PROCEEDINGS

United Nations/Brazil Workshop on Space Law

DISSEMINATING AND DEVELOPING INTERNATIONAL AND NATIONAL SPACE LAW: THE LATIN AMERICA AND CARIBBEAN PERSPECTIVE

UNITED NATIONS

ST/SPACE/28
Office for Outer Space Affairs
United Nations Office at Vienna

PROCEEDINGS

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UNITED NATIONS
New York, 2005

UNITED NATIONS PUBLICATION
Sales No. E.05.I.76
ISBN 92-1-100977-4

Foreword

The proceedings of the Workshop on Space Law "Disseminating and developing international and national space law: the Latin America and Caribbean perspective" have been produced in printed and electronic format.

The 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 www.oosa.org

Introduction

The emphasis placed on the importance of the United Nations treaties on outer space by the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), held in Vienna, from 19-30 July 1999 and the continuous increase in space activities by States, intergovernmental and non-governmental organizations as well as the private sector has made the development of space law and policy a priority for a growing number of countries.

In addition, the development of effective laws and policies on space activities, not just on the international but also on the national and regional level, depends on the presence of suitable professionals able to disseminate information and knowledge on the existing legal framework governing activities in outer space and promote the need to ratify the United Nations treaties on outer space.

In order to build capacity in space law, particularly in developing countries, and to promote the ratification of the five United Nations Treaties on Outer Space, the United Nations office, began in 2002, to organize a series of workshops dedicated to space law.

In 2004, the United Nations Office for Outer Space Affairs, together with the Associação Brasileira de Direito Aeronáutico e Espacial (SBDA) and the Government of Brazil, organized a Workshop on Space Law in Rio de Janeiro, Brazil, from 22 to 25 November 2004, entitled "Disseminating and developing international and national space law: the Latin America and Caribbean perspective". This workshop was the third in the series of workshops organized to build capacity in space law and the first for the Latin America and Caribbean region.

The main objectives of the Workshop were to consider the current and future development of international and national space law, develop expertise and capability in national and international space law with an emphasis on matters of specific interest to the Latin America and Caribbean region, and to promote cooperation in space law.

At the opening of the Workshop, introductory and welcoming statements were made by representatives of SBDA and the Office for Outer Space Affairs. During the Workshop thirty papers and presentations were delivered by invited speakers from both developing and developed countries. In addition, information was exchanged on national institutions conducting space activities and ways and means to build capacity and education in space law was considered. The final session was devoted to finalizing the observations, recommendations and conclusions of the Workshop.

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Current and Future Development of International Space Law

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Introduction

By far the most eminent challenge of public international law in general and also of international space law in particular, is the challenge of globalisation. Symbolized by the Internet, that allows for the seamless travel of information as well as financial transactions, the entire international system has to face serious challenges[1]. The core of the matter is that the new technology limits the capacity of States to control transnational transactions more than ever before. Certainly, we have since the 19th century, and even before, a growing amount of international trade and of movement of tourists. But never before was the denationalizing effect of transactions so pertinent than in the era of globalisation. This has important consequences. The private sector, mostly multi-national corporations, but also non-governmental organizations, and the individual itself, gain importance in the international system. International law, however, has not yet specifically addressed those private actors because it has been formed traditionally by States and, at a later stage, also by international governmental organization. Therefore, it is of paramount importance whether, to what extent, international law in general and international space law in particular react to these challenges to the international system. Furthermore, space law is a highly technical domain to regulate. Space technology progresses in ever-faster dimensions. Here again, the progress of technology, for example in the telecommunications sector, brings about necessary challenges for space law[2].

It is, therefore, the purpose of the following study to briefly discuss how international space law has reacted over the past five decades to the various challenges, notably of a political and technological nature, and, in more recent times, also to the phenomenon of globalisation. Thereby, we will, in the first part of this paper, present the international legal system governing outer space activities, in the second part the major principles of international space law, in the third part we will discuss specific legal regimes for the uses of outer space, and in part four we will address some future developments. This will allow for a conclusion as to the prospects of the development of international space law.

Before, however, any attempt is made on a presentation of international space law is made, a word is necessary as ant the area of regulation we are talking about. It is self-evident that because of its vastness, it is impossible to come to any regulation for the entire universe. Here,

[1] *Delbrück*, Transnational Federalism: Problems and Prospects of Allocating Public Authority Beyond the State, 11 Indiana Journal of Global Legal Studies (2004), p. 31; *Hobe*, Die Zukunft des Völkerrechts im Zeitalter der Globalisierung - Perspektiven der Völkerrechtsentwicklung im 21. Jahrhundert (The future of public international law in the era of globalisation – perspectives for the development of public international law in the 21st century), in: 37 Archiv des Völkerrechts (1999), pp. 253 – 282.

[2] See *Gottlieb*, The Impact of Technology on the Development of Contemporary International Law, RdC 1981, pp. 242 et seq.

dimensions are at stake that are beyond our comprehension[3]. Therefore, it is suggested to limit any legal description of outer space to – if you want – two floors of the universe[4]: the terrestrial lunar system and the interplanetary space of the universe. The terrestrial lunar system is basically defined by the relationship of the Earth and our Moon, and the interplanetary space consists of the Sun as its central body, nine big planets (Mercury, Venus, the Earth, Mars, Saturn, Jupiter, Uranus, Neptune and Pluto) with their moons, asteroids, comets, meteors and meteorites as well as interplanetary dust. One last distinction for the purpose of definition has to be made at the beginning. Hitherto, the issue of the limitation of the Earth to the space environment, at a height of at least 110 km above sea level, arguably even below, has been brought into question[5]. With these necessary definitions in mind, we start to discuss the legal framework for outer space activities. Thus for the purpose of any legal account, outer space shall be defined as being comprised of the terrestrial lunar and the interplanetary space, beginning at a height of around 110 km above sea level.

I. International Space Law – the Treaty Framework

Since at the beginning of the space age, after the launch of the first artificial satellite Sputnik 1 in 1957, all activities were carried out by governmental entities, the legal framework was drafted and finally laid down only by States. Its character is, therefore, of a public international law nature. Public international law knows different sources, namely international treaties, international custom, the general principles of law, and, as auxiliary sources, jurisprudence and doctrine[6]. Interestingly enough, international space law is still very much governed by international treaties, whereas customary law only plays a minor role[7]. One can, if looking at the development of international space law, discover different phases as follows:

1. From Discussion to Resolution (1957 – 1963)

Shortly after the beginning of the space age, with the launch of the first artificial satellite Sputnik 1, the international community already showed some awareness of a need to come to an international legal regulation of this new activity. Whereas space flights in these times were carried out only by the then two super powers, namely the Soviet Union and the United States of America, an early discussion centred around the question of whether or not by analogy to international air law which had started to develop in the early 20th century, one could cover also space activities. The main aim of these early discussions was, on the one hand, to come to a clear understanding of the legal status of outer space and the celestial bodies and, on the other hand, to provide some solutions to the pressing problem of the possible military uses of outer space. Here it was in the interest of the super powers to get at least partial permission from the international community to use outer space for what they called "peaceful" purposes.

Therefore, at the formative stage of international space law in the late 1950ies, one initial and important decision was taken. International space law, most stimulated by the ideas of the super powers, should be negotiated in the realm of the United Nations. Therefore, an ad hoc committee of the United Nations General Assembly, the so-called United Nations Committee on

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[3] See *Hobe*, Die rechtlichen Rahmenbedingungen der wirtschaftlichen Nutzung des Weltraums (The Legal Framework for Commercial Space Activities), Berlin 1992, pp. 21 et seq.
[4] *Ibid.*
[5] *Hobe*, Definition and Delimitation of Outer Space, ECSL Proceedings 1997, p. 49 (57).
[6] Cf. Article 38 paragraph I of the ICJ Statute, and *Hobe/Kimminich*, Einführung in das Völkerrecht (Introduction to Public International Law), 8th Ed. 2004, p. 172.
[7] *Vereshchetin/Danilenko*, Custom as a Source of International Law of Outer Space, JSpL 1985, p. 22 et seq.; *Hobe*, The International Legal Order for Outer Space Activities, ECSL Proceedings 1993, p. 28 (32).

the Peaceful Uses of Outer Space, was created assembled by the super powers and some other interested States[8]. Here, initial discussions on the possible legal consequences of these new activities took place. Two resolutions, prepared in the Committee on the Peaceful Uses of Outer Space and adopted by the General Assembly in 1961[9] and 1963[10], foreshadowed already the new era of space law. Here, two important decisions were taken: the use of outer space for military purposes should be more or less, but not entirely, excluded and, on the other hand, neither outer space nor the celestial bodies should be subject to any kind of appropriation. One can therefore say that in 1963 with the United Nations General Assembly Resolution 1962, the major part of the important general principles as well as the major law-making body was already in place[11].

2. From Resolution to Treaty (1963 – 1979)

The coming 15 years were laying the ground for the international legal framework for outer space activities. The Outer Space Treaty, the Magna Charta for outer space activities, was but a concretisation of the 1963 United Nations General Assembly Resolution. It lays down all the main principles for outer space activities, namely the non-appropriation principle, the principle for exploration and the conditions for the various uses of outer space, the principle for registration and of liability for governmental and non-governmental space activities, the rescue and cooperation principle as well as some ideas on the protection of the outer space environment. It has by now received approximately 98 ratifications and 27 signatures. As of 1 January 2003, it is a significant number, particularly taking into account the fact that many of the 191 members of the United Nations have no, or only very little, contact with outer space activities. The major principles, which will be discussed in the next part of the paper, were laid down in the Outer Space Treaty and have been further specified and elaborated in ensuing space legislation.

