radio Regulations
- ITU Rules of Procedures
- ITU-R Recommendations
- Basic Principles
  - frequency allocations
  - rights and obligations of States
  - international recognition of rights through recording in MIFR

ITU Constitution No 196 – Art 44



"In using frequency bands for radio services, Members shall bear in mind that radio frequencies and any associated orbits, including the geostationary-satellite-orbit, are limited resources and that they must be ***rationally, efficiently and economically,*** *in conformity with the provisions of the* ***Radio Regulations****, so that countries or groups of countries may have* ***equitable access*** *to those orbits and frequencies, taking into account the special needs of developing countries and the geographical situation of particular countries"*

Challenges

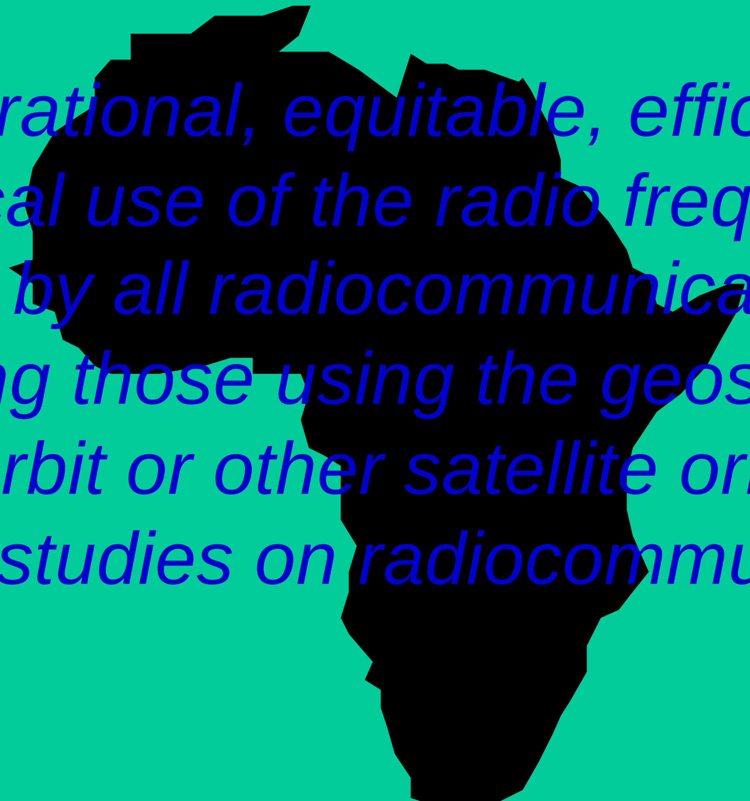


- Changes in telecommunications services
- Convergence
- Liberalisation
- Increased demand for telecom services lading to increased demand for spectrum

ITU-R

- World Radiocommunication Conferences
- Radiocommunication Assembly
- Radio Regulations Board
- Radiocommunication Advisory Group
- Space services
- Terrestrial services
- Study Groups
- Publications
- Seminars and Information meetings
- Cooperation with other Sectors

Mission



“To ensure rational, equitable, efficient and economical use of the radio frequency spectrum by all radiocommunication services -- including those using the geostationary satellite orbit or other satellite orbits -- and to carry out studies on radiocommunication matters”

World Radiocommunication Conferences (I)

- Forum for international agreement on use of radio spectrum and satellite orbit
- Attended by Administrations and observers
- Held every two to three years
- Update the Radio Regulations
  - Spectrum Allocation
  - Notification procedures
  - Administrative and Operational Procedures

World Radiocommunication Conferences (II)

- WRC-03 (9 June – 4 July 2003)
  – 2334 participants from 145 Member States
  – 48 agenda items
- Various innovations
  - simplification of procedures
- Adopt Resolutions

Radiocommunication Assembly

- Held in conjunction with a WRC
- Approve ITU-R Recommendations
- Adopt a work program for the ITU-R Study Groups
- Adopt work procedures

Radio Regulations Board (RRB)

- 12 Part-time Members
- Four meetings/year in Geneva
- Adopts Rules of Procedures to facilitate the application of the Radio Regulations

Radio Regulations Board (RRB)

- Rules of Procedure
  - Draft prepared by BR or Administrations in cases where Radio Regulations are not sufficiently clear
  - Adopted by RRB
  - Applied by BR to process notifications
  - Could be used by competent WRCs to improve Radio Regulations

Planning Procedures

- A priori planning
  - guarantees equitable access to orbit and spectrum resources for *future* requirements
- Coordination Procedures
  - to ensure efficient use of orbit and spectrum resources and interference free operation satisfying *actual* requirements

A priori planning procedure

- Allotment Plan for FSS
  - part of 4/6 & 10-11/12-13 GHz band (Appdx 30B)
- BSS Plan
  - 11.7-12.7 GHz (Appdx 30A)
  - associated Plan for feeder links (14 & 17 GHz bands – Appdx 30A)
- Plans provide orbital position, frequency spectrum and service area (usually country territory)

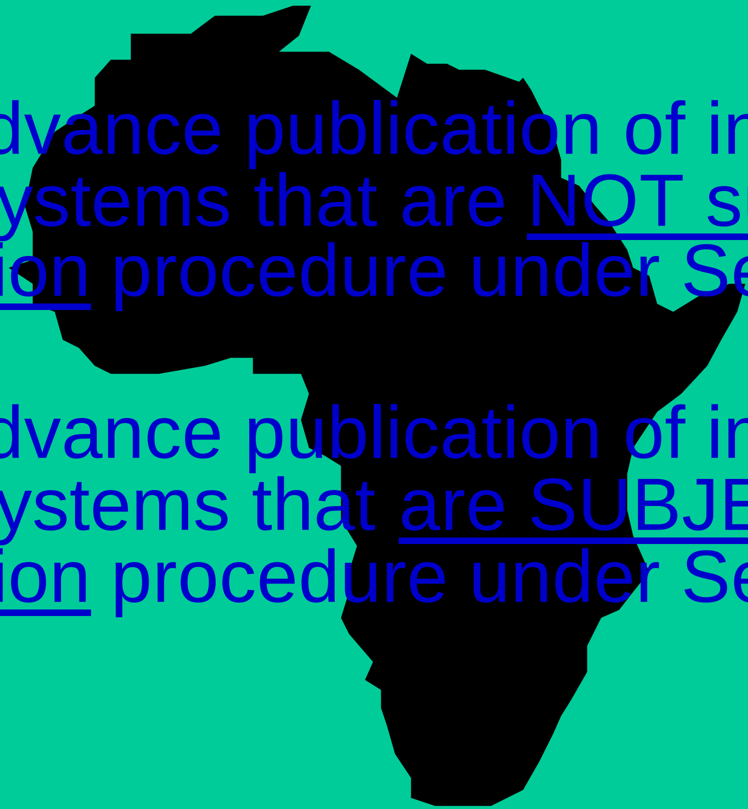
Coordination procedures

- Principle of FCFS
- All coordination procedures consolidated in
  - Art 9 of RR (procedures for effecting coordination with or obtaining agreement of other administrations)
  - Appdx 4 (various data to be supplied)
  - Appdx 5 (criteria for identification of Admn with which coordination is required)
- Provisions detailing Notification requirements
  - Art 11
  - Resolution 33
- Three basic steps in provisions
  - Advance Publication, Coordination and Notification

Advance Publication (I)

- Inform all Adms of any planned satellite network and general description
- Formal mechanism for making initial assessment of the interference effects of that planned satellite network

Advance Publication (III)



- 1A: Advance publication of information on satellite systems that are NOT subject to coordination procedure under Section II of Article 9
- 1B: Advance publication of information on satellite systems that are SUBJECT to the coordination procedure under Section II of Article 9

API (IV)

- BR publishes Special Section API/A
- No priority in being first to start advance publication
- Starts the regulatory clock
- Must be re-started:
  - for new frequency band(s)
  - for a change of GSO orbital location by > 6 degrees

Coordination

(Sec II, Art 9)

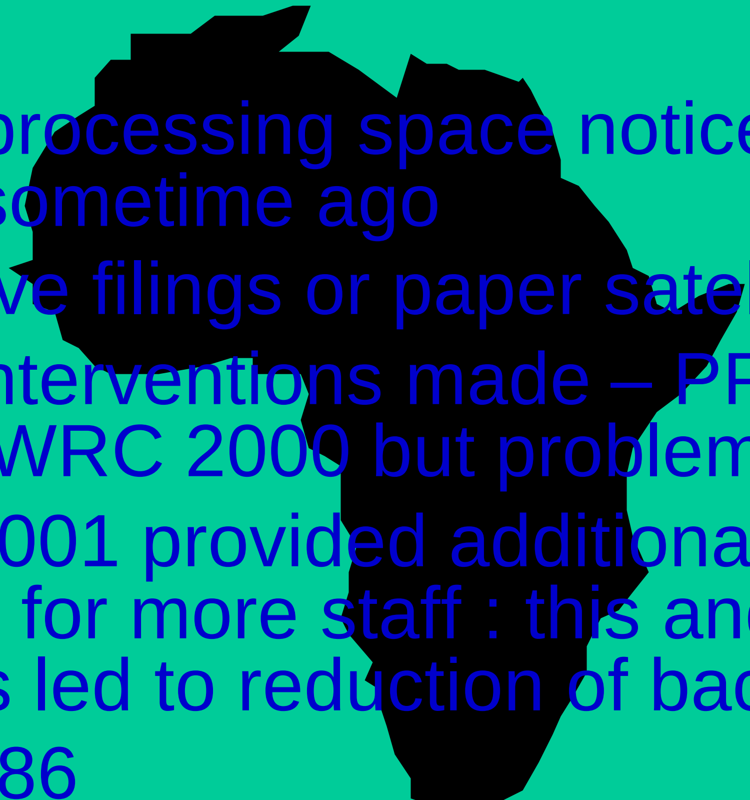
- Regulatory obligation
  - Adm seeking to assign frequency assignment in MIFR)
  - Adm whose existing/planned services affected by assignment
- Agreement confers rights and imposes obligations on both Adm

Notification

(Art 11)

- Final regulatory step to record frequency assignment in MIFR (Master Register)
- Art 6 (CS 37) provides obligations of Adms to abide by Const & Convention

Satellite Network Filings



- Delay in processing space notices became a concern sometime ago
- Speculative filings or paper satellites
- Various interventions made – PP94, PP98, WRC99, WRC 2000 but problem persisted
- Council 2001 provided additional budget allocation for more staff : this and other measures led to reduction of backlog
- Council 486
- Council decision Rev 2005

Regulatory Mechanisms (Control of interference)

- **Allocation** : Frequency separation of stations of different services
- **Power Limits** : PFD to protect TERR services / EIRP to protect SPACE services / EPFD to protect GSO from Non-GSO
- **Regulatory protection** e.g. No. 22.2: Non-GSO to protect GSO (FSS and BSS)
- **Coordination** between Administrations to arrive at interference-free operation / Process and Procedure described in RR

Assistance from ITU

- BR may provide assistance during coordination procedures of sat networks or an earth station
- Art 13 contains provisions for assistance wrt to Art 9, 11 and Appdx 30, 30A and 30B
- Assistance open to both parties – requesting Adm and Adm receiving coordination request

RECENT DEVELOPMENTS IN PATENTS FOR OUTER SPACE ACTIVITIES

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- General Counsel, Intellectual Property, Eurospace

Alenia SPAZIO

ALCATEL SPACE

General outline

HISTORY OF PATENTS

FOUNDING PHILOSOPHY OF PATENTS : example : US Constitution

- **QUICKENING PACE OF COMMERCIAL SPACE – WORLD ECONOMIC DEVELOPMENT**
- **INCREASING IMPORTANCE OF PATENTS**
- **SOME EXAMPLES OF SPACE PATENTS AND THEIR USE**
- **LEGAL CONSIDERATIONS FOR SPACE PATENTS**
- **DIFFICULTIES OF APPPLYING INTELLECTUAL PROPERTY RIGHTS IN SPACE**
- **FORUM SHOPPING ?**
- **POSSIBLE SOLUTIONS – RECENT DEVELOPMENTS**
- **POSSIBLE FUTURE EVOLUTION**

IPR Origins in domestic law

1624. Statute of Monopolies, Great Britain

1787. US Constitution, Art. I, sect. 8, para. 8

10 April 1790. First US patent law

31 July 1790. First US patent delivered

7 January 1791. First French patent law

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IPR Origins in domestic law

EXCERPT FROM THE U.S. CONSTITUTION

"Congress shall have power ...

<u>to promote the progress of science</u> and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries ".

1787. US Constitution, Art. I, sect. 8, para. 8

IPR Considerations

- Intellectual Property is firstly Intellectual, fruit of human mental creativity.
- Intellectual Property is secondly Property, it belongs to someone.
  - Initially property of the creator, IPR is quite often assigned to a third party.
- Intellectual Property Rights (IPR) are the legally recognised rights of the property owner.
  - The first recognised right is that of the owner to forbid others from using the IPR.
  - The second recognised right is to make transactions for consideration.
    - Examples include sale, assignment, lease, license, collateral, technology transfer.
    - The owner may also undertake legal proceedings to obtain a transaction.

SATELLITES AND WORLD ECONOMIC DEVELOPMENT

1. INTELSAT TREATY ORGANISATION : UNIVERSAL SERVICE TELECOMS

2. INMARSAT TREATY ORGANISATION : MARITIME, THEN LAND MOBILE

3. REGIONAL TELECOMS & METEO : EUTELSAT, EUMETSAT

4. EARTH OBSERVATION SATELLITES HAVE MULTIPLE APPLICATIONS :

METEROLOGY, AGRICULTURE, NATURAL RESOURCES, DISASTER RELIEF

5. LOCALISATION AND NAVIGATION AIDS : GPS, GALILEO

6. EXPLOSION OF APPLICATIONS LEADS TO MAJOR PRIVATE INVESTMENTS :

PRIVATE SPENDING EXCEEDED PUBLIC SPENDING FOR FIRST TIME IN 1998.

QUICKENING PACE OF COMMERCIAL SPACE

SPACE INDUSTRY ANNUAL TURNOVER IN TENS OF BILLIONS OF DOLLARS

EXAMPLE : SATELLITE CONSTELLATIONS—MULTIBILLION DOLLARS INVESTMENTS

- **MOTORLA IRIDIUM : $5 BILLION FOR 66 LEO SATELLITES**
- **GLOBALSTAR : $5 FOR 48 LEO SATELLITES**
- **ICO GLOBAL COM : $4.7 BILLION FOR 12 MEO SATELLITES**
- **SKYBRIDGE : $ 4.5 BILLION FOR 80 LEO SATELLITES**
- **TELEDESIC : $ 9-10 BILLION FOR 266 LEO SATELLITES**
- **GALILEO : ESTIMATED AT $3.5 BILLION FOR 30 LEO SATELLITES**

--> INCREASING IMPORTANCE OF PATENTS

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SOME EXAMPLES OF LICENSING CONDITIONS AFTER LITIGATION

VOLUNTARY LICENSE CONDITIONS ARE MOST OFTEN CONFIDENTIAL.

WE CAN ONLY KNOW WHAT'S PUBLISHED AFTER COURT BATTLES.

- **SPACE SYSTEMS LORAL vs. COMDEV**

Plaintiff SS/L settled for $ 3 M plus 100 % royalty levied on product, +4% on qualified bids for tender, whether product actually sold or not

- **HUGHES AIRCRAFT COMPANY vs. US GOVERNMENT**

Plaintiff HAC awarded nearly $ 1 Billion in damages after appeal on 84 infringing satellites, and settled for undisclosed amounts from European entities

- **TRW vs. ICO GLOBAL COMMUNICATIONS**

Plaintiff TRW settled for $ 150M in equity, ICO then went bankrupt for $ 500M




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OTHER RECENT PATENTS WHICH MAY RAISE PHILOSPHICAL ISSUES

-

NORTEL'S PSUEDO-GEOSTATIONARY ORBITS

TELEDESIC'S FREQUENCY SHARING LEO – GEO

SS/LORAL'S "GSM IN THE SKY"

“COMSAT MANŒUVRE” FOR END OF LIFE

MOTOROLA'S LEO "SMART SATELLITE" CONSTELLATION (IRRIDIUM)

SPECIFIC POINTS OF OUTER SPACE LAW & IP LAW

-

1. UN OST OF 1967 ON PEACEFUL USES OF OUTER SPACE

art. 1 : EXPLORATION AND USE FOR THE BENEFIT OF ALL COUNTRIES

art. 2 : NOT SUBJECT TO NATIONAL APPROPRIATION BY SOVREIGNTY CLAIM

2. INTELLECTUAL PROPERTY RIGHTS GRANTED BY A STATE GENERALLY VALID ONLY IN THAT STATE'S TERRITORY

<u>HOW TO RECONCILE SPACE LAW AND INTELLECTUAL PROPERTY LAW ?</u>

-

- **SPACE LAW IS EXTRATERRITORIAL, IP LAW IS TERRITORIAL**
- **SPACE LAW SAME FOR ALL STATES, IP LAW DIFFERENT IN EACH STATE**
- **SPACE LAW IS EXTRATERRESTRIAL, IP LAW IS TERRESTRIAL**
- **SPACE LAW SAYS SHARE BENEFITS, IP LAW GRANTS A MONOPOLY**




DIFFICULTIES OF APPLYING IP LAW TO OUTER SPACE ACTIVITIES

1. **MAJOR PUBLIC FUNDING : WHO HAS THE RIGHT TO CLAIM A MONOPOLY**
2. **IP LAW IS TERRITORIAL : WHICH NATION'S LAW APPLIES IN OUTER SPACE ? To complicate further, consider the case of space activities of multinational corporations and multinational cooperations. Which jurisdiction or control ? What about transfers of title between entities belonging to different states ?**
3. **CONSIDER TRANSBORDER CONSEQUENCES OF ANY NATIONAL LEGAL ACTION.**
4. **PROMISCUITY OF SPACE INDUSTRY PLAYERS : Due to the limited number of players and programs, Competitors on one program will be : -- Partners on another program, -- Customers on another, and/or -- Subcontractors on another.**
5. **DIFFICULTIES TO DETECT INFRINGEMENT ON ORBIT OR IN FACTORY**




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IPR in Outer Space : what does it mean ?