In 1968, the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, the so-called Rescue Agreement[12], was adopted, which basically incorporates the main international legal duty to help astronauts in distress. Moreover, in 1972, the very important Convention on International Liability for Damage Caused by Space Objects, the so-called Liability Convention[13], was adopted, which specifies the responsibility and liability principles of the Outer Space Treaty of 1967. In 1975, the Convention on Registration of Objects Launched into Outer Space, the so-called Registration Convention[14], was opened for signature, which specifies the international legal duty to register space objects in a national as well as in an international register.

Finally, in 1979, the Agreement Governing the Activities of States on the Moon and other Celestial Bodies, the so-called Moon Agreement[15], was adopted by the General Assembly of the

[8] UN General Assembly Res. 1348 (XIII) of 13 December 1958 and Res. 1472 (XIV) of 12 December 1959.
[9] UN General Assembly Res. 1721 (XVI) of 20 December 1961.
[10] UN General Assembly Res. 1962 (XVIII) of 13 December 1963.
[11] *Inter alia*: freedom of exploration and use, non-appropriation, responsibility and liability, registration, rescue.
[12] Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, published in: *Böckstiegel/Benkö/Hobe* (eds.), Space Law - Basic Legal Documents,Vol. 1, July 2004, Utrecht.
[13] Convention on International Liability for Damage Caused by Space Objects; Space Law, published in: *Böckstiegel/Benkö/Hobe* (eds.), Space Law - Basic Legal Documents, Vol. 1, July 2004, Utrecht.
[14] Convention on Registration of Objects Launched into Outer Space; published in: *Böckstiegel/Benkö/Hobe* (eds.), Space Law - Basic Legal Documents, Vol. 1, July 2004, Utrecht.
[15] Agreement Governing the Activities of States on the Moon and Other Celestial Bodies; published in: *Böckstiegel/Benkö/Hobe* (eds.), Space Law - Basic Legal Documents,Vol. 1, July 2004, Utrecht.

United Nations and opened for signature. All of these five international agreements are in force, but with varying status of ratifications. Whereas, on the one hand, the Outer Space Treaty is by far the most accepted Convention, with around 100 ratifications, the international Moon Agreement has by now 11 ratifications and very few signatories. The reason for this reluctance of States will be explained in the next part of this study.

3. From Treaty back to Resolution (1979 – 2004)

After 1979, following the near-failure of the Moon Agreement, the international community was much less successful in framing new international Conventions. Rather, a set of principles by the United Nations General Assembly, necessarily non-binding in character because the General Assembly does not possess a law-making function, contribute to the further *corpus iuris spatialis*. Here we have, on the one hand, the 1982 United Nations General Assembly Resolution 37/92 on direct broadcasting by satellite[16], that somewhat tries to balance the differing interests of a transborder broadcaster (State or private entity) and the receiving State; the 1986 United Nations General Assembly Resolution 41/65 on remote sensing of the Earth by satellites[17] which, similar to the problem of direct broadcasting, tries to balance the interests of sensing States or enterprises and the sensed State; the 1992 principles of United Nations General Assembly Resolution 47/68 on the use of nuclear power sources in space[18]; the 1996 United Nations General Assembly Resolution on the actual importance in interpretation of Article I paragraph 1 of the Outer Space Treaty[19], and the most recent 2004 United Nations General Assembly Resolution which will be adopted in a few weeks with an interpretation of the notion of launching State. It is interesting to observe that the latter two examples do contain current interpretations of basic notions of international space law, namely, the mankind principle of Article I paragraph 1 of the Outer Space Treaty, as well as the notion of "space object" in view of the current needs and more recent State practice. This is significant for the capacity of the international space community to develop basic notions of international space law. Moreover, it is interesting to observe that there is a zigzag development: initially, one could observe a certain move from resolution towards treaty, whereas in more recent times, we have the opposite direction where resolutions rather than treaties are preferred. Therefore, a word in this part should be said about the legal character of the United Nations General Assembly resolutions.

It has already been mentioned that, due to the lacking capacity of the United Nations General Assembly to enact its own distinct legislation, such resolutions lack legally binding force. However, they are still important for a certain *opinio iuris* of a significant number of States, even more so if these resolutions are adopted by consensus[20]. Therefore, space activities like the use of nuclear power sources, the use of telecommunications satellites, or of remote sensing satellites, as

[16] UN General Assembly Res. 37/92 of 10 December 1982, Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting; published in: *Böckstiegel/Benkö/Hobe* (eds.), Space Law - Basic Legal Documents,Vol. 1, July 2004, Utrecht.

[17] UN General Assembly Res. 41/76 of 3 December 1986, Principles Relating to Remote Sensing of the Earth from Outer Space; published in: *Böckstiegel/Benkö/Hobe* (eds.), Space Law - Basic Legal Documents,Vol. 1, July 2004, Utrecht.

[18] UN General Assembly Res. 47/68 of 14 December 1992, Principles Relevant to the Use of Nuclear Power Sources in Outer Space; published in: *Böckstiegel/Benkö/Hobe* (eds.), Space Law - Basic Legal Documents, Vol. 2, July 2004, Utrecht.

[19] Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking Into Account the Needs of Developing Countries, UN General Assembly Res. 51/122 of 13 December 1996, reprinted in Zeitschrift für Luft- und Weltraumrecht (ZLW) 1997, 236.

[20] *Hobe/Kimminich*, Einführung in das Völkerrecht (Introduction to Public International Law), 8th edition 2004, p.196.

well as other possible commercial uses, are not confronted with a complete legal vacuum. Rather, the constant conduct and respect for such resolutions may build up to eventually become customary international law. In this regard, a short word must be said about some earlier observations of the space law age. Here, the famous legal scholar *Bin Cheng* had observed that after the adoption of a United Nations General Assembly resolution for activities in outer space, this resolution would *instantly* become customary international law[21]. There is a correct part of this observation, namely, that for such resolutions, even more so if adopted by consensus to be significant for a respective *opinio iuris* of States, one still needs the time element, that is a certain period of time over which such resolutions are observed by States in order to speak of the development of a respective custom[22].

Moreover, as will be shown in the following, we cannot fully observe the development of custom with regard to all of the respective applications just mentioned in the various United Nations General Assembly resolutions. Rather a differentiated approach must be applied. With regard to the use of telecommunication satellites, the factual development after the end of the – ideologically inspired – Cold War has gone beyond the legal substance of United Nations General Assembly Res. 37/92 of 1982. But with regard to remote sensing by satellites, the current discussion in UNCOPUOS clearly indicates not only that the United Nations General Assembly Resolution 41/76 of 1986 is still not fully consented to but that further consideration is required in view of the growing commercialization of that sector. Indeed, with regard to the use of nuclear power sources, we can in fact speak of a respective custom indicated by the United Nations General Assembly Resolution 47/68 of 1992. The "space benefits" resolution of 1996 is again an important contribution but maybe not the final word on this matter. One thus sees the different ways in which the international community adapts these United Nations General Assembly resolutions.

II. Major Principles of International Space Law

Having thus outlined the legal basis that still mainly consists of international treaties and, to a much lesser extent, of international custom, we now come to a description of the existing legal principles for outer space activities.

1. The Non-Appropriation Principle

Of paramount importance is the major legal principle as contained in Article II of the Outer Space Treaty, namely that outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation or by any other means. The same is true for the celestial bodies. This provision clarifies the status of outer space and the celestial bodies as an area, which cannot be subjected to State appropriation. However, it has been disputed whether or not this statutory provision excludes any kind of commercial exploitation. Although this is not entirely agreed with, the widespread majority is of the opinion that Article II only explicitly prohibits any appropriation of areas, be it in outer space or on celestial bodies, be it by States or by private entities[23]. This is logical in so far as it is the main purpose of this provision to safeguard the *res communis* nature of outer space as belonging to all mankind. Any taking of land, either by States or by individuals, would be prohibited by such an undertaking. It is

[21] *Cheng*, United Nations Resolutions on Outer Space: ´Instant´ International Customary Law?, 5 Indian JIL (1965), pp. 23 – 48.
[22] ICJ, 20.02.1969, Continental Shelf Cases (Federal Republic of Germany v. Denmark; Federal Republic of Germany v. Netherlands), ICJ Reports 1969, p. 3 ff.
[23] See *Hobe*, *supra* note 3, p. 77 et seq.; *von der Dunk/Back-Impallomeni/Hobe/Ramirez*, Sureal estate: addressing the issue of 'Immovable Property Rights on the Moon', Space Policy 20 (2004), p. 149 seq.

therefore clear from the existing outer space law that any taking of areas in outer space or on celestial bodies is prohibited by law. Any claims in this direction, for example, by way of selling areas of the Moon, are therefore totally unfounded in international law. States as signatories of the Treaty have the duty to hinder respective claims of individuals[24]. But as we will see in the following, this clear prohibition to claim areas does not clearly indicate whether or not the taking of resources is allowed or not.

2. Free Exploration of Space

Furthermore, it is clear that outer space can be explored and that the result of such exploration should be beneficial to all mankind[25]. This provision is mainly uncontested.

3. The Problem of Economic Uses of Outer Space

Any kind of commercial use of outer space is, however, subject to discussion. Here we have, on the one hand, the fact that nothing directly prohibits the free use of outer space, the celestial bodies and their resources. At least the Outer Space Treaty does not in principle contain any restricting provision. The only hint to any restriction is, therefore, that outer space and the celestial bodies are designated to be the province of all mankind and that any use of outer space should be carried out for the benefit and in the interest of all countries, irrespective of the degree of economic or scientific development (cf. Article I paragraph 1 of the Outer Space Treaty). This can, of course, be interpreted to the effect that such countries, which cannot actively participate in outer space activities, must benefit from the resources or from the benefits of resources taken by others from the Moon or other celestial bodies[26].

Furthermore, Article 11 of the Moon Agreement, declaring the Moon and other celestial bodies to be the *common heritage of mankind* and outlining a legal regime for the exploitation of such resources, could hint into at some kind of resource sharing[27]. Here, the sharing of the benefits of the resources even by those States that have not actively contributed to the exploitation process (e.g. the developing countries) is explicitly mentioned (c.f. Article 11 paragraph 7 lit. d of the Moon Agreement). However, it is disputed how much weight can be given to this argument. Here, it must be taken into account that, particularly due to this provision, the Moon Agreement has not been ratified by many States and therefore cannot be said to be part of customary international law[28].

For the widespread majority of States, it is, therefore, only the Outer Space Treaty in general, particularly its Article I paragraph 1, which gives the basic guideline for the economic exploitation of outer space and the celestial bodies[29]. Here, as already mentioned earlier, the United Nations General Assembly has adopted a resolution with regard to the interpretation, in

[24] See Declaration by the Board of Directors of the International Institute of Space Law of 2004, online: http://www.uni-koeln.de/jur-fak/instluft/index-e.html or: http://www.iafastro-iisl.com/; *von der Dunk/Back-Impallomeni/Hobe/Ramirez*, Sureal estate: addressing the issue of 'Immovable Property Rights on the Moon', Space Policy 20 /2004, p. 149 seq.
[25] Art. I Outer Space Treaty.
[26] *Hobe*, *supra* note 3, p. 104.
[27] See *Hobe*, *supra* note 3, p. 127 et seq.
[28] See *Hobe*, Common Heritage of Mankind – An Outdated Concept in International Space Law?, IISL 1998, p. 271 (281);*Hobe*, ILA Resolution 1/2002 with Regard to the Common Heritage of Mankind Principle in the Moon Agreement (to be published in 2005 in Liber Amicorum Simone Courteix).
[29] See *Jasentuliyana*, Article I of the Outer Space Treaty Revisited, JSpL 1989, p. 129.

view of current State practice, of this provision[30]. In addition, this resolution very clearly indicates that States are in principle free to choose solutions on how to distribute the benefits from the exploitation of outer space resources. It is the State that shall determine the way of cooperating with other States and particularly with developing countries. This may be regretted, particularly from the point of view of developing countries which in the 1960s and 1970s, with their numerical majority in the General Assembly as a consequence of the decolonisation process, did struggle very much for a restructuring of the international economic legal order thus including respective exploitation provisions of the international commons[31]. But the already mentioned resolution of the United Nations General Assembly is certainly indicative of current State practice that is not supportive of such widespread sharing of benefits.

4. The Principle of Peaceful Uses

One of the main purposes of the Outer Space Treaty was certainly to implement a provision concerning the peaceful uses of outer space. Here, Article IV of the Outer Space Treaty prohibits any placing in orbit of nuclear weapons or other weapons of mass destruction in orbits around the Earth[32]. That still allows for the use of intercontinental ballistic missiles that need a half-orbit in order to reach the other continent. Moreover, Article IV paragraph 2, as well as the Moon Agreement, are stricter in prohibiting any installation of military bases on the Moon. However, it becomes evident that the main aim of the super powers, namely to allow them the partial military use of outer space, has been achieved through the Outer Space Treaty.

5. Responsibility and Liability

The Outer Space Treaty, in its Articles VI and VII, contains basic provisions on international responsibility of States for activities not in conformity with current international law whereby the Articles explicitly include activities of non-governmental entities. Article VII of the Outer Space Treaty specifies that, as a consequence of the responsibility contained in Article VI of the Outer Space Treaty, the State can be held liable under international law[33]. This provision is specified furthermore in the Liability Convention of 1972, which contains a very progressive development of international law. Any launching State – these are States that themselves launch a space object or that use the territory of other States or procure the launching for other States – shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the Earth or to aircraft in flight. It is one of the rare examples where in public international law one can find a regime of strict liability, that is liability without the prerequisite of proving fault, which has of course to do with the ultra-hazardous nature of space activity[34]. On the other hand, any damage by a space object vis-à-vis another space object is only subject to the regime of fault-based liability. Obviously, this liability regime is of great importance for any kind

[30] UN General Assembly Res. 51/122 of 13 December 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" (A/RES/51/122).
[31] See e.g. General Assembly Res. 1514 (XV) of 14 October 1960, "Declaration on the Granting of Independence to Colonial Countries and Peoples", U.N. Doc. A/4684 (1961); UN General Assembly Res. 1803 (XVII) of 14 December 1962, "Permanent Sovereignty over Natural Resources"; UN General Assembly 3281 on a "New International Economic Order" of 12 December 1974 and UN General Assembly res. 3201 (S-VI and 3202 (S-VI) "Declaration on the Establishment of a New International Economic Order and Programme of Action" of 1 May 1974.
[32] See *von Kries*, in: Böckstiegel, Handbuch des Weltraumrechts (Manual on Space Law), Köln 1991, p. 334.
[33] See *Hobe*, *supra* note 3, p. 137 et seq.
[34] See *Jenks*, Liability for Ultra-Hazardous Activities in International Law, RdC 1966 I, p. 105 et seq.; *Malanczuk*, in: *Böckstiegel*, *supra* note 32, p. 771.

of commercial activities since it necessitates an insurance policy on the part of the launching State[35].

6. Registration

Moreover, in the Registration Convention of 1975, the major principle, as already contained in the Outer Space Treaty (cf. Article V and VIII), is laid down as it requires the establishment of a national registry, as well as the delivery of information to the Secretary-General of the United Nations on certain parameters, concerning the flight of the space object and the location of the launch, as well as of the general function of this space object. Unfortunately, States are somewhat reluctant to provide such information, particularly in cases of military space activities. Therefore, the international community in general, and the United Nations Committee on the Peaceful Uses of Outer Space in particular, are considering ways and means of making this international legal principle more effective[36].

7. The Principle of Rescue and Cooperation

The general principle of rescuing astronauts in distress, as contained in the Outer Space Treaty (cf. Article V OST), is further implemented in the International Rescue Agreement of 1972. The duty to rescue astronauts in distress is only a part of the general duty to cooperate with one another with regard to activities in outer space. It is basically undisputed and fully accepted as part of customary international law.

8. Protection of the Environment

It is not astonishing that only very little is said in Article IX of the Outer Space Treaty about the protection of the outer space environment[37]. In 1967, the time was simply not ripe for the implementation of such specific legislation. On this point, the 1992 United Nations Resolution on the use of nuclear power sources is already a first and important step, in that it generally makes any use of nuclear power sources on board space objects in general, and on satellites in particular, dependent on a safety assessment[38]. Moreover, for a number of years, the United Nations Committee on the Peaceful Uses of Outer Space has been discussing the problem of space debris[39]. Tiny parts of space objects, be they even very small, can basically destroy large space infrastructures or satellites. Therefore, it is of paramount importance that the international community comes to practicable and acceptable solutions with regard to the avoidance of space debris, including the cleaning-up of certain orbits.

9. Some Preliminary Conclusions

If one wants to draw some conclusions from these major principles for outer space activities, one could characterize outer space legislation by three dichotomies: the peaceful/military dichotomy, the dichotomy of free and limited commercial uses of outer space, and finally a public/private dichotomy.

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[35] *Moysan*, The Insurance Point of View, in: *Hobe/Schmidt-Tedd/Schrogl* (eds.), Towards a Harmonised Approach for National Space Legislation in Europe, Cologne 2004, p. 113 et seq.
[36] Report of the Legal Subcommittee on the work of its forty-third session, held in Vienna from 29 March to 8 April 2004 (A/AC.105/826), paras. 109-120 p. 19.
[37] See *Frantzen*, in: *Böckstiegel*, *supra* note 32, p. 597 et seq.
[38] Principle 4, *supra* note 18.
[39] See Report of the Scientific and Technical Subcommittee on its thirty-eighth session, held in Vienna from 12 to 23 February 2001, paras. 114-135, p. 19 (A/AC.105/761).

As to the peaceful/military dichotomy, one must be very aware of the "dual" character of many outer space technologies. Let us take the example of the remote sensing satellites. It becomes very evident that such remote sensing technology can, on the one hand, be used to gather information on crops or terrestrial erosion and thus be important particularly for agricultural purposes in developing countries. On the other hand, it is equally clear that one can also gather strategic information by using remote sensing satellites. Therefore, it must be taken into account that even if the importance of the use of outer space for solely peaceful purposes is underlined by many countries, there is always a military overtone.