♦ **IPR are legal rights granted to the Owner by a State :**

➔ **The Owner of such rights may seek enforcement in that State ;**

➔ **Logically, "IPR in Outer Space" means rights which a State is ready to grant which may have effect in Outer Space. But enforceable in the State.**

♦ **The right then becomes that the owner forbids others from using the IPR in Space.**

♦ **Relevant provisions for the applicability of domestic IPR law to Space Activities exist only in US law today, found within the US Space Bill and the NASA act.**

♦ **The US Space Bill extends the applicability of US patent law into Outer Space.**

♦ **The NASA act includes a provision to consider a "space object" as a vehicle.**

US IPR in Outer Space : what does it mean ?

EXCERPT FROM THE U.S. SPACE BILL

"..." Any invention made, used or sold in outer space on a space object or component thereof under the jurisdiction or control of the United States shall be considered to be made, used or sold within the United States for the purposes of this title (*), except with respect to any space object or component thereof that is specifically identified and otherwise provided for by an international agreement to which the United States is a party, or ... carried on the registry of a foreign state <u>in accordance with</u> the Convention of Registration of Objects Launched into Outer Space."...

35 U.S.C.105 (a) **(emphasis added).**

*** "The Present Title" is TITLE 35 U.S.C. concerning PATENTS**

FORUM SHOPPING : CAN'T HAPPEN HERE ?

The Flagship principle as embodied by the InterGovernmental Agreement solves the forum shopping dilemma for the International Space Station by a long-negotiated agreement between the partners : each retains IPR jurisdiction on its own pieces of the ISS.

However the Flagship principle in maritime law has lead to convenience registry. Could this also happen for registry of space objects under the most favorable regime ?

US patent law and IGA make explicit reference to the State of Registry to determine the applicable law. However there still remains a choice of the State of Registry. And what if the State of Registry can change in time ?

U.N. REGISTRY : IN WHICH COUNTRY ?

Several legal consequences may govern the choice of a registry state for space objects : Ownership, liability, jurisdiction and control, hence applicable law.

The 1975 U.N. Registry Convention provides that the "Launching State" will register each object launched in a national register, and inform the U.N. Secretary General.

However the "Launching State" has multiple definitions in art. 1 of the 1975 treaty :

- **the State that launches ;**
- **the State that procures the launching ;**
- **the State from whose territory an object is launched ; or**
- **the State from whose facility an object is launched .**

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EXAMPLE : SEA LAUNCH PROJECT

WHICH IS THE APPROPRIATE STATE FOR U.N. REGISTRY ?

Sea Launch Partners : • **US Boeing (~ 40 % stake)**

- **Norway firm Kvaerner (~ 20 % for platform & boat construction)**
- **Ukranian firm Yuzhnoye (~ 15 % for Zenith 2-stage rockets)**
- **Russian firm Energia (~25% for Zenith 3rd stage)**
- **Sea Launch firm registered in Cayman Islands, British Colony**
- **Sea Launch vessel flying Liberian flag**
- **Sea Launch permanent berth in Long Beach, California (USA)**
- **Sea Launch may also launch from any territorial waters (with permission)**

What about Patentability of Orbits ?

Does this lead to a new type of merchandise ?

- **Novelty criteria : (if an orbit has never been described, it's new)**
- **Inventive step (non obvious): depends on filing date, as many types of orbits are known**
- **Industrial Application : Certainly if technically feasible. This was not always the case.**
- **Conclusion : in general, orbits can present the necessary criteria for patentability.**
- **They can thus become an object of transactions as any other patented technology.**

IPR Considerations

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- Intellectual Property Rights (IPR) are the legally recognised rights of the property owner.
  - The first recognised right is that of the owner to forbid others from using the IPR.
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    - Examples include sale, assignment, lease, license, collateral, technology transfer.
    - The owner may also undertake legal proceedings to obtain a transaction.

SES, Echostar Negotiate Deal for Mexican Satellite Slot

PETER B. de SELDING, PARIS

SES Global and EchoStar Communications Corp. want to move a damaged EchoStar satellite into a Mexican orbital slot in time to meet the Mexican government's July deadline for an SES-backed company to start operations from that orbital slot, according to industry officials and documents EchoStar filed with U.S. regulators.

The companies are running out of time. Under the conditions of a Mexican government license that the SES-backed QuetzSat, S De R.L. De C.V. won in late 2004, QuetzSat must begin operating a direct-broadcast television satellite from Mexico's orbital slot at 77 degrees west longitude by July 10 or face lengthier, and costlier, regulatory procedures.

QuetzSat, a Mexico-registered company created by SES Global, paid Mexican authorities 153 million Mexican pesos ($14 million) for the license, and agreed that a portion of the capacity to be provided from the Mexican slot will be reserved for Mexican government use, free of charge.

EchoStar has agreed to use its damaged EchoStar 4 satellite, now located at 157 degrees west longitude, to provide Luxembourg-based SES Global and QuetzSat with a placeholder satellite, giving SES and its QuetzSat partners time to fully assess the market, line up customers and order a new satellite for the position if market conditions warrant.

EchoStar 4, launched in 1998, has suffered multiple on-board failures and in March was declared a total loss by an arbitration panel after seven years of dispute between Littleton, Colo.-based EchoStar and its insurance underwriters. Insurers have since paid EchoStar $240 million under a negotiated settlement that leaves EchoStar with title to the satellite.

EchoStar was able to declare the satellite a total loss even if only 50 percent of its capacity was unusable following on-board propulsion and other failures. EchoStar 4 remains operational.

Following an agreement with SES Global, EchoStar will move EchoStar 4 to the Mexican slot and continue to own the satellite. EchoStar will temporarily lease EchoStar 4 to QuetzSat, which will then lease it back to EchoStar.

In documents submitted to the U.S. Federal Communications Commission (FCC), EchoStar says it will be able to use Mexico's 77 degrees west location to provide local-into-local high-definition ethnic and other television programming in the United States.

EchoStar is urging expedited FCC approval. The company says it will take 45 days to drift EchoStar 4 along the geostationary orbital arc from its current location to the QuetzSat slot, and that it needs to be in place at the new location on July 1. EchoStar told the FCC that it must begin moving EchoStar 4 by May 15 at the latest.

One industry observer familiar with EchoStar's request said the relocation probably could occur in less than 45 days without using much of EchoStar 4's remaining on-board fuel. In addition, the Mexican government deadline is July 10, not July 1, according to the Feb. 2 Mexican Federal Telecommunications Commission license granted to QuetzSat.

EchoStar and SES also are negotiating the use of another EchoStar satellite to fill a Canadian direct-broadcast television orbital slot recently won by Ciel Satellite Communications, which like QuetzSat is a start-up operator created by SES Global. Under the Canadian license, Ciel has until Aug. 25 to place an interim satellite into operation at the 129 degrees west longitude orbital slot.

SES Chairman Romain Bausch said May 9 that SES would not comment on the Canadian or Mexican licenses until it had lined up satellites and customers for both locations. In the past, Bausch has sought to minimize SES's role in both operations, saying SES has only a minority stake in QuetzSat and Ciel.

An EchoStar filing at the FCC makes reference to an agreement with QuetzSat and SES under which none of the three companies are permitted to make public statements about their Mexican arrangement unless the other two companies agree.

The FCC said it wants more information about the status of the EchoStar 4 satellite, and EchoStar's plans for the temporarily abandoned 157 degrees west orbital slot, before granting EchoStar approval for the maneuver.

The agency also said it wants to EchoStar to detail "any and all additional agreements between EchoStar and SES and between either or both of these parties and QuetzSat" before granting approval.

Comments: pdeselding@compuserve.com

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CASE HISTORY : HOW ABOUT RESERVING THE USE OF A SPECIFIC REGION IN OUTER SPACE FOR A GENERAL EXPLOITATION ?

EXAMPLE : TRW's US PATENT 5,433,726 TO HORSTEIN CLAIM FEATURES :

- **Launch of a constellation of satellites to between 5,600 and 10,000 nautical miles above the earth;**
- **At least one satellite to have a reduced antenna field of view, FOV, less than full earth coverage;**
- **The satellites oriented in a plurality of predetermined orbital planes;**
- **Receiving radio frequency signals by at least one satellite from a plurality of mobile handsets with omni-directional antennae;**
- **Overlapping of a portion of the coverage region of a departing satellite with a portion of the coverage region of an arriving satellite;**
- **Predetermined criteria for the assignment of calls to or from users within the coverage overlap region from a departing satellite to an arriving satellite (hand-over).**

IPR in Outer Space Activities

CASE HISTORY : HOW ABOUT RESERVING THE USE OF A SPECIFIC REGION IN OUTER SPACE FOR A GENERAL EXPLOITATION ?

EXAMPLE of (mis)use of such an Outer Space patent :

♦ **ICO Global Communications, a UK company spin-off of Inmarsat, had a business plan for communications to hand-held receivers from MEO.**

♦ **ICO pursued that plan by obtaining the necessary regulatory authorizations for frequency use, trying to find investors for financing the infrastructure ($5Bn), and contracting the 12 satellites and launches.**

♦ **TRW sued ICO for infringement in a California court, requesting injunction and alleging that satellites under construction in the Hughes plant would become infringing when placed on their intended orbits.**

♦ **The California court found no infringement, TRW lodged an appeal.**

♦ **Pending appeal, ICO could not find backers with an IPR lawsuit on-going.**

♦ **ICO agreed to settle, in the hope to attract investors, for $150 M to TRW.**

♦ **ICO declared bankruptcy for $450 M debt, then was bought up for $50 M by US businessman and telecom magnate Craig MgCaw. The UK business closed.**

International instruments

♦ **Outer Space Treaty of 1967 :**

➔ **"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 economic or scientific development, and shall be the province of all mankind." 1967, 610 UNTS 205 Art. 1, para.1**

➔ **"Outer space ... is not subject <u>to national appropriation</u> by claim of <u>sovereignty</u>, by means of use or occupation, <u>or by any other means</u>."**

1967, 610 UNTS 205 Art. 2 (emphasis added) .

♦ **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. (A/RES/51/122, 4 Feb. 1997)**

IPR in Outer Space Activities

THE UNITED NATIONS RESOLUTION* OF FEB. 4, 1997 IS A FIRST STEP

-- Para. 5, last alinea : "International cooperation, while taking into particular account the needs of developing countries, should aim, *inter alia*, at the following goals ...

... Facilitating the exchange of expertise and technology among States on a mutually acceptable basis.

-- Para. 2 : "... Contractual terms in such cooperative ventures should be fair and reasonable and they should be in full compliance with the legitimate rights and interests of the parties concerned, as, for example, with intellectual property rights. "

***A/RES/51/122, 4 Feb. 1997**

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WHERE IS THE INTERFACE BETWEEN OUTER SPACE IPR LAW AND INTERNATIONAL PUBLIC LAW ?

♦ **A patent office in any country is only doing its job according to the legal and administrative rules which have been laid out for it. The only considerations are the patentability criteria and procedural questions.**

♦ **No one expects a Patent examiner to apply Art. 2 OST in examination. So a patent which evidently infringes Art. 2 may easily be granted.**

♦ **If the patent owner enforces in justice, the only questions raised before the Judge are patent validity and material infringement.**

♦ **No defense lawyer in his right mind would try to base a defense in a patent suit on international public law. And the judge would be deaf.**

♦ **At the UNCOPUOS legal subcommittee, they regard this as a private law issue, as IPR contains the word “Property”. It’s not their “territory”.**

♦ **CONCLUSION : NO INTERFACE !**




IDEAL GOALS IN EVOLUTION OF INTELLECTUAL PROPERTY LAW FOR SPACE

1) RESTORE THE EXPECTED ADVANTAGES OF IPR

2) ESTABLISH LEGAL CERTAINTY FOR SPACE IPR

3) ESTABLISH SPACE AND ITS ACCESSES AS A SINGLE TERRITORY WITH A SINGLE, UNIFORM LAW

4) ESTABLISH A SINGLE UNIVERSAL ENFORCEMENT BODY SUCH AS AN INTERNATIONAL ARBITRATION

5) COME TO AN AGREEMENT ON A CODE OF CONDUCT FOR USE OF SPACE IPR BY 3rd PARTIES

consistent with the provisions of the Outer Space Treaty for space-based inventions, and the UN resolution of 1997.

LEGAL CERTAINTY : POSSIBLE CORRECTIVE ACTIONS -- "HARMONISATION"

"HARMONISATION" OF LAWS APPLICABLE TO THE OBTENTION AND USE OF IPR IN SPACE ACTIVITIES COULD BE CONCEIVED, FROM A STARTING POINT OF AT LEAST ONE OTHER APPLICABLE LAW IN ADDITION TO THE U.S. LAW (ONLY ONE FOR NOW)

AN INITIATIVE OF THE EUROPEAN SPACE INDUSTRY, WITH THE SUPPORT OF THE EUROPEAN SPACE AGENCY, HAS BROUGHT THIS ISSUE BEFORE THE EUROPEAN COMMISSION IN CONNECTION WITH ITS REFLECTIONS ON THE EUROPEAN COMMUNITY PATENT. A COMMUNITY DIRECTIVE INTRODUCES SPACE-SPECIFIC, EUROPEAN COMMUNITY-WIDE LEGISLATION FOR IPR USE IN OUTER SPACE ACTIVITIES, IN A MANNER AND IN TERMS SIMLAR TO THE US SPACE BILL. HOWEVER THIS WILL NOT SOLVE THE FUNDAMENTAL PROBLEMS ILLUSTRATED ABOVE.

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LEGAL CERTAINTY : POSSIBLE CORRECTIVE ACTIONS -- "GLOBALISATION"

A PREFERABLE SOLUTION WOULD BE "GLOBALISATION" OF THE JURISDICTION IN OUTER SPACE ACTIVITIES, i.e. A SINGLE WORLDWIDE IPR LEGISLATION FOR SPACE ACTIVITIES.

THIS COULD BE IMAGINED AS A TREATY UNDER THE AUSPICES OF THE UNCOPUOS, OR AN EXTENSION OF THE 1967 OUTER SPACE TREATY.

- **CREATE A SINGLE TERRITORY FOR IPR IN SPACE ACTIVITIES Including space access (launch sites and vehicles), space objects (UN registry), and space settlements (moon and other celestial bodies).**

A "SPACE PATENT" could be imagined as a new "Country" designation on a PCT (Patent Cooperation Treaty) patent application, to be examined and granted under the auspices of the WIPO (World Intellectual Property Organisation).

LEGAL CERTAINTY : POSSIBLE CORRECTIVE ACTIONS -- "GLOBALISATION" (cont.)

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- **ESTABLISH A SINGLE UNIVERSAL DISPUTE SETTLEMENT BODY**

FOR SPACE IPR ISSUES

This could be an international board of arbitration, similar to that which is already operated under the auspices of WIPO.

This board could be empowered to arbitrate on matters such as space patent validity and compatibility with international law, alleged infringement, fair and reasonable conditions of licensing to third parties, etc.

LEGAL CERTAINTY : POSSIBLE CORRECTIVE ACTIONS -- "GLOBALISATION" (cont.)

-

- **ELABORATE AN AGREEMENT ON A CODE OF CONDUCT**

TO ENSURE THE BASIC PRINCIPLES

-- Exclude patentability when contrary to the principles

-- In other, patentable cases, make licenses available to third parties under fair and reasonable conditions.

Such fair and reasonable conditions may depend on the economic and scientific development of the Licensee, consistent with the terms of the OST, and the recent UN Resolution.

(A/RES/51/122, 4 Feb. 1997)

TAKE A LOOK IN THE CRYSTAL BALL FOR FUTURE EVOLUTIONS

1. **NEW SPACE POWERS : JAPAN, CHINA, BRAZIL, INDIA, RUSSIA**
2. **EVOLUTION OF APPLICABLE LAW IN DIFFERENT FORA :**

- ♦ **EUROPEAN COMMISSION REGULATION UNDERWAY**
- ♦ **UNITED NATIONS EFFORTS, UNISPACE III IN JULY 1999**
- ♦ **WORLD INTELLECTUAL PROPERTY ORGANISATION (UN)**
- ♦ **WORLD TRADE ORGANISATION MILLENIUM ROUND**
- ♦ **REVISION OF THE MUNICH CONVENTION (EUROPEAN PATENT)**
- ♦ **LOBBYING FOR INTRODUCING SPACE IPR INTO FRENCH LAW**
- ♦ **OTHER NATIONAL LAWS IN WORKS : INDIA, KAZAKHSTAN, …**

Intellectual Property Rights in Outer Space Activities ;

World Economic Development : Aid or Impediment ?

BRIEF Conclusions =

♦ **IPR can aid if it contributes to promote the progress of Outer Space Activities. Monopolistic behaviour must be avoided !**

♦ **Appropriate legislation should be initiated in timely manner.**

♦ **Patents on orbits which are subsequently not used are worse than ITU frequency allocations, which unused, become available.**

♦ **Someone else's IPR is always a barrier to overcome somehow.**

♦ **UN resolutions require national legislation to have any effect.**

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Draft protocol on matters specific to space assets to the Convention on International Interests in Mobile Equipment**

Tinuade Oyekunle
Correspondent for the International Institute for the Unification of Private Law (UNIDROIT)

I. UNIDROIT: its role past and present and the participation of the Government of Nigeria

The International Institute for the Unification of Private Law (UNIDROIT) is an intergovernmental Organization, based in Rome. Its traditional role has been to unify existing national rules of law, in particular in areas concerning commercial and economic activity, with a view to facilitating international relations and exchanges. While this type of legislative policy continues to be valid, in recent years UNIDROIT's activity has tended to focus more on modernising national laws, in particular with a view to improving access to cheaper finance for the countries most in need of such finance for the development of their infrastructure.

The member States of UNIDROIT are drawn from the four corners of the world. The Government of Nigeria is a long-standing and greatly valued member. Its participation in the work of UNIDROIT is handled by the Federal Ministry of Justice, and in the first instance Chief Bayo Ojo, Attorney-General of the Federation and Minister of Justice. Its lawyers have long played a major part in UNIDROIT projects: Chief Tinuade Oyekunle, a UNIDROIT correspondent, is Chairman of the UNIDROIT Advisory Board that is currently preparing a model law on leasing, a project on which UNIDROIT is working closely with the International Finance Corporation.