Moreover, the growing commercialization and privatization of outer space activities could bring back the question of the limits of commercial uses of outer space on the international legal order. We have already explained that although there is the principle of free use, outer space as such is an area designated as *res communis* shared by all States, to the effect that the results of the use should also be for the benefit of all mankind. This point will certainly in the future be on the agenda of the international community. Particularly if the use of resources becomes feasible, one must come up with a more precise legal regime for the commercial uses of outer space.

Finally, and closely connected to the last point, we currently observe as a consequence of the era of globalization, a growing shift from the public to the private exercise of space activities[40]. In that respect, further efforts (for example by national space legislation) have to be made to make sure that private entities observe the core principles of international space law to the same degree as they must be observed by governmental entities. We will come back to that when we discuss prospects of international space legislation.

It shall, moreover, be pointed out in this context that not only is the United Nations Committee on the Peaceful Uses of Outer Space occupied in more recent times with a refinement of some basic notions of international space law (for example, space benefits, launching State), but there is also an international discussion, in various *fora,* on how to reshape international space law in order to adapt it to current needs of a stronger commercial (and private) use[41].

III. Specific Legal Regimes for Activities in Outer Space

Let me very briefly go through some of the major specific uses of outer space and let me outline some of the legal principles in law. It should, however, be stressed in that respect, that the major principles are, as already explained, obviously applicable to these activities as well.

1. Telecommunications

Telecommunication satellites form a worldwide net in different orbits, that can be used for example, for telephony. As early as 1971, INTELSAT was founded as an international organization with the purpose to administer worldwide telecommunication by satellites. It was a

[40] See *Hobe/Hettling*, Challenges to Space Law in the 21st Century – Project 2001 Plus, IISL 2002, p. 51 – 55; *Hobe*, Das Weltraumrecht – Eine Einführung in eine nahezu unbekannte Rechtsordnung und ihre Probleme (Space law – An introduction to an almost unknown legal regime), Paper presented at the Bremer Juristische Gesellschaft (to be published).

[41] Cf. the deliberations of the International Law Association's Space Law Committee at its conferences in London (2000), New Delhi (2002), and Berlin (2004). See particularly Resolution 1/2002 of the New Delhi Conference of the ILA on the need to adapt certain international agreements to the needs of commercial uses, stating that the concept of common heritage of mankind is in line with commercial uses of outer space for the benefit of mankind.

semi-private/public enterprise that has, in 1999, restructured with the aim of being completely privatized[42]. Moreover, in more recent years, mobile satellite telecommunication by privately financed systems as IRIDIUM and Global Star have been in the centre of attention. The importance of telecommunication satellites becomes apparent if one realizes that the transfer of data or via the internet takes place by the use of telecommunication satellites. Television, if not by terrestrial means, is also being conducted via satellite. In that respect, the International Telecommunication Union, a specialized agency of the United Nations, which has a very long history, has the goal of technical coordination of frequencies to be used by such satellites[43]. This is particularly difficult in the so-called Geostationary Orbit, an orbit at 36.000 km above the equator, which gives a privileged position because any satellite positioned in the Geostationary Orbit, seems to stand still due to the rotation being equivalent to the rotation of the Earth[44]. Therefore, only a limited number of orbital slots is available and the International Telecommunication Union takes care of the allocation of such orbital slots. The United Nations Committee on the Peaceful Uses of Outer Space had, as already mentioned, looked into the matter from a point of view of transborder overspill of communications which, at times of the Cold War, was still an ideologically inspired problem. But with the end of the Cold War, the problem and its inherent legal difficulties have lost its practical relevance.

2. Satellite Navigation

Moreover, the uses of satellites for navigation purposes are of a significantly growing importance. Be it through the Global Positioning System (GPS) of the United States or the European Galileo system, the global positioning of ships, aircraft, spacecraft, and automobiles will be one of the most important technologies in a world that is characterized by an ever growing population and an ever growing infrastructure[45]. Here, questions of liability incurred by a malfunctioning of satellites for possible accidents are at stake, particularly for the launching State, though this issue is arguably not specifically related to space legislation and space-related liability.

3. Remote Sensing by Satellite

The use of remote sensing by satellite is another commercial means of using outer space. Such data is important for the daily weather forecast and in the areas of geology or cartography, as well as in the agriculture or forest industry[46]. It can also be used for environmental purposes. Several systems, like the American Landsat system or the European Spot system, are commercialized and the United Nations Committee on the Peaceful Uses of Outer Space considers whether an update of the Resolution of 1986, with a view to an assessment of its current applicability, is necessary[47].

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[42] See *Polley*, INTELSAT – Restrukturierung einer internationalen Telekommunikationsorganisation (INTELSAT – Restructuring an international telecommunications organisation), Berlin 2002.
[43] See *Lyall*, On the Reform of the ITU and the Commercial Use of Space, in: *Böckstiegel* (ed.), `Project 2001´ - Legal Framework for the Commercial Use of Outer Space, Cologne et al. 2002, p. 259 – 282.
[44] On the characteristics of the GSO see *Wolfrum*, in: *Böckstiegel*, *supra* note 32, p. 351 et seq.
[45] See for an assessment of the importance, *von der Dunk*, Of Co-Operation and Competition: GALILEO as a Subject of European Law, in: *Hobe/Schmidt-Tedd/Schrogl* (eds.), Legal Aspects of the Future Institutional Relationship between the European Union and the European Space Agency, Cologne 2003, pp. 47 – 56.
[46] See e.g. *Cheng*, Studies in International Space Law, Oxford 1997, p. 584 et seq.
[47] See e.g. Report of the Legal Subcommittee on the work of its forty-second session, held in Vienna from 24 March to 4 April 2003 (A/AC1.105/805), para. 138.

4. International Space Station

Finally, a short word should be said about the largest cooperation project ever conducted, the project of the International Space Station. This is a common undertaking by the United States of America, Russia, Japan, Canada, and ESA member States, here particularly France, Germany and Italy. It incurs costs of an amount of 100 billion Euros for the time span of 1998 to 2008. The purpose of the ISS is particularly research-oriented. At an altitude of 335 to 560 km and at a velocity of approximately 29.000 km per hour, the ISS shall be used for experiments under conditions of microgravity in several areas of science. The cooperation is based on several agreements, mainly the International Governmental Agreement of 1998[48] and the bilateral Memoranda of Understanding[49] concluded between the American NASA and all other space agencies of the cooperating member States. Whether there will also be a potential for a growing commercialization of the International Space Station remains to be seen in the future.

It, thus, becomes evident that although these specific space applications are in general under the umbrella of the general principles of international space law, sometimes specific rules are designed for these specific activities.

IV. Future Developments

What about the future? What is the main direction for international space law? In the course of our short investigation, some areas of future developments have already been mentioned. I will, at the end of my presentation, just name five examples where we can, already by now, observe a clear indication of future legal developments.

1. Remote Sensing Principles under Review

As already mentioned, with regard to current practices and the growing tendency towards commercialization, the United Nations General Assembly Principles on Remote Sensing by Satellite of 1986 will be under review of the United Nations Committee on the Peaceful Uses of Outer Space[50].

2. Future Legal Regimes for the Commercial Exploitation of Outer Space?

Moreover, current claims to appropriate certain areas of the Moon or other celestial bodies will sooner or later lead to the need to clarify the basis and the limits for commercial uses of outer space also by private entities. Interestingly enough, until now, the international community has not used a clause contained in the Moon Agreement, namely its Article 18, that invites member States, 10 years after the entry into force of this agreement (1984), to review it with a view to arriving at more precise clauses. The regime contained in the Moon Treaty, namely the declaration of the Moon and other celestial bodies to be the common heritage of mankind, has

[48] Agreement among the Government of Canada, the Governments of ESA Member States, the Governments of Japan, the Russian Federation, and the USA Concerning Cooperation on the Civil International Space Station, Done on January 29, 1998, Entry into force: March 28, 2001, published in: *Böckstiegel/Benkö/Hobe* (eds.), Space Law – Basic Legal Documents, Vol. 2/1, Utrecht, D.II.4.

[49] E.g. Memorandum of Understanding between the National Aeronautics and Space Administration of the United States of America and the European Space Agency Concerning Cooperation on the Civil International Space Station, Done on January 29, 1998, in: *Böckstiegel/Benkö/Hobe* (eds.), Space Law – Basic Legal Documents, Utrecht, D.II.4.2.

[50] See Report of the Legal Subcommittee of COPUOS adopted on 8 April 2004 (Doc. A/AC.105/826), p. 21, paragraph 125.

not found wide spread support within the international community. The consequences of this dedication are laid down in Article 11 of the Agreement, namely that

> "*…The international legal regime to be established should include an orderly and safe development of natural resources of the Moon, the rational management of those resources, the expansion of opportunities in the use of those resources, and 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 Moon, shall be given special consideration* (Article 11 paragraph 7 of the Moon Agreement).

The example of the Law of the Sea Convention shows that any one-sided limitation on the freedom to act of industrialized States will not lead to the necessary cooperation between developed and developing States for the benefit of all mankind. Therefore, a further consideration is required on the basis and on the limits of the commercial uses of outer space leaving, on the one hand, the possibility for industrialized States to go ahead with possible exploitation, if such exploitation becomes feasible, and, on the other hand, allowing other States to benefit somewhat from these activities. Here, the main question that will have to be decided is whether the international community wants to follow the example of Antarctica, that is to declare outer space and the celestial bodies to be exempt from any commercial exploitation, or whether it wants to follow the example of the Law of the Sea Convention. Here, the principle of the common heritage of mankind was somewhat reinterpreted to the effect that it now allows in principle the commercial use of outer space under specific circumstances.

3. More National Space Legislation

The era of globalization is – as already mentioned – characterized by more activities of private entities. Those entities must, however, to some extent, observe the current legal regime for the carrying out of outer space activities. Therefore, it is of utmost importance that States live up to their duty as contained in Article VI of the Outer Space Treaty, namely that the activities in outer space of non-governmental entities shall require authorization and continuing supervision by the appropriate State Party to the Treaty. One can observe, at the moment, that a growing number of States are considering the adoption of national space legislation. By now, we have already 10 States that have enacted space legislation and about the same number of States that are in a process of closely considering o such activities[51]. Many scientific institutions, like the International Institute of Space Law[52], the International Law Association[53], as well as my Cologne Institute of Air and Space Law[54], are conducting research to come up with some model legislation for States that includes the necessary requirements for making sure that any launch of a space object is properly authorized and continuously supervised.

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[51] An assessment of these laws is contained in Vol. 3 of the Cologne Project 2001 Plus series, published in 2004.

[52] For example, a session of the 2004 IISL Colloquium in Vancouver was specifically dedicated to the issue of national space legislation.

[53] See the 2004 Conference Report of the Space Law Committee of the International Law Association – Report on the Legal Aspects of the Privatisation and Commercialisation of Space Activities, online: http://www.ila-hq.org/html/layout_committee.htm.

[54] See *Hobe/Schmidt-Tedd/Schrogl* (eds.), Towards a Harmonised Approach for National Space Legislation in Europe, Cologne 2004.

4. Basic Notions of Space Law under Review

It has already been mentioned that in more recent times classical notions of space law have been under review by the international community. Such is the case for the notion of launching State, which is the subject of a United Nations General Assembly resolution later this year. It will most likely be the case for the principle of registration, a subject matter that will be on the agenda of the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space next year. Moreover, the authentic interpretation of Article I paragraph 1 of the Outer Space Treaty by the United Nations General Assembly Resolution 51/122 of 1996 must be taken into consideration if a more comprehensive legal regime for the commercial use of outer space is considered.

This all shows that the present era of globalisation has an important impact on the development of international space law.

5. Towards an Aerospace Convention for Space Tourism?

Finally, a most recent development could give rise to further consideration of the international space community. As Space Ship One has made evident, more and more private entities are considering possibilities of space flight and space tourism. The peculiarity of this undertaking is that it uses partly air space and partly outer space. However, as I mentioned at the beginning of my considerations, air law and space law have largely developed in separate directions. Therefore, these legal fields had very little in common so far[55]. At the same time, it is evident that air transportation is a fully commercialized area, while space activities have been dominated by States. However, undertakings like Space Ship One transcend the traditional air law/space law distinction and could give rise to further considerations of a future aerospace convention in which notions of liability and registration should be considered from an air law, as well as space law angle, with a view to reconciling both legal concepts[56].

Some of these aforementioned current issues, inter alia, national space legislation and problems of space travel/space tourism, are going to be discussed at a symposium organized by the Cologne Institute of Air and Space Law and the German Aerospace Centre DLR on 8-10 June 2005 in Cologne in the realm of the Project 2001Plus, celebrating the 80th anniversary of the Cologne Institute of Air and Space Law.

Conclusions

This overview had to be necessarily of a relatively short nature. It is, however, hoped that some ideas has been given on the development of the past 45 to 50 years of space legislation starting at the early age of the 1950s and ending in the early 21st century. The overall political and legal framework has changed considerably during these past 50 years. Starting in the era of the Cold War, we are now in a new era of globalisation, the duopoly of super powers being replaced by one still remaining super power. Of course, also political considerations play a very important role for space activities in general, and for space legislation in particular. But it becomes clear, if one looks into the development of space law, that the early age of a purely research-oriented space flights apart from military applications has been replaced, in the era of globalization, with a

[55] *Hobe/Cloppenburg*, Towards a New Aerospace Convention? – Selected Legal Issues of "Space Tourism", Paper presented at the 47th Colloquium on the Law of Outer Space, Vancouver 4 – 8, 2004 (to be published), p. 1.
[56] *Ibid.*, p. 6 et seq.

growing potential for commercial applications being conducted by a growing number of private actors engaged in space activities.

These applications are still at an infant stage, but they will be the only guarantee in the future for further and growing activities in outer space. Therefore, by still setting the main order through the major principles, the international legal order for space activities should be flexible enough to enable private actors to become active and to invest in outer space activities in order to make this, often called, *last frontier* beneficial, not only for private entities, not only for States, but for all mankind. If this challenge can be met successfully, that would mean that the overall challenge of the era of globalisation has been mastered by the international community.

Current and Future Development of Space Law

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Overview of the Presentation:

- Introduction
- International Space Law – Treaty Framework
- Major Principles of International Space Law
- Specific Legal Regimes for Activities in Outer Space

- International Space Law

  - From Discussion to Resolution (1957-1963)

    UNGA Res. 1348 (XIII) of 13 Dec. 1958

    - UNGA Res. 1472 (XIV) of 12 Dec. 1959
    - UNGA Res. 1721 (XVI) of 20 Dec. 1961
    - UNGA Res. 1962 (XVIII) of 13 Dec. 1963

- International Space Law
  - From Resolution to Treaty (1963-1979)
    - Outer Space Treaty
    - Rescue Agreement
    - Liability Convention
    - Registration Convention
    - Moon Agreement

- International Space Law
  - From Treaty back to Resolution (1979 – 2004)
    - UNGA Res. 37/92 (1982) - DBS
    - UNGA Res. 41/65 (1986) -RS
    - UNGA Res. (1996) – Art. I OST
    - UNGA Res. (2004) – Launching State

- Major Principles of International Space Law
  - Non-Appropriation Principle
  - Free Exploration of Space
  - Problem of Economic Uses of Outer Space
  - Principle of Peaceful Uses
  - Responsiblity and Liability

- Major Principles of International Space Law (contd.)
  - Registration
  - Principle of Rescue and Cooperation
  - Protection of the Environment
  - Preliminary Conclusions

- Specific Legal Regimes for Activities in Outer Space
  - Telecommunications
  - Satellite Navigation
  - Remote Sensing by Satellite
  - International Space Station

- Future Developments
  - Remote Sensing Principles under Review
  - Future Legal Regimes for the Commercial Exploitation of Outer Space?
  - More National Space Legislation
  - Basic Notions of Space Law under Review
  - Towards an Aerospace Convention for Space Tourism?

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Introduction

The main report to the Third United Nations Workshop on Space Law, convened in cooperation with the government of Brazil, as presented by Professor Stephan Hobe, provided an excellent introduction to the issues of the present space law and a solid basis for our discussions on the important subject. I appreciate his approach to these issues and share many observations expressed in his study. The purpose of Professor Hobe's paper, as spelled out in its introductory part, was "to briefly discuss how international law has reacted over the past five decades to the various challenges, notably of political and technological nature and, in more recent times, also to the phenomenon of globalization." Certainly, this is one of the key issues, which requires a full attention of all those who have been keen to examine the problems of the present and future development of space law.

Allow me now to present a number of observations on some aspects relating to this wide topic.

I. Structure and State of Development of Present International Space Law

It is evident from international space treaties and judicial decisions, and recognized by specialized writers, that the present international space law cannot be viewed as a complete system. Since the beginning and throughout almost five decades of its existence, international space law has been conceived as a progressively growing branch of contemporary international law, establishing a legal basis and some regulations for space activities. In several United Nations documents, it has been stated that the main results of this development have been enshrined in five international treaties and five sets of principles, and this outcome is usually positively evaluated. Of course, the United Nations core of international space law must be completed by other valid sources, such as the statutes and acts of international intergovernmental space organizations and numerous agreements on international cooperation in this field.

Even if we limit our observations to the United Nations treaties and principles, it is evident that these instruments have a different legal nature and meaning. Thus, for example, the 1963 Declaration of Legal Principles was intended as the first attempt at formulating a set of general rules governing space activities and it also became the first basis for the 1967 Outer Space Treaty into which those principles, completed by additional provisions, were later incorporated. The four other United Nations space treaties bear, in substance, an implemental character, for they developed in greater detail some of the principles of the Outer Space Treaty. A similar role has been played by the sets of principles adopted during the 1980s and 1990s; however, whereas some of these principles, particularly those relevant to the nuclear power sources in outer space, really established new special norms based on technical knowledge and experience, the other mostly remained on the level of agreements based on political consi-

derations and compromises.

II. Legal Nature of the United Nations Resolutions Relating to Space Activities

While the United Nations space treaties were not only adopted by the United Nations General Assembly but also concluded as other international treaties, thus receiving a legally binding force, the 1963 Declaration of Legal Principles and the other sets of the United Nations General Assembly principles were only adopted by the Assembly in its resolutions. Nevertheless, as stated in the study of Professor Hobe, these principles may be considered as "important for a certain *opinio iuris* of a significant number of States, even more so if these resolutions are adopted by consensus". Moreover, as Professor Hobe continues, "the constant conduct and respect for such resolutions may build up to eventually become customary international law".