II. UNIDROIT's role in the modernization of the law: the Cape Town Convention

The most recent example of UNIDROIT's work is the Convention on International Interests in Mobile Equipment, opened to signature in Cape Town on 16 November 2001. The term "interests in mobile equipment" refers to those proprietary interests created, whether by way of security or under a leasing or conditional sale agreement, where the party acquiring the equipment does not have all the funds necessary to purchase it outright and, therefore, has to raise what are, in effect, loans from one or more financiers and, in return for those loans, gives the financiers a charge over the equipment.

The Convention entered into force on 1 April 2004, but only as regards a category of equipment to which a Protocol to the Convention applies. When work began on the preparation of the Convention, the intention was for its rules to cover all aspects of the law governing the taking of such interests in high-value mobile equipment but, as the work got underway, it quickly became evident that one particular equipment sector, namely the aviation industry, wished to see

** This Paper was presented by Tinuade Oyekunle on behalf of *Martin Stanford, Deputy Secretary-General, International Institute for the Unification of Private Law (UNIDROIT).*

the Convention in force as regards aircraft and aircraft engines, as quickly as possible and was not prepared to wait for other equipment sectors to get up to speed. This was why it was decided to divide the rules to be prepared into those general rules applicable to all types of high-value mobile equipment and those special rules needed to adapt the general rules to the specific characteristics of each type of equipment: the general rules were to be placed in the Convention and the equipment-specific rules were to be placed in separate Protocols applying to each such type of equipment.

The Convention will enter into force as regards what may broadly be referred to as aircraft and aircraft engines, through the entry into force of the Protocol to the Convention on Matters specific to Aircraft Equipment (also opened to signature in Cape Town on 16 November 2001), on 1 March 2006: eight States (Ethiopia, Ireland, Malaysia, Nigeria, Oman, Pakistan, Panama and the United States of America) are already Contracting Parties to both the Convention and the Aircraft Protocol.

Meanwhile, UNIDROIT has been busy developing follow-up Protocols to the Convention on Matters specific to Railway Rolling Stock and Space Assets. It is worth remembering that, when the Government of South Africa organised the diplomatic Conference for the adoption of the Convention and the Aircraft Protocol in Cape Town, they let it be known that, whilst aircraft and aircraft engines were a luxury for African countries, railway rolling stock was an absolute necessity: we were told that the trains carrying all one landlocked African State’s imports and exports were only able to run once a week, so old is the railway rolling stock concerned.

The new international regimen made up of the Convention and its Protocols, existing and future, is very much a typical example of the way in which UNIDROIT has found it opportune to move away from the classic form of unification of law exercise toward that of modernisation of law. Moreover, as the United Nations work carried out by Professor U. Drobnig showed, it would not be feasible to seek to unify all the different national laws governing the taking of security. That is why, on this occasion, UNIDROIT opted for preparing a modern new international legal framework to govern the taking of security in high-value mobile equipment alone, designed, above all, to improve access to secured financing facilities in respect of the acquisition of high-value mobile equipment moving regularly across or - in the case of satellites and transponders - beyond international frontiers in the ordinary course of business. It was considered that, by reason of the numerous differences between national laws in the area of the taking of security, the chances of success of such a project would be greater if its interference with domestic law was kept to a minimum and that also explains why it was judged appropriate to concentrate on those classes of equipment typically operating internationally or - in the case of space assets - intergalactically.

III. Objectives of the new international regimen

The objectives pursued by the new international regimen are both legal and economic, although the latter is by far the more important.

Legally, notwithstanding the fact that it is the *lex rei sitae* (the law of the State where the asset happens to be located) which traditionally governs questions as to the validity, priority ranking and enforceability of security rights in property, this law is clearly singularly ill-suited to provide a predictable legal regimen for assets regularly moving from one jurisdiction to another or - in the case of satellites and transponders - beyond any national jurisdiction at all. This may reasonably be considered a major obstacle to the granting of secured financing facilities in respect of such assets, since financiers will always look at these issues in advance of their decision as to whether or not to conclude such a transaction.

Economically, the overriding aim of the new international regimen is to render asset-based financing more readily available to commercial space activities. The particular beauty of asset-based financing (typified for many by leasing) is that it enables the debtor to pay off his debt through the revenue that he manages to generate by his use of the asset, whilst, at the same time, enabling the creditor, in the event of default by the debtor, to go against the asset. All things being equal, the fact that the creditor has this guarantee greatly improves his risk analysis on the transaction and thus, correspondingly, simplifies negotiating the transaction and lowers the cost of the financing he can provide.

IV. Key features of the new international regimen satisfying the essential requirements for asset-based financing

Three legal requirements are considered to be particularly crucial for the effective mounting of an asset-based financing transaction.

First, such transactions require transparent priority rules, that is rules determining whose right is preferable over a given asset in the event of a dispute between creditors.

Secondly, the creditor in an asset-based financing needs to be sure that, in the event of a default by his debtor, he will be able to rely on prompt enforcement rules.

Thirdly, even after the opening of insolvency proceedings, the creditor in an asset-based financing needs to be sure that such prompt enforcement rules will continue to be available.

The new international regimen satisfies all these criteria.

Before explaining how, it is, perhaps, appropriate briefly to introduce what is an international interest in mobile equipment. An international interest will, in effect, take one of three different forms: either it will be an interest created by what is called a chargor under a security agreement or it will be an interest vested in a conditional seller under a conditional sale agreement or else it will be an interest vested in a lessor under a leasing agreement (cf. Article 2(2)(a), (b) and (c) of the Convention).

The new international regimen satisfies the first criterion for asset-based financing in the way in which the international interest is backed by a fully computerised international registration system. Interests filed in an international registry will, subject to certain limited exceptions, have priority against all other international interests and other interests in the equipment, with such priority being determined according to the time of creation of the particular interest, that is the priority system established by the Convention is a first-in-time system, with the holder of the interest registered first prevailing against all interests registered subsequently as indeed all interests not registered at all.

The second way in which the new international regimen meets the criteria for asset-based financing is in the set of basic default and interim remedies which it provides. Under these, the creditor can take possession or control of the equipment, in the event of default by the debtor, and sell or remarket it. Admittedly, the promptness or otherwise with which the creditor will be able to exercise these remedies will depend on the choice a particular State makes at the time of becoming a Contracting Party regarding, first, whether to permit them to be exercised without recourse to the courts and, secondly, the number of days within which it undertakes to make these remedies available. For the new international regimen gives States, through a complex system of declarations - in particular on these last two issues - the opportunity either to attract all the benefits of asset-based financing or only certain of them, depending on the form of their declarations on such matters.

The third criterion for asset-based financing is satisfied by the new international regimen's provision that in insolvency proceedings against the debtor the international interest will be effective and enforceable provided that it was registered prior to the commencement of those proceedings.

V. Application of the Convention to space assets

In the words of the preamble to the preliminary draft Protocol to the Convention on Matters specific to Space Assets, the preliminary draft Protocol "implements" the Cape Town Convention in relation to space assets. This means that the preliminary draft Protocol, in effect, provides special rules adapting the rules of the Convention to the specific characteristics of space assets.

This paper has already highlighted the especial benefits that developing and emerging economies may expect to derive under the Cape Town Convention. It is expected that these benefits will be particularly felt under the preliminary draft Protocol. An experienced communications expert from Africa has shown that the Convention and the future Space Protocol, taken together, have the potential to revolutionise the basic living conditions of the poorest parts of the world. And this through the invaluable services that satellites can provide to such parts of the world. In addition, the typical party to a satellite financing arrangement has changed considerably in recent years: whereas up until comparatively recently he would have been a Government or a Government agency or a blue-chip company, nowadays he will increasingly tend to be an entrepreneurial company with no real credit history and no significant assets to pledge by way of collateral other than his satellite.

What are "space assets" for the purposes of the Convention and the preliminary draft Protocol? Article I(2)(g) of the latter provides that the term '"space assets" means:

(i) Any identifiable asset that is intended to be launched and placed in space or that is in space;
(ii) Any identifiable asset assembled or manufactured in space;
(iii) Any identifiable launch vehicle that is expendable or can be reused to transport persons or goods to and from space; and
(iv) Any separately identifiable component forming a part of an asset referred to in the preceding sub-paragraphs or attached to or contained within such asset.'

The special significance of the term "identifiable" in the context of the Convention and the preliminary draft Protocol arises from the fact that the international registration system is designed as an asset-based system, with the corresponding need for each asset to be uniquely identifiable in some way in order to be capable of being registered in the international registry.

VI. Special characteristics of space assets reflected in the preliminary draft Space Protocol

There are six issues in particular on which the preliminary draft Protocol sets out to adapt the rules contained in the Convention.

First, unlike the other categories of equipment covered by the Convention, satellites and transponders are both difficult to repossess and, in any case, of little value for repossession purposes. The access and command codes affording the opportunity to exercise control over and operate the satellite and transponder are what the creditor is going to be interested in in the event of his debtor's default.

Article IX *bis* of the preliminary draft Protocol provides that the parties to the agreement creating or providing for the international interest may agree for the placement of such access and command codes with a third party so as to enable the creditor, if necessary, to take possession of, establish control over or operate the space asset.

But, secondly, even once the creditor has managed to establish control over or operate the satellite and transponder, the latter will not be of any great value to him without those governmental licenses permitting their operation, allowing the use of their orbital slot and, where applicable, permitting the broadcasting of media from the satellite and transponder. In many countries, these governmental licenses will not be transferable without governmental approval. Such restrictions on the transferability of these rights will clearly significantly affect the value of the satellite and transponder for the creditor. The intention, therefore, is to make them transferable with the international interest but, in the light of the current widespread need for governmental approval for such transfers, the preliminary draft Protocol makes this transferability subject to the applicable law (cf. Article II(2)).

Thirdly, many space assets will be dual-purpose in nature, that is they can be used for both civilian and military purposes. For reasons of national security or public policy, a Government may wish to limit the transfer of control over such assets. The preliminary draft Protocol, therefore, permits Contracting States to restrict or attach conditions to the exercise of remedies in such cases (cf. Article XVI(2)). The creditor will then have to wait for the State having restricted or attached conditions to the transfer of the asset to inform it of the conditions in question. This, necessarily, will represent a limitation on the extent to which the creditor will be able promptly to enforce his remedies but a very necessary limitation in the geo-political reality of the world in which we live.

Fourthly, as mentioned above, the international registration system as conceived by the Convention is an asset-based system. Article VII of the preliminary draft Protocol, for the time being, begs the question as to the criteria for the identification of space assets to be employed for their registration in the future international registry. The problem is that, whereas aircraft and aircraft engines will all have either manufacturer's serial numbers or other unique identifying marks, this will not be true of a great many types of space asset. In fact, many of the space assets covered by the sphere of application of the preliminary draft Protocol will not have any unique identifying mark. In these circumstances, it is likely that a mixed asset- and debtor-based registry will have to be conceived for space assets, including such criteria as the name and address of the debtor and the creditor.

Fifthly, as announced in the preamble to the preliminary draft Protocol, it is in no way intended to affect the application of the established principles of space law, including those contained in the international space treaties concluded under the auspices of the United Nations. It was not felt that this was sufficient to achieve the purpose sought and, therefore, Article XXI *bis* reaffirms that, in case there might be any doubt on the issue, the Cape Town Convention as applied to space assets (that is through the preliminary draft Protocol) does not affect State Party rights and obligations under the existing United Nations Outer Space Treaties or instruments of the International Telecommunication Union.

Finally, a major question still to be resolved is whether the fact that a space asset is being used, even if only in part, to perform a “public service” should affect the possibility of the creditor exercising his remedies under the Convention and the preliminary draft Protocol and, if so, to what extent. This clearly involves a major policy decision and opinions are divided. What is at issue, in effect, is how to strike the balance between a creditor seeking to exercise remedies against the space asset in the event of his debtor’s default, on the one hand, and one or more organs of the State anxious to ensure the continuity of the performance of a particular “public” service secured by the space asset in question, notwithstanding the debtor’s default, on the other.

VII. Method being used to reach agreement

In recognition of the need to ensure the technical input of the international commercial aerospace and financial communities at the earliest possible stage, UNIDROIT decided to give these communities the opportunity to prepare a first draft of what they believed would be necessary to extend the benefits of the Cape Town Convention to commercial space activities. This is how the President of UNIDROIT in 1997 came to invite Mr. Peter Nesgos, a well-known expert in the commercial space financing field, to organize a working group (the Space Working Group), made up essentially of representatives of satellite manufacturers, operators, financiers and insurers, to prepare such a first draft for submission to the UNIDROIT Governing Council for advice as to the appropriate follow-up action.

Following the holding of five sessions, between 1997 and 2002, at which the Space Working Group also sought the advice of many other space law experts, including the United Nations Office for Outer Space Affairs, the UNIDROIT Governing Council decided that the first draft prepared by the Space Working Group was ready to be submitted for finalization to Governments.

A first session of a Committee of governmental experts (the members Stateship of which was extended beyond that of UNIDROIT to take in also that of the United Nations Committee on the Peaceful Uses of Outer Space) was held in Rome in December 2003. 39 Governments and a number of intergovernmental and international non-governmental Organizations took part in the session. The Government of Nigeria was represented by Prof. Robert A. Boroffice, Director-General of the National Space Research and Development Agency, Mr.s. Margaret A. Lashman, Legal Adviser to the Federal Ministry of Aviation, Mr.. Samuel M. Gaiya, Legal Adviser and

Company Secretary to the Civil Aviation Authority, Mr.s. Nonyelum L. Achebe, Legal Adviser to the Nigerian Airspace Management Agency, and Mr.. Tare Brisibe, Adviser to the National Space Research and Development Agency. The Committee of governmental experts was structured very much as a public/private partnership, with the Space Working Group - representing the international commercial aerospace and financial communities - participating fully in the negotiations alongside Governments. A second session of the Committee of governmental experts was held in Rome in October 2004. It is hoped to convene a third session early in 2006. Following a fourth and, hopefully, final session of the Committee, it is hoped that it may be possible to convene a diplomatic Conference for the adoption of a Space Protocol in 2007. This is, evidently, a very tight schedule and a great number of factors will need to be assured if it is to be maintained.

Promoting Education in Space Law

Ways and means of promoting education in space law in Africa

Sergio Marchisio

Chairman UNCOPUOS Legal Subcommittee 2004-2005, Italy

I. ECSL: Aims and Organization

The aim of this Workshop is to consider the development of programmes in space law in Africa, with a view to promoting national expertise and capability in this field. In this context, the experience of the European Centre for Space Law (ECSL), set up in Paris, France, in May 1989, is highly meaningful.

The Centre is not a faculty or an institute of law or political studies, nor an establishment in which students can follow courses and obtain qualifications [1]. It aims at promoting the knowledge of and the interest in space law and supports research activities, including the dissemination of information and the organization of workshops and colloquia.

From the beginning, its objective was to bring together people with different backgrounds (academics, practitioners, international and national civil servants, students and researchers) involved in space law, and to provide assistance in implementing initiatives of the European Space Agency (ESA), created by the Convention signed in Paris in March 1975.

The Convention establishing ESA, gathers 17 European States in order to play a federative role in Europe in the area of space research and technology and their applications. In this regard, Article II of the ESA Convention, concerning the purpose of the Agency, stresses cooperation among European States by implementing *a long-term European space policy*. Since 1975, ESA has become an active actor within the international space community and its contribution to the framing and application of space law has become evident.

Out of these requirements, came the idea of putting in place a flexible instrument, open to the various communities, law faculties, research institutes, scientists, company lawyers, practitioners and students. It was proposed to a Constituent Assembly convened in October 1988 to adopt a Charter, which set out the objectives of ECSL.

The preamble of the Charter embodies some fundamental principles: first, the growing complexity of the sources of space law, both international and national, and, as a consequence, the difficulties of access to documentation; second, the multidisciplinary character of space law, which includes the rules, both of private and public character, related to access to and use of outer space as well as the means for organizing and executing space-related activities on Earth; further, the steady enlargement of the space user community, as developers users, operators, and their

[1] The Centre's main unit is located at the European Space Agency (ESA) Headquarters, 8-10 rue Mario Nikis, 75738 Paris 15, France.

needs; finally, the ESA role to facilitate the exchange of scientific and technical information pertaining to the fields of space research and technology and their space applications.

These were a sum of valid reasons for setting up a European Centre for Space Law, in order to improve the state of space-law research and knowledge in Europe, for the benefit of academics, students, practitioners, and also the image of ESA.

The thread running through the whole project, and which was perhaps the reason for its success, was a resolve to avoid a centralized structure, and to go instead for a flexible one, making it possible to contribute to and benefit from exchanges and coordination. In fact, ECSL relies on a network of National Points of Contact (NPOC). Today NPOCs exist in Austria, Belgium, France, Germany, Finland, Italy, the Netherlands, Spain, Switzerland and United Kingdom. There is also contact with Portugal, while Sweden used to have a NPOC. Each NPOC has its own activities and structure, it adheres to the ECSL Charter and principles and acts at national level to further implement its goals.

The result of exchanging ideas, thoughts and documentation should be progress for all – lawyers and non-lawyers alike - progress in terms of professional development and the formulation of legal policies. All this in furtherance of an approach rooted in Europe's legal culture.

Article 2 of the Charter, concerning the main purposes of the Centre, depicts the ECSL as a complementary tool in Europe in the field of space law research, as the promoter of gaining knowledge and interest in the law relating to space activities through the promotion of research activities.

At the same time, ECSL has to play the role of a sort of think thank instrument, in order to identify themes related to space law in which research and training activities should be concentrated and encouraged, and to discuss and propose principles and draft norms which may then be promoted at national or European level. In this regard, I can mention the well received inputs that ECSL gave in a number of relevant topics to the sessions of the COPUOS Legal Sub-Committee in Vienna.

The link between ESA and ECSL is evident: membership of the Centre is open to natural and legal persons from ESA Member States, Associate States, and other European States having concluded a co-operation Agreement with ESA. However, ECSL does not have legal personality and it is not an ESA establishment or agency. Where its operation does call for a legal base, it relies on ESA's legal personality. The basic idea was to seek a mechanism able to promote, coordinate and respect the activities of each party. ECSL is directed by a board of 10 members elected by the biennial General Assembly. The Board elects a Chairman and a vice Chairman among its members.

II. ECSL Educational Programmes

The ECSL educational programmes and services offered to the space law community include the European Round of the Manfred Lachs Moot Court Competition, the Space Law and Policy Summer Course, the Practitioner's Forum and the Regional Workshops.