In studying this issue, however, we have to be cautious, for the principles included in individual sets are not all of the same nature. Some of them are really equal to legal principles, i.e. to general rules of conduct formulated on a high degree of abstraction. Some other, however, are spelled out more as recommendations of standards of practice. Furthermore, except the Principles Relating to Remote Sensing and also part "J" of the Direct Satellite Broadcasting (DBS) Principles, the duties included in these documents are expressed by the conditional "should", not by the affirmative "shall" which means a legal obligation. Moreover, while the principles enshrined in the 1963 Declaration have been called *expressis verbis,* as Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, the titles of other sets of principles miss the adjective "legal" and the last set misses even the term of principles and is entitled only as "Declaration on International Cooperation..." And while a fundamental legal role was attached to the principles of the 1963 Declaration - and they were even called by some representatives of the United Nations Member States as legally binding during the process of their adoption - such legal nature was never attached to the other sets of principles. On the contrary, it was more or less obvious that the latter should play a rather temporary role and they could be completed, amended or replaced by new documents during the further development of space activities. The 1992 Principles Relevant to Nuclear Power Sources even explicitly recognize in the preamble that "this set of Principles will require future revision in view of nuclear power applications and of evolving international recommendations on radiological protection". And the final principle of this set stipulated: "These Principles shall be reopened for revision by the Committee on the Peaceful Uses of Outer Space no later than two years after their adoption."

Therefore, it is our conviction that the character of customary international law can now be assigned without doubts only to the principles included in the 1963 Declaration of Legal Principles. They were adopted without any opposition or reservation with the intention to establish a set of fundamental rules of international space law. They have been honoured as such by constant practice of international legal persons. Later on, they were transformed into the 1967 Outer Space Treaty and other legally binding documents and there has not been any attempt at derogating the Declaration either as a whole or some of its principles. It is even possible to go further in this direction and affirm that the fundamental principles of this document have become peremptory norms of general international law/*jus cogens* accepted and recognized by the international community of States as a whole. No derogation is permitted from such norms and they can be modified only by subsequent norms of general international law having the same character.

III. Can the United Nations Resolutions Establish Interpretation of Treaty Provisions?

When assessing the United Nations treaties and principles, one specific question should be raised, namely that of mutual relations between these two categories of space law sources. Is it possible to accept the view that the sets of principles play an interpretative role to the basic provisions of the 1967 Outer Space Treaty? This should be valid, according to Professor Hobe's study, particularly for the 1996 Declaration on International Cooperation and also for the recently adopted General Assembly resolution on the application of the concept of the "launching State".

I hesitate to accept this conclusion for several reasons. The first and most important one is the difference between the binding force of the 1967 Outer Space Treaty and the recommendatory character of the United Nations Resolutions, which cannot derogate or change the substance of the earlier treaties. The second reason is the difference between the circles of the consenting and adopting parties to those instruments. Moreover, the third reason is the fact that at least some of the United Nations Member States that are parties to the United Nations space treaties explicitly reject the capability of the United Nations Resolutions to interpret or even amend the treaty rules binding them. In this respect, it may be also referred to one of the preambular paragraphs of the recently adopted resolution on the "launching State", which spells out that nothing in that document constitutes an authoritative interpretation of or a proposed amendment to the Registration Convention or the Liability Convention.

The United Nations space treaties and the General Assembly resolutions remain separate legal documents of different legal value. This conclusion, however, does not mean that the provisions included in the United Nations sets of principles and other General Assembly resolutions are without any impact on the application of the treaty provisions concerned. They should certainly be taken into account during the process of application of the treaties, particularly when negotiating agreements on international cooperation or issues arising in practice of space activities.

IV. Legal Meaning of the Non-Appropriation Principle

The adoption of the non-appropriation principle, which appeared for the first time in the 1961 General Assembly resolution 1721 and was then incorporated into the 1963 Declaration and the 1967 Outer Space Treaty, has certainly been one of the most important events in the development of international space law. There have been dividing opinions about the exact legal meaning of this principle and there will probably be still more debates on its practical impact on space activities in the future.

In his study, Professor Hobe draws our attention to the fact that the prohibition of national appropriation by claim of sovereignty, by means of use or occupation, or by any other means does not exclude any kind of commercial exploitation and that the clear prohibition to claim areas does not clearly indicate whether or not the taking of resources is allowed or not. Nevertheless, after some analysis, he concludes in harmony with the 2004 Declaration by the Board of Directors of the International Institute of Space Law (IISL) that it is clear from the existing outer space law that any taking of areas in outer space or on celestial bodies is prohibited by law. Any claims into "this direction, for example by way of selling of areas of the Moon, are therefore totally unfounded in international law. States as signatories of the Treaty have the duty to hinder respective claims of individuals."

It has to be agreed with Professor Hobe that, from the wording of the principle concerned, it should be undisputable that the principle bans national appropriation, in all respects. The

adjective "national" must be interpreted in conjunction with Article VI of the 1967 Outer Space Treaty, which defines "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 entities. Therefore, the prohibition of national appropriation is fully applicable not only to the activities of States and international intergovernmental organizations, but also to the activities of non-governmental entities, commercial companies and private individuals.

It should be recalled that the principle of non-appropriation was enacted in the above-mentioned instruments during the period when the exploitation of space resources was not yet in sight and therefore the legislative efforts tended only to regulation of the exploration and use of outer space. The issue of exploitation of space natural resources emerged almost two decades later, in connection with the discussions on the legal regime of the Moon and other celestial bodies and under the influence of negotiations on the status of the seabed area and its resources, which became later a part of the 1982 United Nations Convention on the Law of the Sea.

It may be concluded at this stage of the comments, that the principle of non-appropriation forbids any national appropriation of outer space, including the Moon and other celestial bodies and any parts thereof, but not a possible alienation of resources that would be conducted under a special international regime that would be established by agreement of the international community. This conclusion will be further developed in the final part of these comments.

V. The Principle of Peaceful Uses

Only a few sentences relate to this issue in Professor Hobe's study. Many discussions on this topic were held in the past and disputes mostly concentrated on the meaning of the term "peaceful"; however, it should be mentioned that "Ways and means of maintaining outer space for peaceful purposes" have remained a matter of priority on the agendas of the Committee on the Peaceful Uses of Outer Space and its Legal Subcommittee and therefore, the importance of the principle of peaceful uses has not been diminished. It rather should be adjusted to changes in the world of today.

One specific aspect of this topic should be added, which also relates to the demilitarization of the Moon and other celestial bodies. Art. IV para. 2 of the 1967 Outer Space Treaty and the 1979 Moon Agreement not only prohibit any installation of military bases but they also forbid the installations and fortifications on the Moon, testing of any type of weapons and the conduct of military manoeuvres. Finally, yet importantly, the general clause concerning the Moon and other celestial bodies, which reserves their use exclusively *for* peaceful purposes, must also be recalled. The only exception from this principle is the use of military personnel and of any equipment or facility necessary *for* peaceful exploration of the Moon and other celestial bodies.

VI. Protection of the Space Environment

A great and complex issue, which lies before us, is the regulation of different aspects of protecting the space environment. Unlike the environmental instruments relating to the protection of the Earth against pollution of different kinds and *may*be *more* than a thousand of bilateral and multilateral agreements among State *for* international cooperation in this field, there are but very limited legal means on how to protect the space environment that is becoming *more* and *more* important *for* humankind.

As the most impending issue amongst those problems, is considered the protection of space environment against the generation of space debris. One agrees with Professor Hobe when

he reminds us that "it is of paramount importance that the international community comes to practicable and acceptable solutions with regard to the avoidance of space debris including the cleaning-up of certain orbits". In *our* opinion, however, this appeal should be made effective as soon as possible. It must be recognized that the attention of the Committee on the Peaceful Uses of Outer Space to this issue has been drawn *for* several years, and the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space has continued its consideration of the item on space debris in accordance with two successive work plans. The proposals on debris mitigation presented by the Inter-Agency Space Debris Coordination Committee to the Scientific and Technical Subcommittee, when approved, will certainly be instrumental for reaching substantive progress in the technical aspects of the issue. However, an agreement on such guidelines should be accompanied by a thorough analysis and resolution of the legal problems involved.

VII. Problems of Further Development of Space Law

One of the main ideas of Professor Hobe, which permeates through several parts of his study and is spelled out amongst its preliminary conclusions, relates to "the growing commercialization and privatization of outer space activities" that "could bring back the question of the limits of commercial uses of outer space in the international legal order." According to his opinion, "this point will certainly in the future be on the agenda of the international community. Particularly if the use of resources becomes feasible, one must come up with a more precise legal regulation of the commercial uses of outer space." Professor Hobe outlines two alternatives for a possible solution. Either to follow the example of Antarctica, i.e. to declare outer space and the celestial bodies to be exempt from any commercial exploitation, or to follow the example of the Law of the Sea Convention, i.e. to establish a regime based on the common heritage of mankind as reinterpreted by the 1994 Agreement allowing in principle the commercial exploitation under specific conditions.