Beginning with the *European Round of the Manfred Lachs Moot Court Competition*, this is a model that could usefully be extended to many other disciplines, as both students and teaching staff learn a great deal from it. ECSL organizes the semi-finals in Europe, either at ESA Headquarters, other ESA facilities in Europe or in an European law faculty. A colloquium on a specific topic will usually be held at the same time as the semi-finals.

Another important event is the *Space Law and Policy Summer Course*, organized every year jointly by a European law faculty and ECSL. This is an intensive two-week course, attracting students from several universities in ESA Member States. The host country normally changes every year. The activity having begun in 1991, many European universities have so far hosted the course.

The main aim of the Summer Course is to have a full-immersion training course on legal, political and economic aspects of space activities. Lectures are given by distinguished lawyers and practitioners of the space field: they have included personalities from the UN Space organs, like the Office of Outer Space Affairs, COPUOS and its Subcommittees, professors from universities in member or non-member countries, legal experts from international organizations, space agencies or ministries, and practicing lawyers.

Lectures are characterised by three main aspects: they provide general knowledge; but after looking at space law basic principles and texts, special fields and actual practice are examined in depth. Students then prepare for mock pleadings (of the Moot Court type) or mock negotiations for an intergovernmental agreement. This is an exercise, which, though not easy, is very popular, as it gives students the impression of being responsible for handling an actual case for the first time. There are also the ties that such an exercise creates, together with the discovery of a common future.

ECSL publishes special compilations of documentation for the summer courses participants, which provide quite a complete selection of both background material and current legal developments. Not to mention the publication of the Summer Course's Proceedings.

Since 1992, one of the most important events within the ECSL activities is the organisation of the *Practitioners' Forum*, a yearly gathering of practicing lawyers, to which students can have access, providing them with experience of actual issues dealt with by the profession (legal counsel, company lawyers).

The meeting is intended to fulfil the need for practitioners to have an opportunity to meet expert lawyers practicing in the field of space activities, who can provide them with an update of their knowledge and information in this area. It is a one-day session during which specialists present the latest developments in special fields of space law and related matters, like telecommunications, EC law, contracts and procurement law, liability, insurance, each presentation being followed by a question/discussion session. The Forum is informal and no papers are published, therefore allowing participants complete freedom of speech and an exchange of views.

The popularity of this initiative attests that not only has space law been given greater importance day-by-day, but also that the number of lawyers and law firms occupied for a large part of their time on space law issues have increased dramatically in recent years.

ECSL activities are not limited to the European region. We can mention, in this vein, the *regional workshop* organized at the request of African Mediterranean countries in the field of space law.

This new ECLS activity began in 2001 with a first workshop organized at the request of the *Royal Moroccan Centre for Remote Sensing* in Rabat and attended by more than 80 professionals and practitioners from several African countries. This was a clear demonstration of the growing interest in space in developing countries. The first day was devoted to the basic principles of space law, while the second dealt with concrete issues associated with remote sensing, telecommunications and the management of major disasters. Special attention was paid to specific capacity-building in the field.

The second workshop, which also dealt with "Remote sensing for sustainable development: legal aspects", took place in Tunis in 2002, co-organized by ECSL and the *Regional Centre for Remote Sensing of North Africa States* (CRTEAN), an intergovernmental body based in Tunis and grouping several northern African countries. It aims to promote the development of remote sensing activities of member States and to encourage the implementation of regional projects on remote sensing applications. As for training activities, CRTEAN is engaged in coordinating related initiatives at all levels. In co-operation with competent national institutions, it is in charge of the establishment of high-level training programmes for citizens of member States. In 2005, the third Workshop was also held in Tunis in cooperation with CRTEAN, covering the topic of the contribution of space law to the management of natural disasters.

At the conclusion of each regional workshop, a Declaration was adopted by the participants, defining the needs and the expectations of the Northern African countries on the issue at stake. It was used as a starting point for further discussions at the intergovernmental level.

Finally, ECSL publishes a *Newsletter*, which covers various space law topics and contains information about the activities of the Centre. In its turn, the ECSL Homepage www.esa.int/SPECIALS/ECSL offers information on the Centre's activities and on space law at large. A specialised space law database accessible on the Internet is ESALEX, ECSL's database.

In conclusion, the results achieved over more than 15 years of activity show that the methodology adopted by ECSL has been largely fruitful. I do hope that ECSL could constitute a model also for other regions of the world, namely Africa, which has hosted this UN Workshop on capacity building.

UN/Nigeria Workshop on Space Law
21-24 November 2005
Abuja – Nigeria

Session 5 Promoting Education in Space Law

The Educational Programme of the European Centre for Space Law (ECSL)

Sergio Marchisio

European Centre for Space Law

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The European Centre for Space Law (ECSL) and its activities

. The Centre commenced on May 12 1989.

- Not a law faculty or institute of law or political studies, nor an establishment in which students can follow courses and obtain qualifications.

- An institution working in the sector of space law educational programmes and providing assistance in implementing initiatives of the European Space Agency (ESA, Convention signed in Paris in March 1975)

ESA Role in Space Law

- ESA main aim is to play a federative role in Europe in the area of space research and technology and their applications.

- ESA should also help coordinate national efforts in the field of space law as a natural extension of this work.

- ESA had become an observer and actor within the international space community and particularly within COPUOS and its Legal Subcommittee.

The need for an ECSL

By the end of the eighties, came the idea of setting up ECSL, as

a flexible instrument,

open to the various communities, law faculties, political science research institutes,

scientists, company lawyers,

practitioners, academic community and students.

Charter of ECSL, as amended on 2001 and 2004

- Principles embodied in the Charter:

- growing complexity of the sources of space law, both international and national;
- multidisciplinary character of space law;
- steady enlargement of the space users;
- role of ESA to facilitate the exchange of scientific and technical information.

ECSL Charter

Article 2:

- ECSL as promoter of knowledge of and interest in the law relating to space activities.

The ECSL National Points of Contact (NPOCs).

- ECSL as an instrument for promoting the establishment and development of national centres for space law research and giving them technical and other advice.

ECSL institutional features

- Membership open to natural and legal persons from ESA Member States, Associate States and States having concluded cooperation agreements with ESA
- ECSL relies on ESA’s legal personality
- Organs: two-yearly General Assembly, Board and Secretariat
- Financing: contribution from ESA, membership fees, voluntary contributions
- Located at ESA Headquarters in Paris

The ECSL educational programme

- **<u>Activities directed towards students</u>**

- A) The Manfred Lachs Moot Court Competition: organization of the European semi-finals, either at ESA headquarters or in an European Law Faculty, with a colloqium on a specific topic;
- ECSL covers the costs of the team taking part in the final round at the yearly World Space Congress

The ECSL educational programme

- **<u>Activities directed towards students</u>**
- B) The Summer Course on Space Law and Policy (from 1991)
- Attended by academics, technicians, government consulting and students from ESA Member States
- Lectures provide general knowledge and examine special fields
- Students prepare for mock pleading

The ECSL educational programme

- Activities directed towards practitioners.

- A) The Practitioner's Forum (since 1992)
- A yearly gathering of practicing lawyers and professionals to provide them with an update of their knowledge and information
- One-day session on latest developments in special fields of space law
- Informal character of the Forum open to discussion and exchange of views

The ECSL educational programme

- Activities directed towards practitioners.
- B)Capacity building: ECSL Regional Workshops in developing countries
- 1. Workshop on Space Law and Remote Sensing, Rabat, Royal Moroccan Centre for Remote Sensing, attended by 80 professionals and practitioners from several African countries
- 2. Workshop on Remote Sensing for Sustainable Development: Legal Aspects, Tunis, Regional Centre for Remote Sensing of Northern African States

Other ECSL activities

- Organization of workshops and legal colloquia (i.e., Prague, 1997; Perugia, 1999)
- ECSL Newsletter
- ESALEX, the ECSL's database. It includes the databases of NPOCs and the libraries of the Leiden and Cologne Universities.

Conclusions : The results of ECSL 12 years of activities

- International law, comparative law, private law, commercial and insurance law, patent law: the flow of knowledge from one to the other must be encouraged.
- The requirements: sound knowledge of international law; dedicated teachers; broad legal documentation; contacts with the private sector.
- ECSL is one example, which meets the needs of the European context.

The main objective of the ECSL

- to foster the exchange of information among interested stakeholders and to help to improve and promote the teaching of space law.
- to provide updated information on Europe's contribution to space activities beyond Europe,
- to enhance the European position in the field of space law practice, teaching and publications.

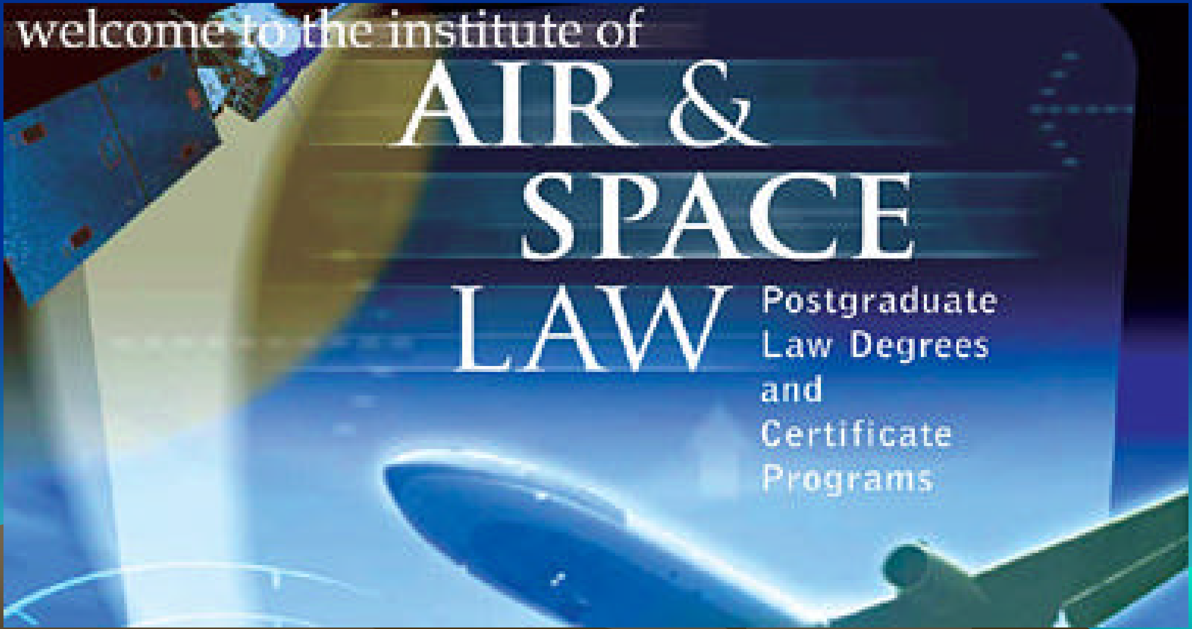
- **Visit the ECSL website at**

- **www.esa.int/SPECIALS/ECSL/**

Institute of Air and Space Law

McGill University, Montreal, Canada

Web-site: http://www.mcgill.ca/iasl/



HISTORY AND GENERAL INFORMATION

- Institute of Air and Space Law is in Montreal, which a is bi-lingual and multi-cultural cosmopolitan city, one of the safest city in North America.
- Institute was established within the McGill Faculty of Law in 1951. The Faculty of Law is more than 150 years old, one the most highly respected legal educational institutions in North America.
- Thus has been teaching air and space law for about 55 years
- Institute introduced its first Space Law course in 1963 and thus became the first institution in the world to offer such a course.
- Institute's Space Law Program the most extensive and advanced in the world.
- Institute has more than 900 alumni sprinkled across more than 120 countries around the world.

- The Institute carried out analyses, submitted reports with recommendations, organized symposia, and produced several publications on issues related to outer space.

- These multidisciplinary studies were carried out from legal, technical, political and economic perspectives. Of particular interest is the extensive research and consulting undertaken:

- on behalf of the Canadian External Affairs in the field of arms control and military uses of outer space,

- for the Canadian Department of Communications in the field of regulatory aspects of radio frequency management,

- for Canadian Space Agency, in the field of Space and International Trade.

- Institute has a history of 30 years of the *Annals of Air & Space Law*, a highly respected and valuable compendium of important research.

- Institute's library hosts an invaluable and unique collection of official documents and manuscripts, which are available no where else in the world. They include master and doctoral theses of our graduates:

- **Our mission and objectives are to:**

- *Educate the next generation of air and space lawyers to serve the needs of the air and space community worldwide. (a global perspective)*

- *Publish research valuable to governmental and multinational institutions, the airline and aerospace industries, and the legal profession.*

- *Create a thriving intellectual environment and professional global network for our faculty, our students, our graduates, and experts in the field.*

FUNDED RESEARCH & CONSULTATION

- During the 2004-05 academic year, the Institute received
- SSHRC grants of $162,500 and $10,000
- Arsenault Family Foundation grant of US$50,000
- Secure World Foundation grant of US$46,000
- Canadian Department of Foreign Affairs grants of $10,000 & $25,000
- Conference Board of Canada grant of $10,000
- Donner Canadian Foundation grant of $32,515
- Recognition of the Institute's expertise
- Opportunities for our students to be involved in research and earn money, knowledge and experience.

WORKSHOPS, SEMINARS & CONFERENCES

Institute of Air and Space Law organized and co-sponsored the followings during 2004-05:

- Workshop on Militarization of Space, in Montreal, September 23-24, 2004 (50 attendees);
- Worldwide Conference on Current Challenges in International Aviation, in Montreal on Sept. 25-26, 2004 (attended by more than 350 from more than 70 nations);
- Workshop on Space Security Index, in Montreal, Feb. 25 – 26, 2005 (50 participants;
- Workshop in International Aviation Policy for Canada, in Montreal on May 13-14, 2005 (100 participants)
- Conference on the Airline Industry's Financial Crisis, in Brussels, Belgium
- IASL European Alumnae Conference June 11-12, 2004, in Zurich, Switzerland
- Luncheon address on 18 June 2004 by eminent scholar
- Luncheon address on April 1, 2005 by a CEO of an aerospace company
- Luncheon address on 17 June 2005 by a top official of Canadian Space Agency
- Opportunities for our students in networking and gaining organizational experience

ACADEMIC PROGRAMMES

Certificates and Degrees:

- Graduate Certificate in Air and Space Law; is awarded after at least one term (4 months) of residence and on completion of a minimum of 15 credits of course work**;**

- Master of Laws (LL.M.) is a 45-credit programme with a minimum duration of three academic terms (full-time); and

- Doctor of Civil Law (D.C.L.) is granted when candidate’s doctoral thesis is adjudged as an original contribution to legal scholarship. Candidate must follow a program of at least three years’ residence.

ADMISSION REQUIREMENTS & STANDARDS

Language of instruction is English, however, students can write essays, examinations and theses in French.

Language requirements:

- Applicants must achieve a minimum TOEFL score of 575 (233 on the computer-based test) or 7.0 in the IELTS.

Academic requirements:

- Candidates for admission must possess a Bachelor of Laws degree or an equivalent law degree from an accredited university with a cumulative grade point average of 3.0/4.0, or its equivalent (upper second class).

- However, applicants for the Graduate Certificate in Air and Space Law who do not hold a law degree must fulfil the following two requirements:

  - have an undergraduate university degree in another discipline, and

  - possess sufficient professional experience in the fields of Air and/or Space Law

- Admission to the D.C.L. programme is granted to applicant who has completed a graduate law degree with thesis at McGill or at another university, and the Graduate Admissions Committee is satisfied that the quality of his or her previous research is sufficient to justify admission to a doctoral programme.

SPACE LAW COURSES OFFERED

- **General Principles of Space Law:** The basic objective of the course is an examination of the role of international law in the regulation of outer space activities. The course covers the following topics: current and potential future uses of outer space; the law-making process relating to space activities and the international institutions that are involved in this process; the legal regime of outer space and celestial bodies including the exploitation of their natural resources; the legal status of spacecraft including their registration; liability for damage caused by space activities; assistance to astronauts and spacecraft in distress; settlement of space-related disputes etc.

- **Law of Space Applications:** This course deals with the international legal aspects of various space applications. In particular, the course examines the international law related to satellite telecommunications, the role therein of various international organizations as well as broadcasting by satellite, navigational services, remote sensing by satellites, space stations, space travel, etc. Certain specific aspects of international law will be discussed as they relate to international technology transfers, military uses of outer space, trade in space products, satellite telecommunications and launch services.

- **Government Regulation of Space Activities:** National public and private law and regulatory regimes governing space activities, particularly those that are carried out by private entities for commercial purposes.

- **Plus compulsory courses:** public International air law and private international air law
- **Complementary courses:** public international law, international trade law, law of international organizations, communications law, etc.

NUMBER OF FACULTY AND STUDENTS

Faculty members in programme: 10

(full-time, part-time & visiting)

Students in programme per year: 20

(plus students continuing their LL.M. and doctoral studies)

COST OF PROGRAMME

Tuition fees: in Canadian dollars for International students.

- For Graduate Certificate, one term of full-time study: $ 5,615
- For Master's Degree, three terms of full-time study: $ 16,845
- For Doctoral Degree, 2-3 years of full-time study, per year: $ 10,239
- After two-three years of full-time study, if the thesis is not completed: $2,507

Estimates for cost of living per year: $14,473

Financial aid: Several fellowships/scholarships are available for foreign students

The National Center for Remote Sensing, Air, and Space Law

Presented by

Prof. Joanne Irene Gabrynowicz

to

1st African Leadership Conference on Space Science and Sustainable Development

23 November 2005

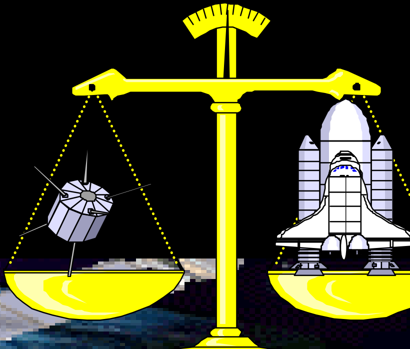
National Center for Remote Sensing , Air and Space Law

University of Mississippi School of Law

www.spacelaw.olemiss.edu

The National Center for Remote Sensing, Air, and Space Law

- **Established in 1999**
  - **2001: Director, Joanne Irene Gabrynowicz**
  - **2003: Associate Director, Jacqueline Etil Serrao**
- **University of Mississippi School of Law**
  - **American Bar Association accredited**
- **Oldest U.S. space law tradition**
  - **1935: Myres McDougal awarded law degree**
    - **lead author of seminal space law text, Law and Public Order in Space**
  - **1960s: Dr. Stephen Gorove joins the law faculty**
  - **1969: 1st space law conference**
  - **1972 - current: *Journal of Space Law***



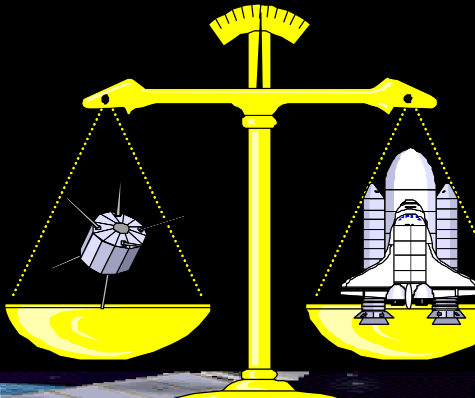
The National Center for Remote Sensing, Air, and Space Law

- **Dr. Joanne Irene Gabrynowicz**
  - Teaching space law since 1987
  - Teaching remote sensing law since 1990
  - Founding faculty member of UND Space Studies Department
    - 1990 - 2001 Director of Graduate Studies
  - Editor-in Chief, *Journal of Space Law*
- **Dr. Jacqueline Etil Serrao**
  - On list of ICAO aviation law experts
  - Wrote civil aviation laws for Mongolia
  - Writing civil aviation laws for Mozambique
  - Executive Editor, *Journal of Space Law*
- **University of Mississippi Law Faculty**
- **Visiting scholars, e.g., Ikuko Kuriyama of JAXA**

The National Center for Remote Sensing, Air, and Space Law

Courses

- **U.S. National Space Law**
- **International Space Law**
- **Remote Sensing Law**
- **U.S. National Aviation Law**
- **International Aviation Law**
- **Aviation Regulation**
- **Law of the Global Commons**
- ***Journal of Space Law***
- **Independent Study**
- **Special Topics**

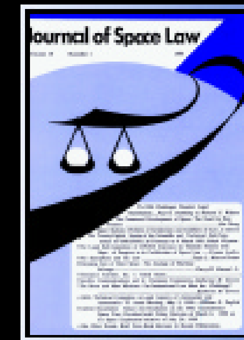


The National Center for Remote Sensing, Air, and Space Law

Classes Taught Via Distance Technologies

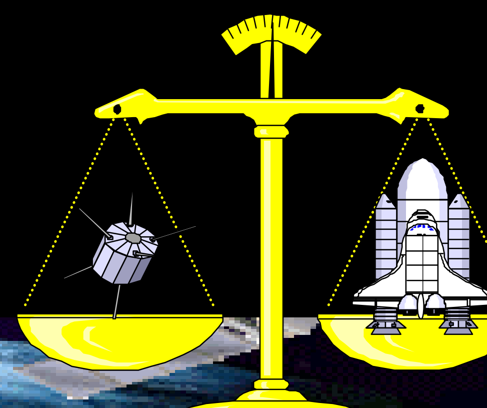
- Aviation law class from Ulan Bataar, Mongolia
  - Internet
- International space law from Vienna, Austria
  - Teleconference
- Remote sensing law from Daejon, South Korea
  - International GRID node
- Remote sensing law to Minneapolis, MN, USA
  - Teleconference

The National Center for Remote Sensing, Air, and Space Law



Journal of Space Law

- **Continuously published since 1972**
- **Authors include international recognized experts from academia, government and practice**



JOURNAL OF SPACE LAW
Volume 31 Summer 2005 Number 1

rticles

Space Travel Law (and Politics): The Evolution of the Commercial Space Launch Amendments Act of 2004

Timothy Hughes & Esta Rosenberg

"Eyes" On Freedom—A View of the Law Governing Military Use of Satellite Reconnaissance in U.S. Homeland Defense

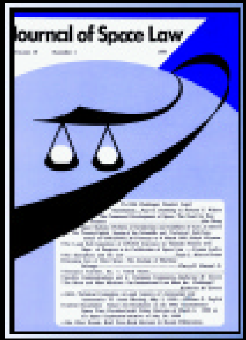
Christopher M. Petras, Lt Col, USAF

Interplanetary Contamination: The Ultimate Challenge for Environmental an
Constitutional Lawyers?

Dr. George Robinson, III

Legal Aspects of Reusable Launch Vehicles

Varlin J. Vissepó, Esq., LL.M.



ommentary

The Evolutionary Stages of The Legal Subcommittee of The United Nations Committee on the Peaceful Uses of Outer Space (COPUOS)

Prof. Sergio Marchisio

ibliography

Case Developments and Recent Publications……….Keishunna Randall & Jamie Rutland

The *Journal of Space Law*

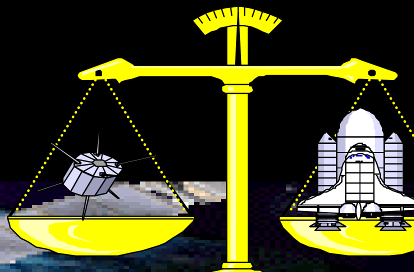
Sample of subscribers

- NASA Headquarters Library
- NASA Goddard Space Flight Center
- NASA Law Library, Office of General Counsel
- NASA Jet Propulsion Lab
- US Department of State
- US Air Force Academy
- US Naval War College
- US Dept. of Justice Main Library
- US Library of Congress, Congressional Research Service
- United Space Alliance
- NY Supreme Court
- OH Supreme Court
- US Court of Appeals, MA
- Australian Parliament Library
- Royal Embassy of Saudi Arabia
- British National Space Center
- Consulate General of Spain
- NATO C3 Agency
- United Nations Library
- Institut Suisse de Droit Compare
- Institute of Advanced Legal Studies
- International Space University

The National Center for Remote Sensing, Air, and Space Law

Publications

- **The U.N. Principles Relating to Remote Sensing of the Earth from Space: A Legislative History -- Interviews of Members of the U.S. Delegation**
- ***Landsat 7*: Past, Present and Future**
- **The Remote Sensing Industry: A CEO Forum**
- **Remote Sensing and Space Law Bibliography**
- ***Proceedings*, The 1st International Conference on the State of Remote Sensing Law**



The National Center for Remote Sensing, Air, and Space Law

Law Review Articles

- Gabrynowicz & Serrao, *An Introduction to Space Law for Decision Makers*, 30 J. Space L. 227 (2004).
  - English, French and Spanish

- Gabrynowicz, *Space Law: Its Cold War Origins and Challenges in the Era o Globalization*, 37 Suffolk U. L. Rev. 1043 (2004).

- Serrao, *Global Versus Unilateral Measures to Protect the World's Environment - Implications for the Air Transport Industry*, 27 Annals of Ai & Space L. 551 (2002).

- Gabrynowicz, The Perils of Landsat from Grassroots to Globalization: A Comprehensive Review of U.S. Remote Sensing Law with a Few Thoughts for the Future, Chi. J. Int'l L. (2005).

The National Center for Remote Sensing, Air, and Space Law

Conferences

- The 1st International Conference on the State of Remote Sensing Law
- A Legal Assistant's Guide to Legal Applications of Geospatial Information
- The Legal Applications of Geospatial Data and Information
- The Remote Sensing Industry: A CEO Forum
- Exhibition: Earth as Art Satellite Imagery
- Life, the Universe, and SETI in a Nutshell
- Science Colloquium: SETI: Pulling Signals out of Noise

Public Service

- Observers/delegates of/to international meetings and organizations: ICAO, COPUOS Legal Subcommittee, GEO
- National Satellite Land Remote Sensing Archive Committee
- Advisory Committee on Commercial Remote Sensing
- Briefed Secretary of Interior Gale Norton for Earth Observation Summit

INTERNATIONAL INSTITUTE OF
AIR AND SPACE LAW

Space law education at Leiden University

Dr. Frans von der Dunk

Director Space Law Research

International Institute of Air and Space Law

The Leiden Programmes

- Graduate course 'aerospace law'
  - 20-30 students annually
- LL.M. (adv.) Programme
  - ± 20 students annually (currently)
  - Various versions
- Ph.D. Programme
  - Individually-tailored
  - Currently 4 formal candidates in space law

LL.M. (adv.) Programme

- Core curriculum includes
  - Space law: treaties & law-making
  - Space law: applications, institutions & national law
  - European aerospace law
  - Internship - can be in space (law) sector
  - LL.M. thesis - can be on space law topic
- Requirement: law degree or equivalent

Versions

- Normal version (1 year full-time)
- Part-time version (max. 2.5 years)
- Modular version (3-4 months)
- Blended learning (all 3 versions)
  - Targeted at practitioners
  - Face-to-face: 3 x 2 weeks in Leiden
  - Distance-learning: Internet assignments
- LL.M. (adv.) / MBA combination

Methodologies

- Traditional classes
  - But limited size → (inter)active
- Guest lectures from the practice
- For BL: weekly assignments
- Presentations & papers
- ‘Projects’
- Moot court
- Various seminars, conferences etc.

INTERNATIONAL INSTITUTE OF AIR AND SPACE LAW

Space Policy Institute

Center for International Science
and Technology Policy
Elliott School of International Affairs
The George Washington University

Workshop on Space Law
Abuja, Nigeria, November 2005

Prof. Henry R. Hertzfeld
(hrh@gwu.edu)

Web site: www.gwu.edu/~spi

George Washington University

- George Washington University founded 1821
  - Three major campuses with 800 full time faculty
    - 9,000 undergraduates and 5,000 graduate students
- Elliott School of International Affairs, founded 1960
    - 40 full time faculty + 100 affiliates
    - 1800 undergraduates and 400 masters students
- Center for International Science and Technology Policy, founded 1965
  - 6 full time faculty and over 25 graduate students
  - Space Policy Institute
    - 3 faculty; approximately 10 students

Space Policy Institute Faculty

- Dr. John M. Logsdon, Director
- Dr. Ray A. Williamson, Research Professor of Space Law and International Affairs
- Dr. Henry R. Hertzfeld, Research Professor of Space Law and International Affairs

Degrees Granted

- Masters Degree in Science and Technology Policy with a specialty in Space Policy
  - As a specialty within the Elliott School of International Affairs, Center for International Science and Technology Policy
- Ph.D. (Advising Doctoral students at GW)
  - Elliott School of International Affairs does not grant a Ph.D., but the Space Policy Institute has arrangements with other schools within GW for students wishing to write dissertations in space policy

Courses

- U.S. Space Policy
  - Logsdon
- Issues in Space Policy
  - Logsdon, Williamson, Invited Lecturers
- Space Law
  - Hertzfeld
- Space and National Security
- Outer Space and International Affairs
  (Undergraduate Course)

Space Law at GWU

- Introductory Course
  - As part of the Space Policy Curriculum
  - Coordinated with the GWU Law School
- Manford Lachs Space Law Moot Court Team
  - Winner of the 2005 North American competition
  - Winner of the 2005 International competition in Fukuoka, Japan
- Research

Other Activities of the SPI

- Sponsor of international seminars and workshops on space policy
- Visiting scholars from many nations
  - China, Korea, Russia, Japan, Poland, France, Brazil, etc.
- Luncheon discussion series on space and national security
- Dinner speaker series

Selected Affiliations

- Other space expertise within GWU
  - Law School, School of Public Policy and Public Administration, School of Engineering
- Close affiliations with NASA, NOAA and other space agencies
- International Space University
- Space Education Consortium

SPI Active Research Interests

- Earth observations and remote sensing
- Space law
- International space activities
- Space and National Security
- Economic impacts of space expenditures
- History of space program
- Privatization/commercialization of space assets

Ways and means of promoting education in space law in Africa

Justine White**
University of Witwatersrand, South Africa

Introduction

In this paper I want to enlighten how, through a successful partnership between the Government, the University, the private sector and a number of supportive and enthusiastic foreign experts, the School of Law at the University of the Witwatersrand, has been able to offer an LL.M course in Space and Satellite Law, since 2000. This is to share with you all the efforts put in building a successful course that fits coherently within a broader communications law-focused LL.M programme, and which has some interesting aspects that other institutions might find useful.

The University of the Witwatersrand (Wits) is one of South Africa's premier English-speaking universities as is situated in Johannesburg. The School of Law at Wits offers a general course-work Master of Laws degree consisting, currently, of four courses (each lasting for a six month semester) and a Research Report of 10,000 words. Students may chose to do a range of courses (there are some 20 courses to choose from) and, they have the option of specializing in a particular area by choosing, for example, a human rights or a commercial law focus in their course selections.

In July 1997, I started teaching an LL.M course in Media Law, focusing on the constitutional right to freedom of expression. In the course we debated not only general media law issues such as: defamation, hate speech, pornography but also electronic media regulation, the right of access to information and to administrative justice. There was a great deal of interest in these issues as South Africa had begun to open up the broadcasting and telecommunications sectors to competition and independent broadcasting and telecommunications regulators had been established[1].

In 1997, in my professional practice as an attorney, I had begun to specialize in electronic communications issues, specifically, in the regulation of broadcasting and telecommunications.

The more I got involved in electronic communications law, three things became clear:

** BA LL.B (Wits) LL.M (Yale), Webber Wentzel Bowens Visiting Senior Fellow of Communications Law, Mandela Institute, School of Law, University of the Witwatersrand. Director, Mukwevho Mkhabela Adekeye Inc.

[1] These were the Independent Broadcasting Authority and the South African Telecommunications Regulatory Authority, which, in 2000, were merged to form the Independent Communications Authority of South Africa.

- Electronic communications had a significant impact on broader socio-economic development in South Africa and was an important economic driver in South Africa and in Africa generally;
- South African university law schools, as a rule, were not teaching telecommunications and broadcasting law, such as electronic communications law. There were one or two courses (mostly at the LL.M level) in Internet law but teaching the regulation of electronic communications itself was not being addressed; and
- There was a desperate need for specialized legal skills in the electronic communications sector given the growth of the sector and lawyers were needed: in government (to formulate policy and draft legislation), in the electronic communications regulators (to deal with licensing, and other regulatory issues) and in the private sector, to represent clients' interests.

I started planning to expand the single Media Law course into three courses: Media Law, Broadcasting Law and Telecommunications Law and former students from the Media Law course (some of whom were working in the sector) indicate their willingness to help get these expanded courses off the ground.

But then, I had a chance to meet the then-Director-General of the Department of Communications ("DOC"), Mr. Andile Ncgaba, at a satellite conference at the Centre for Scientific and Industrial Research. Mr. Ncgaba mentioned that the South African Government, through the DOC, was interested in funding a space and satellite law course at a university but hadn't settled upon a particular institution as yet.

That chance led to a series of discussions between Wits and the DOC about developing a Wits degree at the LL.M level focusing on communications law issues. We talked about the courses and how they could fit together and came up with the idea of a four-module Communications Law specialization as follows:

- Constitutional Underpinnings of Electronic Communications Law: which would be a re-shaping of the former Media Law course;
- Broadcasting Law: focusing on the regulation of broadcasting in South Africa (the industry comprises public, private and community broadcasters);
- Telecommunications Law: focusing on the regulation of telecommunications in South Africa; and
- Space and Satellite Law.

I. Training the Trainers

The DOC, and Mr. Ncgaba in particular, was passionate about space issues. It was clear that the DOC wanted South Africa to be involved in space activities and wanted to be involved in capacity building (in science, technology and law) to create a general level of space-related skills in the country to ensure that South Africa's space-related activities could flourish.

We discussed the Space and Satellite Law programme and agreed that it ought ultimately to have a specific communications-law focus while dealing with the general International law principles of space law to enable lawyers who had taken the course to be able to deal with a number of space law-related issues and not only communications ones.

But there was a problem. While I had studied Public International Law to quite an advanced level in my own legal studies I knew nothing about Space Law specifically. Similarly, my practice as an attorney had allowed me also to develop a theoretical understanding of telecommunications and broadcasting law at a national level, including in respect of satellite issues, but I was not equipped with the necessary knowledge of international communications satellite regulatory issues.

The DOC immediately suggested sending me, together with a member in the Space Directorate within the DOC, for training in space law and to meet the international experts in this area who could assist in developing the course. And that is where the third element of the successful partnership came into play: the issue of supportive international experts.

In mid 1999 we arrived in Rovaniemi, Finland, to do the Certificate in Air and Space Law at the University of Lapland. Professor Andem's focused course covered:

- The technology aspects of space
- The International treaties; and
- A field trip to a satellite telemetry tracking station.

The course included a number of international guest lecturers including Mr. Giuseppe Barberis of Eutelsat who was teaching on the commercial contractual issues in Space Law.

Following our time in Finland we went to McGill University, to meet with Professor Ram Jakhu from the Institute of Air and Space Law. Mr. Jakhu was extraordinarily helpful in making McGill's extensive library available to us and in advising us on how to go about putting a course together and starting to build up a library of relevant Space Law materials.

II. Making it Happen

Back in South Africa, the DOC and Wits cemented their common commitment to providing Space Law education by entering into a formal written contract, which provided for the DOC to donate approximately R350 000.00 per annum to Wits to fund:

- 10 bursaries a year for historically disadvantaged students: black people, women and the disabled. These bursaries cover all tuition costs and the relevant course packs for the LL.M specialization in Communications Law. It is important to note that in practice the DOC has been generous in allowing these bursaries to be given to deserving African students too, and besides South African students, students from other African countries including: Senegal, Nigeria, Lesotho, Zimbabwe and the Democratic Republic of Congo have been able to do the degree;
- A Communications Law section within Wits' Law Library. We now have an impressive collection of books and journals dealing with communications law issues and we have a number of materials that deal specifically with space law. Our librarian is of the view that it is the most comprehensive Space Law Library on the Continent[2]; and
- Visiting lecturers: this funding comprises three aspects:
  - a co-lecturers programme to ensure that the lecturing roles are replicated. The aim of this is to take excellent Black graduates from the LL.M

[2] See the annexure which lists the Communications Law-related titles the Wits Law Library had acquired by November 2005.

programme and to train them as co-lecturers to ensure that various educational skills are passed on. Thus far a number of Black co-lecturers have been appointed and have been trained in aspects of university teaching, including:

- drafting an appropriate course curriculum;
- choosing appropriate reading materials;
- preparing course packs;
- preparing lecture notes;
- giving lectures;
- facilitating class discussions and debates;
- setting examinations and essay topics;
- marking examinations and essay topics;
- conducting oral examinations; and
- liaising with external examiners;

- Wits Communications Law lecturers being able to attend international workshops and conferences. Thus far, we have used this funding to attend: part of the ITU Plenipotentiary meeting in 2002 in Marrakesh, a telecommunications workshop in India and this workshop; and
- Invited foreign guests to come to South Africa to teach. This has been extremely significant and has enabled a number of international guests to come and teach in South Africa (some of whom have come many times) including: Professor Ram Jakhu, Mr. Guiseppe Barberis, Mr. Jeremy Rose and Ms. Katrin Nyman-Metcalf. In the beginning of the programme, a number of the classes were taken by the foreign lecturers, but as capacity building of local academics has taken place this has become less necessary. Another important aspect of foreign guest lecturers is that the Space and Satellite course has pioneered making use of video-conferencing for teaching purposes. For example, Mr. Barberis and a colleague from Eutelsat gave a lecture on "the Privatization of International Satellite Organizations" from Paris by way of video-link up with the entire class and a lively real time inter-Continental discussion ensued. While Wits has the facilities for video conferencing, it is extremely expensive. However, we have found that foreign experts were often happy to facilitate their companies or institutions paying for the costs of the video conferencing, which has been of great assistance.