In our opinion, it is necessary to differentiate between the commercialization and privatization of outer space activities within the existing limits of the peaceful exploration and use of outer space on the one hand /such as telecommunications, remote sensing and other activities, and the commercial exploitation of space resources on the other hand. Whereas international space law does not ban the former categories of space activities, the legal status of the latter category of activities is different and must be carefully studied for the purposes of future regulation. It should be admitted that further development of space activities is unavoidable and any prospect of delaying the exploitation of space resources according to the Antarctica model is hard to imagine.

After all, it would be against the interests of all countries, irrespective of their degree of economic or scientific development. In this context, it should be recalled that even the 1979 Moon Agreement admitted this development when providing "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."

At the same time, it is not possible to accept that the exploitation of space resources should be left only to national regulations of those countries, which would be able to conduct such activities. Any recalling of the 1996 Declaration on International Cooperation as saying "that States are in principle free to choose solutions how to distribute the benefits from the exploitation of outer space resources" is not correct, for the Declaration as well as the introductory part of the General Assembly resolution deal only with 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. And according to para. 2 of the 1996 Declaration, States are free only to determine all aspects of their participation in international cooperation in the exploration and use of outer space on an equitable and mutually acceptable basis.

In the development of space law as a whole, the establishment of an appropriate legal regime to govern commercial activities in the exploitation of space resources should be affected on both tracks, international and national. At the same time, the future elaboration of international law principles governing such activities should be original, taking into due account the specificity of space conditions. If it is not possible to apply the current Antarctica model to the space environment, it would also not be reasonable to copy the model of exploitation of the seabed resources. However, it is possible to learn from both models. The 1979 Moon Agreement indicated a specific way, but until now, the elements of the international regime to be established for governing the exploitation of the natural resources of the Moon - and eventually also applicable to other celestial bodies within our solar system - has not been attractive for many countries. It will be necessary to think about improvements and possible modifications of this approach.

Current and Future Development of National Space Law and Policy

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I. Introduction of 'Policy' and 'Law'

In a highly political, highly visible area of society such as that of space activities, 'law' and 'policy' are not always clearly distinguishable – and more often that not, the ties between the two are very short and very direct. If a distinction would need to be made, certainly to the public eye 'policy' would focus more on the day-to-day handling of affairs with 'flexibility' as the key concept, whereas 'law' would be focusing more on long-range stability, with inherent 'inflexibility' almost inevitably following from that. Whatever the value of such evaluation, essentially the ties between the two are bi-directional.

From the one end, 'law' presents one of the major parameters – at least in law-abiding societies – for policy making, next to such less formal, more amorphous parameters as political, economic, social, moral, technical and scientific ones. Certain policy alternatives will be downright prohibited, others will be confronted with too many negative legal consequences to represent viable alternatives, still others will almost automatically follow from existing law and regulation.

From the other end, 'law' is one of the instruments through which actual policies – at least those of a more comprehensive, long-during and substantive character – can be implemented. Once a certain major policy shift has been decided upon at the relevant levels, almost inevitably the need and desirability arise to change relevant parts of the law as it stands. By adding to, or changing the existing legal regime, the new policies are given substance and at least some measure of stability.

When, therefore, the present paper seeks to discuss current and future development of national space law and policy, this is done keeping the closely intertwined role and character of 'law' and 'policy' as referred to above in mind. Since, to a certain extent, this makes the choice as to where to start –take law or policy as the point of departure? – of lesser importance, the current author hopes to be excused for taking, as a lawyer, the law as the point of departure, transiting whenever and wherever he feels necessary – and at least a bit confident! – into the territory of policy more properly speaking. Especially when looking towards the future of national space law and policy, the law as it is – for the reasons briefly indicated above – represent a helpful set of parameters in any case.

II. The Rationale of National Space Law: Private Involvement in Space Activities

Nowadays private entities have also become involved in carrying out activities in outer space to a great extent, even if States still comprise the major category of actors in space.

Obviously, however, the public interests in regulating security, safety, liability issues, and the use of outer space for peaceful purposes remain valid also in the context of privately conducted activities.

Since international space law has not dealt with the particularities of private participation as such, the commercialization and privatization of space present a clear challenge to these public interests involved in space activities, in policy terms as much as in legal terms. The present international rules concerning space activities are essentially directed at States, and will continue to be developed primarily at the public level for some time to come. The same normative system should of course also apply to private commercial space activities, though at present private enterprise is not directly bound by those rights and obligations. As a consequence, the issue of developing national space-dedicated legislation, the most comprehensive instrument available for that purpose, continues to be of the highest relevance and topicality in the area of space law.

There are, essentially, three reasons for that. Firstly, as mentioned international space law is largely of a public nature, hence national space legislation would provide the most comprehensive, transparent and effective instrument to implement on a domestic level *vis-à-vis* private entities the international legal obligations arising from the space treaties. This concerns in particular the 1967 Outer Space Treaty[1], the 1972 Liability Convention[2] and the 1975 Registration Convention[3].

Following the discussions at the Second United Nations/Republic of Republic of Korea Workshop on Space Law[4], it was concluded in these respects:

- 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 a strong *recommendation* arose there from for such authorization and continuing supervision to be incorporated into a broader licensing regime as part of a national (framework) law in view of the comprehensiveness and transparency of such an approach;
- 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 law including a licensing system;

[1] 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, done 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).
[2] Convention on International Liability for Damage Caused by Space Objects (hereafter Liability Convention), London/Moscow/Washington, done 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).
[3] Convention on Registration of Objects Launched into Outer Space (hereafter Registration Convention), New York, done 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).
[4] Second United Nations/Republic of Republic of Korea Workshop on Space Law, held in Daejon, Republic of Republic of Korea, 3-6 November 2003; for more information, see the website of the United Nations Office for Outer Space Affairs, at http://www.oosa.unvienna.org/index.html.

- 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 – 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.

Secondly, for reasons comparable to those arising from the international space treaties as discussed, States may be inclined or even strongly induced to develop national space legislation for the purpose of monitoring and controlling such activities as to their national effects. For obvious reasons the space treaties deal with legal effects of private space activities only if these have consequences beyond the borders of the State(s) under whose control the activities at issue fall. Once the underlying privatization of space and space-related activities is a fact of life within a certain country however, there are also certain elements of those activities that would call for regulation at the national level – sometimes simply because they are not dealt with, as such, at the international level.

A prominent example concerns liability. The Liability Convention only deals with cases of 'international' liability, that is liability for damage caused by the space object of a launching State or its citizens or entities to *another* State or *its* citizens or entities.[5] Yet, such a space object may of course also cause damage to citizens and entities of the launching State itself, and since that is not covered by the Liability Convention, national law should step in to deal with those cases.

Thirdly, especially in those States that favour, in principle, private participation in economic and other activities, such legislation would represent the best vehicle for implementing policies of supporting private participation as part of more general national (space) policies. Thus, interesting incentives could be offered in such areas as research and development, financing, taxation and advantageous liability and/or insurance regimes, as an alternative to using other (existing, non-space-specific) law. Domestic legislation thus presents a possibility for States to harness private enterprise for the public cause by making it attractive for it to participate in space activities.

In the abstract, national space legislation thus represents the best way to establish legal effects of a system of public rights and obligations for private enterprise, and States can and should exercise their sovereignty to control in law the international effects of private space activities and preserve the relevant public interests in such activities.

The major reason for enacting any domestic space legislation would therefore lie most prominently in a comprehensive system of licensing such activities, thereby constituting the centrepiece of any national space law in the narrow sense of the word. Establishment of a framework law tying the relevant categories of private space actors into the legal system of rights and obligations provided by international space law should have priority, as the relevant State in turn will be held accountable for those activities internationally. This certainly is the best way to

[5] Cf. esp. Art. II, III, VII, VIII, Liability Convention.

take into due account the public-private paradigm in international space law: ensuring that the public rules of international space law, intended to preserve the public interests in space, are also duly implemented *vis-à-vis* private enterprise and private involvement in space activities. In other words: to enforce the provisions of the Outer Space Treaty also in this context!

III. International Space Law and National Space Legislation

International space law itself then firstly calls for the establishment of national space legislation; secondly, it provides for the outlines of such legislation as to its scope; and thirdly it provides for a few broad rules as to its contents. In short, a State will have to exercise any available jurisdiction primarily *vis-à-vis* those particular categories of private activities in respect of which it can be held accountable internationally.

This accountability refers to the obligation resting upon a relevant entity to answer *vis-à-vis* other entities for certain activities or occurrences. Under space law it has a two-fold character: it comprises both a general accountability in the form of State responsibility, and the specific case of accountability for damage as presented by the concept of State liability. These two notions carry their own definitions regarding the entities *for which* a particular State might be held accountable.

On State responsibility, Article VI of the Outer Space Treaty provides that States are internationally responsible for "national activities in outer space", including cases where these are "carried on (...) by non-governmental entities". This responsibility pertains to "assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty". States are thus responsible for activities undertaken in outer space in case these activities violate obligations under, essentially, international space law. Moreover, States are responsible to the same extent for private activities as they are for their own, public activities.

Whilst Article VI then begs the question: for *which* categories of private space activities is *which* particular State to be held responsible on the international plane, it would be beyond the purpose of the present paper to deal with those issues. In any case, the answer to this question would lie in the interpretation of the key term "national activities"– but no authoritative definition of the (scope of) "national activities" of a State for which it is to be held responsible has been provided by the Outer Space Treaty or elsewhere. Consequently, no agreement exists as to the interpretation of this term. From this author's perspective, the most effective and sound interpretation of private "national activities" would make States internationally responsible precisely for those activities over which they can exercise legal control. In other words: a State would be held responsible for those private activities undertaken somehow from within its jurisdiction.