This funding by the DOC was augmented by a significant donation made to the Wits Law School by one of Johannesburg's leading law firms, Webber Wentzel Bowens ("WWB"), to fund the salary of a Communications Law academic. This enabled me to commit to spending two full days a week at the University and to reduce my attorney's practice from five to three days a week.

Wits' reciprocal obligations were to provide for a Communications Law specialization in its LL.M programme by offering the four courses: Constitutional Underpinnings of Communications Law, Broadcasting Law, Telecommunications Law and Space and Satellite Law and by agreeing to make academic resources available to supervise Research Reports on a Communications Law-related topic. In this regard it is particularly important to note that Wits, in keeping with the right to academic freedom, is entirely at liberty to determine the course content, manner of teaching with regard to the Communications Law course and the DOC and WWB have no influence over course content and the way in which issues are taught at Wits.

III. The Space and Satellite Law Course Curriculum at Wits

Currently, Space and Satellite Law is taught in the second semester, that is, from July to November. Broadly speaking it consists of a number of topics for which readings are assigned[3] that focus initially on general space law issues and later on satellite communications law issues. The course consists of the following topics:

- *An Introduction to Space Technologies***.** This topic is usually taught by Mr. Mlamli Booi, a South African telecommunications engineer who has served on the country's Independent Broadcasting Authority (as it was then known). Mr. Booi is extremely skilled at talking to lawyers (who generally have no technological or scientific background) in a manner that easily explains complex space technologies.
- *An Introduction to Space Applications***.** In the past this topic has been taught by Dr. Daniel Limpitlaw, a South African environmental mining engineer who specializes in using satellite imagery for: assessing the environmental impacts of mining activities, analyzing geological formations etc. This is useful in giving students a broader idea of space applications apart from satellite broadcasting and telecommunications.
- *International Space Law Treaties*. This topic is covered in at least two seminars and involves an in-depth discussion of International Space Law including: the structures of the United Nations ("UN") and the Committee on Peaceful Uses of Outer Space ("COPUOS"), the various treaties and conventions and the key principles and values underlying these. Throughout this discussion, emphasis is put on the needs and position of the developing world in general and of Africa in particular.
- *International Satellite Telecommunications Law.* This topic is also covered in at least two seminars and involves an in-depth discussion of the organs and operations of the International Telecommunications Union ("the ITU"), the ITU's procedures in respect of geo-stationary orbital slot positions; the ITU's procedures in respect of spectrum management and spectrum allocations. Again emphasis is put on the needs and position of the developing world in general and of Africa in particular.
- *International Satellite Broadcasting Law*. This topic involves an analysis of a number of international conventions and resolutions on satellite broadcasting and examines, among other issues, the prior consent debate with regard to international satellite broadcasting.
- *Satellite Broadcasting in South Africa***.** This topic involves an analysis of South Africa's domestic laws and regulations regarding satellite broadcasting and looks at whether the international debates have been effectively dealt with at the national level.
- *Satellite Telecommunications in South Africa.* This topic involves an analysis of South Africa's domestic laws and regulations regarding satellite telecommunications, including, GMPCS.
- *International Satellite Organizations: Historical and Future Role.* This topic is usually covered in at least two seminars and involves an in-depth discussion of the organs and operations of various International satellite organizations such as: Intelsat, Eutelsat, Inmarsat, Arabsat etc. The aim of this lecture is to explore the practical and theoretical implications of the privatization of these bodies with

[3] The current course outline and reading list is annexed for your ease of reference. Please note that due to the relocation to another province of Ms Joy-Marie Lawrence, who has co-taught the course with me for the past few years, I taught the course alone in 2005.

particular emphasis on whether or not this has implications for the developing world in general and for Africa in particular.

- *Satellite Contracts***:** This topic focuses on various commercial aspects of different types of satellite contracts e.g. for the purchase of space segment, satellite procurement contracts, launch contracts etc. Issues include: service level requirements, insurance, liability etc.
- *Regional and Local Satellite/Space Initiatives***.** The aim of this topic is to focus on South Africa and Africa's various space and space law initiatives. This entails examining the provisions of South Africa's Space Affairs Act and South Africa's current space policy process and also an in-depth look at the convention and operating agreement of RASCOM, Africa's regional satellite organization.

1. The Space and Satellite Law Course at Wits: Insights from the Classroom

At Wits (as is the case at African and indeed all other universities) our students are desperate for legal skills that will equip them to get jobs or to improve their marketability once they are in the profession.

The Space and Satellite Law course, to put it mildly, was not a popular choice in the beginning and students doing the LL.M in Communications Law used to question the relevance of the first part of course ie the general principles and instruments of space law - they just could not see the relevance or practical application of it. Perhaps this is universal among space lawyers but there seemed to be far too many snide comments about "space cadets" doing the rounds.

Many of our students come from extremely disadvantaged communities – I recently had a student who clearly remembered the first time he used a telephone - it was when he turned 18 and had visited his father's place of work. In such communities: no one has a telescope; very few schools teach about space topics, not even the fundamentals such as the planets, the solar system etc; and people cannot afford access to subscription satellite broadcasting. So a career in space law probably seems about as remote as… outer space!

Probably the most important hurdle to overcome in getting the students really engaged is just the crisis of imagination that results from disadvantage – when you cannot imagine that this high tech exciting area of law could have real career opportunities or even have anything to do with you at all. So the chance to engage with engineers and lawyers who have made a career out of space-related activities (our focus was satellite communications) has really changed attitudes and it is extremely gratifying to see students suddenly open up to the opportunities that Space Law brings.

Our students consist of a mix of part time and full time LL.M students and some of our students are already in the Communications Law field: working for the regulator, government, in broadcasting, telecommunications or signal distribution companies, whether public or private, or in private practice with a law firm that does work in the field. The classes are small, averaging 10 students a year (but this has ranged from 3 to 26 students) and this allows for in-depth discussion and ensures that each student is required to participate. The international nature of the course means that African students from all over the Continent get to debate and discuss African concerns regarding space resources. For example, there were students from four African countries (South Africa, Kenya, Lesotho and Zimbabwe) in the class that just completed the course.

In the five years, since the course has been running, we have built up a pool of graduates who can now go on to contribute immeasurably to the Continent as government policy makers, regulators, in-house legal advisors on space and satellite law issues and this ought to be encouraged by governments employing them and making use of their skills.

IV. Space Law Education in Africa - Some Strategic Recommendations

In order to overcome the challenges faced by a lack of funding, I think that it is time that we harnessed the skills and educational experience that already exists in Africa. Listening to the speakers and particularly to the questions posed over the past few days, I would like to make the following suggestions for people who are interested in ensuring that Space Law is taught in their countries but have no idea where to begin:

- Don't wait for formalized certain funding – it might never come;
- There are some 50 countries in Africa. Of these, 30 have at least one graduate from Mc Gill University's Institute of Air and Space Law. If we accessed these graduates in teaching or even just in advisory capacities, we could tap into a wealth of knowledge and expertise. There are also graduates from the International Space University and other institutions;
- Make use of resources/people who are available on-line eg space laws and developments (eg Space Law update), the UN Office for Outer Space Affairs, all the speakers which you have met here etc. The advantage of International Space Law is that is that it does not change radically from year to year. While it is a nice to have, it is not necessary to have a library full of hard copy materials, access to the Internet is sufficient;
- Investigate video conferencing as a means of supplementing teaching and be bold about asking whether the foreign institution could pay the cost thereof;
- If there is a small amount of funding available, use it to access good foreign experts who can: do concentrated teaching (e.g. on consecutive days), advise on the curriculum, assist with reading lists etc. In my experience, people are often very willing to come and teach and you might even find some who are able to access their own funding to come and teach;
- Stay involved in space law networks, even if you have to do this remotely e.g. through email discussions and be innovative with the lack of funding; and
- Finally, and most importantly, I think it is important to challenge governments in Africa to actually make use of Space Law graduates (whether trained locally or overseas) - include them in delegations (as participants and/or observers) to organizations such as COPUOS, the ITU and regional and continental bodies dealing with communications and other satellite/space law issues including, SADC, ECOWAS, RASCOM etc. Not only will this increase the desire of people to be trained in this area, it will professionalize and increase the effectiveness of government delegations and enable Africa, to be able to promote a developmental agenda in these organizations.

Course Outline and Reading List: Space and Satellite Law – 2nd Semester 2005

Classes take place on Tuesdays from 17h30 to 19h00 in Room 41, unless otherwise indicated.

Classes will begin promptly at 17h30.

The course co-ordinator is Justine White, Webber Wentzel Bowens Visiting Senior Fellow in Communications Law at the Mandela Institute, School of Law and director, Mukwevho, Mkhabela and Adekeye Inc.

Justine White
Consultation time: 16h30 – 17h30 on Mondays. Room 137 Wits Law School
Email: whitej@law.wits.ac.za
Tel: 717-8421 (available on Mondays and Tuesdays)

Please refer all administrative queries to Ms Mimi Motsiri on 717-8402.

Examinations:
All students will be required to write a term paper (50 %) and undergo a closed book examination (50%) of one and a half hours.

Papers:
Paper are to be approximately 25 typed pages – 1.5 spacing on a Space Law topic. The papers must be in the house-style of the South African Law Journal (the library has copies of the style rules). The topic must be one that has been set or approved by Justine White. The papers are to be handed in to Mimi Motsiri by 15h00 on 25 October 2005. Please note that absolutely no extensions will be granted, as the submission date is so close to the beginning of the examinations period.

Aim of the Course:
This course, the only one of its kind in Africa, is taught with the assistance of visiting lecturers from overseas. As a result, a number of high intensity periods of teaching are often necessary (ie three lectures a week on occasion). Students who wish to complete the course must be prepared to be flexible in this regard. The course is run as a series of lectures/seminars and the discussion is aimed at a high level, with the assumption that all students have completed all the readings. Students will obtain both an understanding of South African and International Space and Satellite Law generally, with a particular emphasis on those aspects relating to communications law.

Seminar One: 19 July 2005
Topic: Introduction to Space Applications ie Different Satellite Uses
Lecturer: Justine White/Dr. Daniel Limpitlaw
Readings:

- Pages 17-24 (incl) of Chapter Two "Boundaries of Outer Space in *An Introduction to Space Law* 1999. Editor Diederiks-Verschoor. Kluwer Law International.
- Prof Jakhu's Space Law Notes
- Chapter 7: "The Development of Space Law from a Third World Perspective" in *Recent Trends in International Space Law and Policy* by Mani, Bhatt and Reddy. Lancers Books
- Chapter 1 and Chapter 2 (upto and incl pg 27 only) in *Launching and Operating Satellites* by R. Bender. Martinus Nijhoff Publishers.

Seminar Two 26 July 2005
Topic: An Introduction to Space Technologies
Lecturer: Mlamli Booi, Independent Communications Consultant and formerly of ICASA
Reading List:

- Pages 35-40 (incl) of Chapter 3: "Satellite Communications" in *Telecommunications Made Easy* by Khumalo. 1988. Raven Press
- Pages 253-262 (incl) of "The International Telecommunications Union and the Geo-Stationary Orbit: An Overview" by Wilson in *Annals of Air and Space Law* 1998 Vol. XXIII.

Seminar Three: 2 August 2005
Topic: International Space Law Treaties - General
Lecturer: Justine White
Reading List:

- Prof Jakhu's Space Law Notes
- 1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Underwater
- 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies
- 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space
- Pages 12-19 of "Achievements of the United Nations in the Establishment of International Space Law by a Series of Space Treaties" in *Unispace III: Technical Forum.* 1999, United Nations.
- Chapter 1 in *Satellite Communications Regulations in the Early 21st Century* by Salin. Martinus Nijhoff Publishers.

Seminar Four 16 August 2005
Topic: International Space Law Treaties – General Cont.
Lecturer: Justine White
Reading List:

- Prof Jakhu's Space Law Notes
- 1972 Convention on International Liability for Damage Caused by Space Objects
- 1975 Convention on Registration of Objects Launched into Outer Space
- 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies
- 1986 Principles Relating to Remote Sensing of the Earth from Outer Space
- 1992 Principles Relevant to the Use of Nuclear Power Sources in Outer Space
- 1996 Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of all States, taking particular account of the Needs of Developing Countries.

Seminar Five to Seven 23-25 August 2005 **NOTE THESE ARE TWO HOUR LONG LECTURES EACH, FROM 17H30-19H30 DAILY.**
Topic: International Satellite Telecommunications Law. Topics to be covered include:

- The Operation of the International Telecommunications Union
- Obtaining a Satellite Slot through the International Telecommunication Union
- Rights and Responsibilities of Satellite Slot Registrants and ITU Radio Rules
- Current issues of Radio Frequency and Orbital Congestion, Developing Country Perspectives

Lecturer: Prof Ram Jakhu, Head, Institute of Air and Space Law, McGill University, Canada.
Reading List

- Professor Jakhu's Notes

EXTRA LONG STUDY BREAK

Seminar Eight: 19 September 2005
Topic: Satellite Broadcasting: International
Lecturer: Justine White

- 1936 International Convention Concerning the Use of Broadcasting in the Cause of Peace
- 1979 Convention Relating to the Distribution of Programme-carrying Signals Transmitted by Satellite
- 1992 Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting
- Pages 243-254 (incl) of Chapter 9: “Direct Broadcasting Satellites” in *The Law and Regulation of International Space Communication.* White. 1988. Artech House.
- Pages 57-61 (incl) of “Communications Satellites” in *An Introduction to Space Law* Diederiks. 1999. Kluwer Law International
- Prof Jakhu’s Space Law Notes

Seminar Nine: 27 September 2005
Topic: Satellite Broadcasting: South Africa
Lecturer: Justine White
Readings:

- Broadcasting Act, 1999 as amended by the Broadcasting Amendment Act 64 of 2002. Chapters: I, III, V, and VII.
- Discussion Paper on Subscription Broadcasting 2005
- “Satellite Broadcasting: Breaking Down the Issues” by Ria Greyling in Free Press March 2002, published by the Media Institute of Southern Africa.
- Turner Broadcasting System, Inc v FCC 512 US …(1994).

Seminar Ten: 4 October 2005
Topic: Satellite Telecommunications in South Africa
Lecturer: Justine White
Reading List:

- Telecommunications Act: Section 1 (definitions) and Chapter V (Telecommunication Services)
- GMPCS Regulations
- Section 8.3.1.5 (on pages 347-350 incl) in *Satellite Communications Regulations in the Early 21st Century* by Salin. Martinus Nijhoff Publishers.
- Pages 385-398: “Mobile Satellite Communications” in *Outlook on Space Law Over the Next 30 Years* by Lafferanderie and Crowther. Kluwer Law International
- “The Future of Regulation of Global Mobile Personal Communications by Satellite: A Farewell to Lex Americana” by Jurgen Cloppenburg in the *Annals of Air and Space Law*. 2000 Vol. XXV

Seminar Eleven and Twelve: 10 and 11 October. **NOTE THESE ARE TWO HOUR LONG LECTURES EACH IE FROM 17H30-19H30 DAILY.**
Topic: International Satellite Organizations: Historical and Future Role
Lecturer: Katrin Nyman-Metcalf
Reading List:

- Pages 132-152 (incl) of Session 5 “The Role of International Organizations in Privatization and Commercial Use of Outer Space” in *Unispace III: Technical Forum.* 1999, United Nations.

- “Special Problems of Privatizing the International Mobile Satellite Organization” by David Soger. *Annals of Air and Space Law.* 2000 Vol XXV
- “Restructured Inmarsat and Public Service Obligations” by Jerzy Vanau in *Annals of Air and Space Law*. 2001 Vol XXVI.
- Chapter 8: “Private Enterprise in Space“ in Activities in Space: Appropriation or Use by Katrin Nyman-Metcalf

Seminar Thirteen: 17 October 2005
Topic: Regional Satellite/Space Initiatives
Lecturer: Justine White
Reading List:

- Space Affairs Act, 1993
- Convention and Operating Agreement of RASCOM (Regional African Satellite Communications Organization)
- Pages 312-314 (incl) of *International Law, a South African Perspective. 2 Ed.* Dugard. 2000
- Khumalo and Sibanda, Telecommunications Made Easy 1998 Ravan Press Chapter 10 pg 90-93.
- Kotze and Steyn “African Elite Perspectives: AU and Nepad” 2003 Konrad Ardenauer Stiftung Chapter 4 pg 82-91.

COMMUNICATIONS LAW/SPACE LAW

BOOKS

ACTIVITIES IN SPACE: APPROPRIATION OR USE? / KATRIN NYMAN METCALF.

AFRICAN ELITE PERSPECTIVES: AU AND NEPAD: A COMPARATIVE STUDY ACROSS SEVEN AFRICAN COUNTRIES / HENNIE KOTZE, CARLY STEYN.

AFRICAN TELECOMMUNICATION INDICATORS 2001.

ANTITRUST AND NEW MEDIA / VOLUME EDITOR, MIGUEL DE AVILLEZ PEREIRA.

ARBITRATION IN AIR, SPACE AND TELECOMMUNICATIONS LAW: ENFORCING REGULATORY MEASURES: PAPERS EMANATING FROM THE THIRD PCA INTERNATIONAL LAW SEMINAR, FEBRUARY 23, 2001 / EDITED BY THE INTERNATIONAL BUREAU OF THE PERMANENT COURT OF ARBITRATION.

BEYOND OUR CONTROL?: CONFRONTING THE LIMITS OF OUR LEGAL SYSTEM IN THE AGE OF CYBERSPACE / STUART BIEGEL.

BROADCASTING AND THE NATIONAL QUESTION: SOUTH AFRICAN BRAODCAST MEDIA IN AN AGE OF NEO-LIBERALISM.

BROADCASTING IN THE EUROPEAN UNION : THE ROLE OF PUBLIC INTEREST IN COMPETITION ANALYSIS / INGRID NITSCHE.

BROADCASTING POLICY AND PRACTICE IN AFRICA / EDITED BY TAWANA

KUPE.

BROADCASTING REFORM IN INDIA: MEDIA LAW FROM A GLOBAL PERSPECTIVE / EDITED BY MONROE E. PRICE, STEFAN G. VERHULST.

BUILDING DIGITAL BRIDGES: EGYPT'S VISION OF THE INFORMATION SOCIETY.

BURKINA FASO: THE RIGHT TO ACCESS INFORMATION - AN ESSENTIAL HUMAN RIGHT / REPORT WRITTEN BY CAROLYN NORRIS, WITH THE COLLABORATION OF NEWTON AHMED BARRY.

BUTTERWORTHS INFORMATION TECHNOLOGY LAW HANDBOOK / CONSULTANT EDITOR, JEREMY PHILLIPS.

CARLOS CARDOSO: TELLING THE TRUTH IN MOZAMBIQUE / PAUL FAUVET AND MARCELO MOSSE.

THE CHANGING ROLE OF GOVERNMENT IN AN ERA OF TELECOMMUNICATIONS DEREGULATION: BRIEFING REPORT ON TELECOMMUNICATIONS REGULATORY ISSUES FOR ELECTRONIC COMMERCE / DAVID N. TOWNSEND.

THE COMMODIFICATION OF INFORMATION / EDITED BY NIVA ELKIN-KOREN AND NEIL WEINSTOCK NETANEL.

COMMUNICATION AND DEMOCRATIC REFORM IN SOUTH AFRICA / ROBERT B. HORWITZ.

COMMUNICATIONS LAW / BY YVONNE BURNS.

COMPILATION OF SELECTED ACTS WITHIN THE JURISDICTION OF THE COMMITTEE ON COMMERCE: COMMUNICATIONS LAW INCLUDING COMMUNICATIONS ACT OF 1934 ... SELECTED PROVISIONS FROM THE UNITED STATES CODE / PREPARED FOR THE COMMITTEE ON COMMERCE, U.S. HOUSE OF REPRESENTATIVES.

THE CONSUMER LAW SOURCEBOOK 2000 : ELECTRONIC COMMERCE AND THE GLOBAL
ECONOMY.

CONTROLLING MARKET POWER IN TELECOMMUNICATIONS: ANTITRUST VS. SECTOR-SPECIFIC REGULATION / DAMIEN GERADIN AND MICHEL KERF.

COPYRIGHT AND ELECTRONIC COMMERCE: LEGAL ASPECTS OF ELECTRONIC COPYRIGHT MANAGEMENT / EDITOR P. BERNT HUGENHOLTZ; CONTRIBUTORS KAMIEL J. KOELMAN... [ET AL.].

CYBERLAW @ SA II: THE LAW OF THE INTERNET IN SOUTH AFRICA / REINHARDT BUYS, EDITOR; FRANCIS CRONJ{226}E, WEB SITE EDITOR.

DATA PROTECTION: A PRACTICAL GUIDE TO UK AND EU LAW / PETER CAREY.

DATA PROTECTION: LAW AND PRACTICE / BY ROSEMARY JAY AND ANGUS HAMILTON.

DEFAMATION: LAW, PROCEDURE AND PRACTICE / DAVID PRICE AND KORIEH DUODU.

DEFENDING PORNOGRAPHY: FREE SPEECH, SEX, AND THE FIGHT FOR WOMEN'S RIGHTS / NADINE STROSSEN.

DEFINING DEFAMATION: PRINCIPLES ON FREEDOM OF EXPRESSION AND PROTECTION OF REPUTATION.

DESTRUCTIVE MESSAGES: HOW HATE SPEECH PAVES THE WAY FOR HARMFUL SOCIAL

MOVEMENTS / ALEXANDER TSESIS.

DEVELOPING COUNTRIES IN THE WTO / CONSTANTINE MICHALOPOULOS.

DIGITAL EVIDENCE AND COMPUTER CRIME : FORENSIC SCIENCE, COMPUTERS AND THE INTERNET.

THE DIGITAL REVOLUTION / JACK CHALLONER.

E-COMMERCE IN PRACTICE / DAWID B JORDAAN ... [ET AL.]; EDITORS: JOHN CARSTENS & PIERRE LOUW.

E-COMMERCE, WTO AND DEVELOPING COUNTRIES / BY ARVIND PANAGARIYA.

EARTH - ORIENTED SPACE ACTIVITIES AND THEIR LEGAL IMPLICATIONS: PROCEEDINGS OF THE SYMPOSIUM HELD ON OCTOBER 15-16, 1981 = LES ACTIVIT{226}ES SPATIALES EFFECTU{226}EES AU SERVICE DE LA TERRE ET LEURS IMPLICATIONS JURIDIQUES: RAPPORT DU SYMPOSIUM TENU LES 15 ET 16 OCTOBRE 1981.

EC COMPETITION AND TELECOMMUNICATIONS LAW / EDITED BY CHRISTIAN KOENIG, ANDREAS BARTOSCH AND JENS-DANIEL BRAUN.

ELECTRONIC COMMERCE: LAW AND PRACTICE / MICHAEL CHISSICK AND ALISTAIR KELMAN.

ELECTRONIC COMMERCE: LAW AND PRACTICE / MICHAEL CHISSICK AND ALISTAIR KELMAN.

ELECTRONIC SIGNATURES: LAW AND LEGISLATION / BY LORNA BRAZELL.

ENCYCLOPEDIA OF EUROPEAN TELECOMMUNICATIONS LAWS / [EDITED BY] CHRIS WATSON [OF] SIMMONS & SIMMONS.

EUTELSAT: CONVENTION AND OPERATING AGREEMENT (ENTERED INTO FORCE 1 SEPTEMBER 1985).

FIXED WIRELESS ACCESS.

FREEDOM OF COMMERCIAL EXPRESSION / EDITED BY ROGER SHINER.

FREEDOM OF EXPRESSION AND FREEDOM OF INFORMATION: ESSAYS IN HONOUR OF SIR DAVID WILLIAMS / EDITED BY JACK BEATSON AND YVONNE CRIPPS.

FREEDOM OF EXPRESSION IN ENGLAND AND UNDER THE ECHR: IN SEARCH OF A COMMON GROUND: A FOUNDATION FOR THE APPLICATION OF THE HUMAN RIGHTS ACT 1998 IN ENGLISH LAW / HELEEN BOSMA.

FREEDOM OF SPEECH AND INCITEMENT AGAINST DEMOCRACY / THE MINERVA CENTER FOR HUMAN RIGHTS, THE HEBREW UNIVERSITY OF JERUSALEM AND FRIEDRICH EBERT STIFTUNG; EDITED BY DAVID KRETZMER AND FRANCINE KERSHMAN HAZAN.

THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD/ LAWRENCE LESSIG.

THE GATT/WTO DISPUTE SETTLEMENT SYSTEM: INTERNATIONAL LAW, INTERNATIONAL ORGANIZATIONS AND DISPUTE SETTLEMENT.

GLOBAL TELECOMMUNICATIONS LAW AND PRACTICE / GENERAL EDITOR: COLIN D. LONG.

GUIDE TO THE GATS: AN OVERVIEW OF ISSUES FOR FURTHER LIBERALIZATION OF TRADE IN SERVICES / EDITED BY WTO SECRETARIAT.

HANDBOOK: MOBILE-SATELLITE SERVICE (MSS).

HANDBOOK ON JOURNALISM ETHICS: "JOURNALISM PRACTICE & TRAINING": AFRICAN CASE STUDIES / EDITED BY CHUDI UKPABI.

HANDBOOK: SPACE RESEARCH COMMUNICATIONS.

HANDBOOK: TERRESTRIAL LAND MOBILE RADIOWAVE PROPAGATION IN THE VHF/UHF BANDS.

HUMAN RIGHTS AND GOOD GOVERNANCE: BUILDING BRIDGES / EDITED BY HANS-OTTO SANO AND GUDMUNDUR ALFREDSSON ; WITH THE COLLABORATION OF ROBIN CLAPP.

THE IMPACT OF THE INTERNET AND NEW TECHNOLOGIES ON THE WORKPLACE: A LEGAL ANALYSIS FROM A COMPARATIVE POINT OF VIEW / MICHELE COLUCCI ; EDITOR, ROGER BLANPAIN.

IMPORTING THE FIRST AMENDMENT: FREEDOM OF EXPRESSION IN AMERICAN, ENGLISH AND EUROPEAN LAW / EDITED BY IAN LOVELAND.

IN HARM'S WAY: THE PORNOGRAPHY CIVIL RIGHTS HEARINGS / EDITED BY CATHARINE A. MACKINNON AND ANDREA DWORKIN.

AN INFORMATION POLICY HANDBOOK FOR SOUTHERN AFRICA / EDITOR, TINA JAMES; CONTRIBUTORS, NEIL BUTCHER ... [ET AL] ; REVIEWERS, MICHAEL JENSEN, NIGEL MOTTS, SE{226}AN {226}O SIOCHR{226]U.

INFORMATION PRIVACY LAW / DANIEL J. SOLOVE, MARC ROTENBERG.

INFORMATION TECHNOLOGY LAW IN AUSTRALIA / OLUJOK E AINDEMOWO.

INFORMATION TECHNOLOGY LAWS / EDITED BY R.K. SURI, PARAG DIWAN, SHAMMI KAPOOR.

INTERNATIONAL IDEA HANDBOOK ON DEMOCRACY ASSESSMENT / DAVID BEETHAM ... [ET AL., EDITORS].

INTERNATIONAL SPACE LAW AND THE UNITED NATIONS / BY NANDASIRI JASENTULIYANA.

INTERNATIONAL TRADE LAW AND THE GATT/WTO DISPUTE SETTLEMENT SYSTEM / EDITED BY ERNST-ULRICH PETERSMANN.

INTERNET FOR A MOBILE GENERATION

INTERNET MARKETPLACES : THE LAW OF AUCTIONS AND EXCHANGES ONLINE/ CHRISTINA RAMBERG ; CONSULTANT EDITOR : CHRISTOPHER KUNER.

AN INTRODUCTION TO SPACE LAW.

AN INTRODUCTION TO SPACE LAW / BY I.H. PH. DIEDERIKS-VERSCHOOR.

IP TELEPHONY.

LAUNCHING AND OPERATING SATELLITES: LEGAL ISSUES / R. BENDER.

LAUNCHING SPACE OBJECTS: ISSUES OF LIABILITY AND FUTURE PROSPECTS / BY VAL{226}ERIE KAYSER.

THE LAW AND MEDIA IN BENIN.

THE LAW AND POLICY OF AIR SPACE AND OUTER SPACE: A COMPARATIVE APPROACH / BY P.P.C. HAANAPPEL.

THE LAW AND REGULATION OF INTERNATIONAL SPACE COMMUNICATION / RITA LAURIA WHITE AND HAROLD M. WHITE, JR.

THE LAW OF COPYRIGHT AND THE INTERNET: THE 1996 WIPO TREATIES THEIR

INTERPRETATION AND IMPLEMENTATION / BY MIH{226}ALY FICSOR.

THE LAW OF DEFAMATION AND THE INTERNET / BY MATTHEW COLLINS.

THE LAW OF ENTERTAINMENT AND BROADCASTING / VINCENT NELSON, ASSISTED BY PARISH PATEL [AND] MATTHEW SELIGMAN.

THE LAW OF FREEDOM OF INFORMATION / BY JOHN MACDONALD, CLIVE H. JONES WITH ROSS CRAIL, COLIN BRAHAM; AND CONTRIBUTIONS FROM STEPHEN SCHAW MILLER ... [ET AL.].

THE LAW OF PRIVACY AND THE MEDIA / EDITED BY MICHAEL TUGENDHAT, IAIN CHRISTIE.

LAW RELATING TO COMPUTERS, INTERNET AND E-COMMERCE : A GUIDE TO CYBERLAWS AND THE INFORMATION TECHNOLOGY ACT, 2000, WITH RULES AND NOTIFICATIONS / NANDAN KAMATH, EDITOR.

THE LAWS OF THE INTERNET / BY CLIVE GRINGRAS.

LEFT TO THEIR OWN DEVICES: THE IMPACT OF INFORMAL INFORMATION AND COMMUNICATION NETWORKS ON SECURITY IN THE TANZANIAN REFUGEE CAMPS.

LEGAL AND ETHICAL LESSONS OF NATO'S KOSOVO CAMPAIGN / ANDRU E. WALL, EDITOR.

LEGAL BASIS FOR A NATIONAL SPACE LEGISLATION / BY JULIAN HERMIDA.

THE LEGAL FRAMEWORK FOR FREEDOM OF EXPRESSION IN ETHIOPIA.

THE MEDIA CONTRACTS HANDBOOK / BY DEBORAH FOSBROOK, ADRIAN C. LAING.

THE MEDIA IN GUINEA.

MEDIA LAW / BY GEOFFREY ROBERTSON AND ANDREW NICOL.

MEDIA LAW AND HUMAN RIGHTS / ANDREW NICOL, GAVIN MILLAR, ANDREW SHARLAND.

MEDIA STUDIES / EDITED BY PIETER J. FOURIE.

MINORITY-LANGUAGE RELATED BROADCASTING AND LEGISLATION IN THE OSCE / PROGRAMME IN COMPARATIVE MEDIA LAW AND POLICY (PCMLP), CENTRE FOR SOCIO-LEGAL STUDIES, WOLFSON COLLEGE, OXFORD UNIVERSITY & INSTITUTE FOR INFORMATION LAW (IVIR), UNIVERSITEIT VAN AMSTERDAM ; EDITED BY TARLACH MCGONAGLE, BETHANY DAVIS NOLL, MONROE PRICE.

THE MURDOCH ARCHIPELAGO / BRUCE PAGE IN COLLABORATION WITH

ELAINE POTTER.

OBSCENITY AND PORNOGRAPHY DECISIONS OF THE UNITED STATES SUPREME COURT / MAUREEN HARRISON & STEVE GILBERT, EDITORS.

OUTLOOK ON SPACE LAW OVER THE NEXT 30 YEARS: ESSAYS PUBLISHED FOR THE 30TH ANNIVERSARY OF THE OUTER SPACE TREATY / EDITOR-IN-CHIEF, GABRIEL LAFFERRANDERIE AND CO-EDITOR, DAPHN{226}E CROWTHER.

POLITICS OF THE INFORMATION SOCIETY : THE BORDERING AND RESTRAINING OF GLOBAL DATA FLOWS.

PORNOGRAPHY: PRIVATE RIGHT OR PUBLIC MENACE? / EDITED BY ROBERT M. BAIRD & STUART E. ROSENBAUM.

PRIVACY AND FREEDOM OF EXPRESSION / BY RICHARD CLAYTON, HUGH TOMLINSON.

PRIVACY AND HUMAN RIGHTS 2001: AN INTERNATIONAL SURVEY OF PRIVACY LAWS AND DEVELOPMENTS / ELECTRONIC PRIVACY INFORMATION CENTER.

PRIVACY AND PRESS FREEDOM.

PRIVACY AND THE PRESS / JOSHUA ROZENBERG.

THE PRIVACY LAW SOURCEBOOK 2001 : UNITED STATES LAW, INTERNATIONAL LAW, AND RECENT DEVELOPMENTS / MARC ROTENBERG.

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.

PROCEEDINGS UNITED NATIONS/INTERNATIONAL INSTITUTE OF AIR AND SPACE LAW WORKSHOP ON CAPACITY BUILDING IN SPACE LAW.

PUBLIC BROADCASTING IN THE ERA OF COST RECOVERY : A CRITIQUE OF THE SOUTH AFRICAN BROADCASTING CORPORATION'S CRISIS OFACCOUNTABILITY / CONSOLE TLEANE & JANE DUNCAN.

PUBLIC SERVICE BROADCASTING IN TRANSITION : A DOCUMENTARY READER/ EDITED BY MONROE E. PRICE AND MARC RABOY.

RADIO REGULATIONS.

RECENT TRENDS IN INTERNATIONAL SPACE LAW AND POLICY / EDITORS, V.S. MANI, S. BHATT & V. BALAKISTA REDDY; FOREWORD BY C.G. WEERAMANTRY.

RIGHTS VS REPUTATIONS: CAMPAIGN AGAINST THE ABUSE OF DEFAMATION AND INSULT LAWS.

RUSSIAN MEDIA LAW AND POLICY IN THE YELTSIN DECADE: ESSAYS AND

DOCUMENTS / EDITED BY MONROE E. PRICE, ANDREI RICHTER, AND PETER K. YU.

SADC MEDIA LAW: A HANDBOOK FOR MEDIA PRACTITIONERS.

SATELLITE COMMUNICATIONS REGULATIONS IN THE EARLY 21ST CENTURY: CHANGES FOR A NEW ERA / BY PATRICK-AND R{226}E SALIN.

SATELLITE REGULATION IN EUROPE: LEGAL TEXTS AND MATERIALS / EDITED BY ST{226}EPHAN LE GOUEFF.

SEX/GENDER OUTSIDERS, HATE SPEECH, AND FREEDOM OF EXPRESSION: CAN THEY SAY THAT ABOUT ME? /MARTHA T. ZINGO.

SEX, MORALITY, AND THE LAW / EDITED BY LORI GRUEN AND GEORGE E. PANICHAS.

SO THIS IS DEMOCRACY?: REPORT ON THE STATE OF THE MEDIA IN SOUTHERN AFRICA, 2002 / COMPILED BY ZO{226}E TITUS ; EDITED BY GRAHAM HOPWOOD ; TRANSLATED BY RICARDO BRANCO, RUI CORREIA AND JERRY DOS SANTOS.

SOUTH AFRICA'S RESISTANCE PRESS: ALTERNATIVE VOICES IN THE LAST GENERATION UNDER APARTHEID / EDITED BY LES SWITZER AND MOHAMED ADHIKARI; FOREWORD BY GUY BERGER.

SPACE POLITICS AND POLICY: AN EVOLUTIONARY PERSPECTIVE / EDITED BY ELIGAR SADEH.

TELECOMMUNICATION POLICIES FOR THE AMERICAS: THE BLUE BOOK.

TELECOMMUNICATIONS AND UNIVERSAL SERVICE: INTERNATIONAL EXPERIENCE IN THE CONTEXT OF SOUTH AFRICAN POLICY REFORM / SE{226}AN {226}O SIOCHR{226}U.

TELECOMMUNICATIONS, BROADCASTING AND THE INTERNET: E.U. COMPETITION LAW AND REGULATION / L.J.H.F. GARZANITI.

TELECOMMUNICATIONS, BROADCASTING AND THE INTERNET: EU COMPETITION LAW AND REGULATION / L.J.H.F. GARZANITI.

TELECOMMUNICATIONS LAW / EDITED BY IAN WALDEN AND JOHN ANGEL.

TELECOMMUNICATIONS MADE EASY / LEONARD LINDA KHUMALO [AND] JABULANI SIBANDA.

TOWARDS UNIVERSAL ACCESS: STRATEGIC APPROACHES IN FOUR DEVELOPING COUNTRIES: BOLIVIA, BURKINA FASO, MALAWI, NEPAL.

TRADE LIBERALIZATION, COMPETITION AND THE WTO / EDITED BY CHRIS MILNER AND ROBERT READ.

TRENDS IN TELECOMMUNICATION REFORM, 2002: EFFECTIVE REGULATION.

UNITED STATES SPACE LAW: NATIONAL & INTERNATIONAL REGULATION / COMPILED AND EDITED BY STEPHEN GOROVE.

THE USE OF AIR AND OUTER SPACE COOPERATION AND COMPETITION: PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON AIR AND OUTER SPACE AT THE SERVICE OF WORLD PEACE AND PROSPERITY, HELD IN BEIJING FROM 21-23 AUGUST 1995 / EDITED BY CHIA-JUI CHENG.

A VIRTUE LESS CLOISTERED: COURTS, SPEECH AND CONSTITUTIONS / IAN CRAM.

WORLD CYBERSPACE LAW / BY STEVEN HOFFER.

WORLD TELECOMMUNICATION DEVELOPMENT REPORT, 2002: REINVENTING TELECOMS.

WORLD TELECOMMUNICATION STANDARDIZATION ASSEMBLY, MONTREAL, 27 SEPTEMBER-6 OCTOBER 2000.

WORLD TRADE ORGANIZATION (WTO) AND DEVELOPING COUNTRIES: DIPLOMACY TO RULES BASED SYSTEM / SURENDRA BHANDARI; FOREWORD BY S.K. VERMA.

PERIODICALS

ANNALS OF AIR AND SPACE LAW, VOLUME 1-1976 – VOLUME 18- 1993, PUBLISHED BY INSTITUTE OF AIR AND SPACE LAW MCGILL UNIVERSITY.

INTERNATIONAL INSTITUTE OF AIR AND SPACE LAW

Core elements of an education curriculum on space law

Dr. Frans von der Dunk

Director Space Law Research

International Institute of Air and Space Law

INTERNATIONAL INSTITUTE OF AIR AND SPACE LAW

The *Idea*

- Discussion at 1st UN / IIASL Workshop, XI/2002
- Need ***useful*** & ***succinct*** courses
  - Focusing on key issues
  - Of practical relevance
  - Number of teaching institutions available
- General ideas on baseline course
  - To be offered as ***starting point***

Key contents

- Meta-legal discussion
  - *"What is 'space law'?" "Why study it?"*
- The core of space law
  - Esp. UN Treaties & Resolutions
- Moving to applications & specials
  - Institutions; projects; national space law
- Relate to other legal fields
  - Telecom; IPR; trade; financing

'Five elements baseline course'

1. The concept of space law
2. The Outer Space Treaty
3. Liability & Registration Conventions
4. National space legislation
5. Special case: satcoms

- Options for addition

1. The concept of space law

- Space activities & (int'l) law
- Jurisdiction & sovereignty
- Interference with other legal regimes
- Definition & delimitation issue
- History of space activities
- Role UN & COPUOS

2. The Outer Space Treaty

- Non-appropriation
- Freedom of exploration & use
- Responsibility & liability (general)
- Peaceful uses
- Role general int'l law
- Int'l cooperation & benefits of all mankind / province of all mankind

3.A. Liability Convention

- Launching state definition
- Other definitions (damage!)
- Exceptions & exonerations
- Claiming states
- Absolute vs. fault liability
- Unlimited compensation
- Dispute settlement mechanism

3.B. Registration Convention

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- Jurisdiction
- National & UN Register
- Single vs. plural registration
- Registration parameters
- Flaws in registration
- Registration practices

4. National space legislation

- Obligations & interests to implement
- Ways to implement
- Role of licensing system
- Examples of nat'l implementation
- Prospective nat'l space laws
- Coordination with other nat'l law

5. Satellite communications

- Space activities ←→ telecoms
- Satellite telecoms & role ITU
  - Operation & divisions ITU
- Coordination process ITU
  - Allocations of frequency bands to services
  - Allotments of frequencies to systems
  - Assignments to IGO's / private entities
- Landing rights – WTO & satcoms

Options for additions

- Remote sensing & data access
- Timing, positioning & navigation
- Financing & securities
- Int’l trade & commerce
- Int’l cooperation projects
- Institutional issues
- National policy needs

Possible approach (1)

- Baseline course on a website
  - Handful of video lectures…
  - …with attendant PowerPoint presentations
  - Fundamental reference materials
  - Links to other websites for secondary reference materials
  - Addresses of teaching institutions & their specialisations

Possible approach (2)

- Activities on a national / local level
  - Realising access to baseline course
    - Integrate into existing classes?
    - Set up technical means?
  - Adapting & extending baseline course
    - Adding topics as relevant at nat'l / local level
    - Discussion sessions
    - Papers & presentations
    - Moot court / mock negotiations
    - Excursions to nat'l / local facilities & entities

INTERNATIONAL INSTITUTE OF AIR AND SPACE LAW

Possible approach (3)

- Link back with external level
  - Follow-up questions on baseline course
  - Use external sources & institutions in ***judicious*** manner
    - For specials: exchanges of staff or students
    - For co-organising seminars, conferences etc.
    - For going to seminars, conferences etc.
      - IAF/IISL on general space law & policy issues
      - Many more specific conferences: satcoms, remote sensing, navigation, financing, etc.
      - Many regionally- / nationally-focused events

Annexes

Annex I

Recommendations, observations and conclusions

1. Participants at the Workshop agreed that universal acceptance of and compliance with the United Nations treaties governing the activities of States in the exploration and use of outer space would contribute to the orderly use of outer space and ensure the strengthening of the rule of law, provide transparency with regard to rights and obligations of States in conducting space activities, increase development of customary behaviour, create a level playing field for all actors, ensure that non-state actors complied with the provisions of the treaties, enhance strategic stability and predictability and safeguard against arbitrary rulings. They therefore recommended that States not yet parties to the outer space treaties take the necessary steps to ratify or accede to them.

2. Participants agreed that, by becoming parties to the outer space treaties, States could better protect and defend their legitimate rights and interests, take legal action in accordance with the treaties, enforce equality of parties before the law, propose their amendment, clarification, updating and revision and also propose new agreements, declarations and other instruments to regulate new areas or activities, including the use of new technologies.

3. Participants observed that United Nations mechanisms such as the Committee on the Peaceful Uses of Outer Space provided a useful avenue and tools for exchanging views and reaching consensus on important issues.

4. Participants agreed that it was imperative for States to conduct their space activities in accordance with international law, including the Charter of the United Nations and the outer space treaties, as well as to observe, in good faith, the United Nations principles on outer space.

5. Participants noted that the principles on outer space could serve as foundations for future international treaties to further develop the legal regime of outer space.

6. They also noted that the online index of objects launched into outer space, a web database maintained by the Office for Outer Space Affairs, contained information officially received from Member States and international organizations in accordance with the Registration Convention and General Assembly resolution 1721 B (XVI), as well as complementary information collected from unofficial recognized sources.

7. Participants agreed that the index could serve as a useful cross-referencing tool for assisting States that were parties to the Registration Convention and those States which wished to provide voluntary information in accordance with resolution 1721 B (XVI) to ensure that information on their objects launched into outer space had been transmitted to the Secretary-General.

8. They also agreed that the website of the Office for Outer Space Affairs provided a valuable public service and was vital for disseminating information on space law and the work of the Committee on the Peaceful Uses of Outer Space and its Legal Subcommittee.

9. Participants recognized the crucial role of space technologies for sustainable development and noted the need for establishing and nurturing supportive national regulatory environments to optimize the utilization of space technologies.

10. Participants agreed that it was essential for States to conduct a policy and legal assessment in order to establish the proper local context prior to developing their national space policies and laws.

11. They also agreed that States should ensure the participation of key stakeholders in the development of their national space policies.

12. They further agreed that the outer space treaties provided a basis for the development of national space laws.

13. Participants agreed that when a State party chose to enact national space laws it was important for it to do so in accordance with its international obligations and the national requirements of its existing legal system.

14. Participants noted that national space laws should establish a regime for, among other things, licensing, registration of space objects launched into outer space, liability and safety, a system for financial responsibility, including indemnification and insurance, and that they should take into account domestic interests, respect foreign interests and set up mechanisms for cooperative efforts with other States.

15. They also noted that other existing national space laws could serve as examples when considering the development of national space laws.

16. Participants agreed that developing countries with a sensing capability were in a position to influence the development of law by taking action to establish evidence of state practice that would enhance and protect the right of access to data from all sensing States. That could be achieved by applying the Principles Relating to Remote Sensing of the Earth from Outer Space (General Assembly resolution 41/65, annex) and concluding bilateral and multilateral agreements among developing countries that possessed sensing capabilities.

17. Participants also agreed that it was essential for developing countries to harness existing skills and educational experiences to overcome the challenges of developing capacity in space law.

18. They further agreed that those challenges could be addressed by making use of available online resources and video-conferencing as means of supplementing educational resources, by taking advantage of any available financial resources to gain access to experts in space law with a view to conducting intensive courses, obtaining advice on the curriculum and assisting in the preparation of reading lists.

19. Participants agreed that the Office for Outer Space Affairs should pursue the possibility of identifying fellowship opportunities for students from developing countries to undertake studies in space law.

20. They also agreed that it was essential for educators, space law practitioners, legislators and policy- and decision makers in the African region to remain engaged in space law networks, including taking advantage of electronic mail to facilitate regular communication when a lack of resources limited other means of participation.

21. They further agreed that increased opportunities for education in space law in the African region could be achieved by encouraging Governments, educational institutions as well as the

private sector to participate actively in those efforts and by finding innovative solutions for overcoming financial constraints.

22. Participants agreed that by including individuals with space law expertise in their delegations to meetings of space-related intergovernmental organizations, such as the Committee on the Peaceful Uses of Outer Space and the International Telecommunication Union, Governments in the African region would enhance their capacity to promote the development agenda in those organizations and encourage their youth to pursue professional careers in space law.

23. Participants recommended that the Office for Outer Space Affairs develop, in accordance with recommendations made at previous United Nations workshops on space law, a baseline course on space law.

24. They agreed that the participation of youth in conferences, symposiums and workshops addressing space science, technology and law, such as the International Astronautical Congress, should be encouraged and facilitated.

25. Participants expressed their deep appreciation to the Government of Nigeria, its National Space Research and Development Agency and the Office for Outer Space Affairs for organizing the Workshop.

Annex II

Programme

MONDAY
21 NOVEMBER 2005
OPENING

08h30-10h00

08h30-09h00
Registration

09h00-10h00
Opening of workshop and welcoming Statements

R. A. Boroffice
Director-General/Chief Executive, National Space Research and Development Agency, Nigeria

Natercia Rodrigues
United Nations Office for Outer Space Affairs

SESSION 1 **INTERNATIONAL SPACE LAW**

10h00-13h00

Chair
Sergio Marchisio
Italy, Chairman, Legal Subcommittee 2004-2005

10h00-11h00
International legal regime on outer space: Outer Space Treaty, Rescue Agreement and the Moon Agreement

Vladimir Kopal
Czech Republic, Chairman, Legal Subcommittee 1999-2003

11h00-11h30
Discussion

11h30-11h45
Coffee Break

11h45-12h30
International legal regime on outer space: Liability Convention and Registration Convention

Sergio Marchisio
Italy, Chairman, Legal Subcommittee 2004-2005

12h30-13h00
Discussion

13h00-14h30 **Lunch**

14h30-18h00

14h30-15h15
United Nations Principles on Outer Space

Ram Jakhu
Institute of Air and Space Law, McGill University, Canada

15h15-16h00
Brief overview of the work of the Legal Subcommittee and the United Nations Register of Objects Launched into Outer Space

Natercia Rodrigues
United Nations Office for Outer Space Affairs

16h00-16h30
Discussion

16h30-16h45
Coffee Break

16h45-17h30
Benefits of becoming party to the Treaties and conducting activities in accordance with the Principles

Panel Discussion

Maurice N. Andem
Institute of Air & Space Law, University of Lapland, Rovaniemi, Finland

José Monserrat Filho
Associaçao Brasileira de Direito Aeronáutico e Espacial Brazil

Sergio Marchisio
Italy, Chairman, Legal Subcommittee 2004-2005

Kenneth Hodgkins
Department of State, United States of America

17h30-18h00
Discussion

TUESDAY
22 NOVEMBER 2005

SESSION 2 NATIONAL SPACE LAW AND POLICY

Chair
Frans von der Dunk
International Institute of Air and Space Law, Leiden University, The Netherlands

09h00-13h00

09h00-10h45
Overview of national space laws and policies

Joanne I. Gabrynowicz
National Remote Sensing and Space Law Centre, United States of America

Ganiy Agbaje
National Space Research and Development Agency, Nigeria

José Monserrat Filho
Associaçao Brasileira de Direito Aeronáutico e Espacial, Brazil

10h45-11h00
Coffee Break

11h00-11h25
Overview of national space laws and policies (continued)

Mothibi Ramusi
Department of Trade and Industry, South Africa

11h25-11h50
Developing national space policy and strategies

Henry Hertzfeld
Space Policy Institute, George Washington University

11h50-12h20
Fundamental provisions for national space laws

Frans von der Dunk
International Institute of Air and Space Law, Leiden, University, The Netherlands

12h20-13h00
Discussion

13h00-14h30 **Lunch**

SESSION 3 COORDINATING NATIONAL SPACE-RELATED ACTIVITIES

14h30-18h00

Chair
R. A. Boroffice
National Space Research and Development Agency, Nigeria

14h30-15h00
Ways and means of coordinating national space-related activities

Kenneth Hodgkins
Department of State, United States of America

15h00-15h15
Coffee Break

15h15-16h45
Ways and means of coordinating national space-related activities: the African experience

R. A Boroffice
National Space Research and Development Agency, Nigeria

Peter Martinez
Co-ordinator, National Working Group on Space Science and Technology, South Africa

Nassim Haned
Algerian Space Agency

Hamid Tadlaoui
Morocco

16h45-17h15
Discussion

17h15-18h00
National space-related activities, education and institutions in Africa

Anas Osman
President, National Research Institute of Astronomy and Geophysics (NRIAG), Egypt

Akwasi Ayensu
Deputy-Director General, Council for Scientific and Industrial Research, Ghana

Harun R. Muturi
Chief Science Secretary, National Council for Science and Technology, Kenya

WEDNESDAY
23 NOVEMBER 2005

SESSION 4 **OTHER SPACE-RELATED LEGAL ISSUES**

09h00-13h00

Chair
Peter Martinez
National Working Group on Space Science and Technology, South Africa

09h00-09h40
Legal and regulatory developments in Aeronautical Communications and Navigation

Tare Brisibe
National Space Research and Development Agency, Nigeria

09h40-09h50
Discussion

09h50-10h30
Remote sensing data dissemination policy and national implementing legislation

Joanne I. Gabrynowicz
National Remote Sensing and Space Law Centre, United States of America

10h30-10h40
Discussion

10h40-11h10
ITU regulations and procedures

Shola Taylor
Kemilinks International

11h10-11h20
Discussion

11h20-11h35
Coffee Break

11h35-12h05
Intellectual Property Law and Space Activities

Bradford Lee Smith
Alcatel, France-United Kingdom

12h05-13h00
Discussion

13h00-14h30	**Lunch**
14h30-15h10	14h30-15h00 **Draft protocol on matters specific to space assets to the Convention on International Interests in Mobile Equipment** ***Tinuade Oyekunle*** *Correspondent for the International Institute for the Unification of Private Law (Unidroit)* 15h00-15h10 **Discussion**

SESSION 5 PROMOTING EDUCATION IN SPACE LAW

15h10-18h00	*Chair* ***Maurice N. Andem*** *Institute of Air & Space Law, Finland* 15h10-16h05 **Education courses/opportunities in Space Law** ***Maurice N. Andem*** *Institute of Air & Space Law, University of Lapland, Rovaniemi, Finland* ***Sergio Marchisio*** *European Centre for Space Law* ***Ram Jakhu*** *Institute of Air and Space Law, McGill University, Canada* ***Joanne I. Gabrynowicz*** *National Remote Sensing and Space Law Centre, United States of America* ***Frans von der Dunk*** *International Institute of Air and Space Law, Leiden University, The Netherlands* ***Henry Hertzfeld*** *Space Policy Institute, George Washington University* 16h05-16h30 **Ways and means of promoting education in space law in Africa** ***Justine White*** *University of Witwatersrand, South Africa* 16h30-17h05 **Discussion**

17h05-17h30
Core elements of an education curriculum on space law

15h10-18h00 (Continued)

Frans von der Dunk
International Institute of Air and Space Law, Leiden, University, The Netherlands

17h30-18h00
Discussion

THURSDAY
24 NOVEMBER 2005

SESSION 6 **RECOMMENDATIONS, OBSERVATIONS AND CONCLUSIONS OF THE WORKSHOP**

Chair
Vladimir Kopal
Chairman, Legal Subcommittee, 1999-2003

09h00-12h00

09h00-11h45
Finalization of the recommendations, observations and conclusions of the Workshop

11h45-12h00
Conclusion of the Workshop

Annex III

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