As to State liability, Article VII of the Outer Space Treaty provides that States are "internationally liable for damage to another State (...) or its natural and juridical persons", if such damage is caused by their space objects. This clause has been elaborated upon in some detail in the Liability Convention.

Which particular State or States are liable in respect of a specific space object causing damage is determined by a four-fold criterion. As States to be held liable qualify, in a cumulative manner, the State that "launches" the space object, the State that "procures the launching" of that space object, the State "from whose territory" the launching of that space object occurs, and the State from whose "facility" that space object is launched.[6]

[6] Cf. also Art. I(c), Liability Convention. Using the same four-fold criterion for determination of the "launching State(s)".

This international liability by implication applies also to damage caused by space objects launched or operated with private involvement or even completely privately. A State is thus liable for a private space activity and the damage it causes, in case (A) that activity involves a space object and (B) the State concerned was involved in the launch of that space object in any of the four modes mentioned.

Thus, from a particular State's perspective, it would be wise to include, as far as possible, launches with involvement by private entities in the scope of its national legislation wherever such launches would lead to that State's international liability being invoked at the international level, i.e. under the terms of Article VII of the Outer Space Treaty and the Liability Convention. If the above, admittedly narrow, definition of national space law as focusing on a licensing system is followed, essentially nine-and-a-half examples of States having established such framework laws for private space activities can be found. The nine concern the United States, Norway, Sweden, the United Kingdom, the Russian Federation, South Africa, Ukraine, Australia and Brazil. In addition, Hong Kong may be referred to as a special case: its transfer back to the People's Republic of China in 1997 resulted in the need to adapt the relevant UK act, hitherto applicable to Hong Kong, to the new political status by means of a special Ordinance.

States such as Japan, France, Canada and Argentina do also have *both* private companies involved in space activities operating within their jurisdiction, *and* substantial and quite general national legislation in place focused on space; yet the crucial element of a transparent and comprehensive governmental structure for authorization ('licensing') of private space activities seems to be missing.

For example, Argentina National Decree No. 995/91[7] created the National Commission on Space Activities, a hybrid public/private body according to the Decree, but without any clear-cut authority to license private space enterprise– let alone a system and legal parameters for doing so. A further National Decree, No. 125/95[8], established a national registry of space objects launched into outer space, but once more without any specific reference to privately-launched, -operated or-owned satellites. Apparently, satellite communication providers are subjected to an obligation to be licensed to provide their services, but this occurs under the applicable general telecommunications licensing regime without any specific implementation of either Article VI or Article VII of the Outer Space Treaty, or of the Liability Convention for that matter.

In such and similar cases the policy approach to fulfilling the obligations of "authorization and continuing supervision" of Article VI of the Outer Space Treaty has been that of, effectively, a spider in the web. Under this pragmatic policy, governmental space agencies just make sure to be so centrally involved in any relevant space activity with private involvement that control over that involvement can always be asserted through the particular structure of the project or programme at issue, and does not require a general or comprehensive law to achieve such a governmental control. For reasons of comprehensiveness and transparency however, this 'spider-in-the-web' approach may no longer suffice. Consequently, these States, joined by others such as India, China, Republic of Korea, Germany, Italy, Belgium and the Netherlands, are contemplating or already in the process of actually drafting a national framework law.

Without claiming in any respect to be comprehensive, this paper, in addition to indicating a few general characteristics will deal with the national space laws by focusing on two elements

[7] Creation of the National Commission on Space Activities, National Decree No. 995/91, 28 May 1991, National Space Legislation of the World, Vol. II (2002), at 366.
[8] Establishment of the National Registry of Objects Launched into Outer Space, National Decree No. 125/95, 19 July 1995; National Space Legislation of the World, Vol. II (2002), at 373.

considered to be of major importance. The first one concerns the scope of the relevant legislation: what types of space activities are concerned, and to whom or what are the rules addressed, particularly in terms of the relevant licensing obligation. The second concerns the most directly quantifiable aspect of national implementation: how the potential international liability of the relevant State for licensed private space activities is dealt with in terms of obligations of reimbursement of that State on the part of the licensee.

1. The United States

The United States originally took the approach of establishing, in addition to a general space law (the National Aeronautics and Space Act of 1958[9]), three specific sets of national laws for each of the three respective areas where private enterprise has become substantially involved in space activities: launching, satellite communications and satellite remote sensing. In the course of the 1990s, policy makers apparently and increasingly became aware of a number of overarching and transversal issues and problems amongst the various sectors. Also the growing private and commercial use of the Global Positioning System (GPS) signals and the impending prospect of partly commercial International Space Station (ISS) operations called for a more comprehensive approach to private and commercial involvement in US space activities.

Several efforts to achieve more coherence and comprehensiveness resulted. Most notably, in 1998 a Commercial Space Act[10] was enunciated which, in addition to other 're-shuffling' of acts, to some extent amended the three specific sets of space acts referred to as well as tying them into a somewhat more coherent framework. For the purpose of easy reference, however, the brief discussion hereunder refers to the original versions and formats. Before doing that, however, a final consequence –or perhaps 'cause' is a better word– of the above developments concerns security issues, which for obvious reasons have gained immensely in importance over the last three years. Security concerns touch upon all relevant fields or aspects of space activities, on the one hand no doubt stimulating the above efforts to tie all into one coherent whole, but on the other hand likely causing major policy and legislative initiatives to focus on security aspects –whether related to remote sensing, launching, satellite navigation or any other type of space activities. The discussions on, and intra-governmental fights for the driver's seat regarding export control are poignant examples thereof, and may likely dominate the domestic legal and policy developments for some time to come.

Launching Activities

The Commercial Space Launch Act[11] was enacted on 30 October 1984 specifically to deal with one of the three fields of interest to private enterprise: launching activities. It was directly aimed at inducing involvement of the United States private sector in such activities. Even more to the point, it was the absence of substantial success in the prodding of private enterprise to enter the business that led to the enactment of Amendments to the Launch Act[12] in 1988. These Acts were

[9] National Aeronautics and Space Act, Public Law 85-568, 85th Congress, H.R. 12575, 29 July 1958; as amended through 1983; 72 Stat. 426; Space Law – Basic Legal Documents, E.III.1.
[10] Commercial Space Act, Public Law 105-303, 105th Congress, H.R. 1702, 27 January 1998; 42 U.S.C. 14731.
[11] Commercial Space Launch Act, Public Law 98-575, 98th Congress, H.R. 3942, 30 October 1984; 98 Stat. 3055; Space Law – Basic Legal Documents, E.III.3.
[12] Commercial Space Launch Act Amendments, Public Law 100-657, 100th Congress, H.R. 4399, 15 November 1988; 49 U.S.C. App. 2615; 102 Stat. 3900; Space Law – Basic Legal Documents, E.III.3, 13 ff.

later incorporated more formally into the US Codes, solidifying the relevant arrangements without fundamentally changing them.[13]

The scope of application of the Launch Act and its licensing system in terms of activities encompasses both the operation of launch vehicles and the operation of launch sites. The Act firstly applies to all persons undertaking these activities within the United States. Secondly, it applies to US citizens, meaning individual citizens, as well as juridical persons incorporated in the United States, which undertake these activities outside the United States. Thirdly, it applies in principle to non-US-incorporated legal persons subject to a controlling interest of any US national or US-incorporated legal person. This, provided the entity undertakes the activities in question outside the United States as well as outside any other State's territory and unless, by agreement, the exercise of jurisdiction and control over the activities has been transferred to another State. Thus, only launches of US-registered launch vehicles outside US territory by non-US nationals are not covered by the Launch Act, but that may be a rather hypothetical construct anyway.

The Launch Act in its original version provided for every licensee to obtain obligatory liability insurance without limits, making the US Government the recipient of any insurance monies that would be paid. Because of the obligation for a licensee to obtain insurance without any ceiling on compensation, no private entity seriously considered applying for a license under the Launch Act. This was repaired in 1988, when Section 16 was amended. Licensees still are required to obtain third party liability insurance or to show financial responsibility, allowing the US Government to be reimbursed for any third party liability claim that arises as a consequence of the activities of the licensee. This time, however, the absolute maximum of the insurance coverage (alternatively financial responsibility) to be demonstrated is US$ 500 million. Furthermore, this ceiling will be lowered firstly if the maximum liability insurance available in the world market at reasonable cost is determined to be less than US$ 500 million. Secondly, it will also be lowered, if the maximum probable loss would be less than either US$ 500 million or the aforementioned maximum liability insurance coverage. As a result, the United States Government *de facto* acts as an insurer of private launches for the purpose of *international* third party liability for those parts of claims up to and above the amount of liability insurance required to be taken by the private entity.

In terms of *domestic* liability, that is, victims in a private capacity suing a licensee before a US court, a further provision of the 1988 Amendments is relevant, in that the US Government limits such involvement as partial compensator of damage caused by the licensee to US$ 1.5 billion per accident. In other words, victims of an accident under the Act suing before a US court will find their collective compensation capped at the total of the maximum imposed by means of the license upon the licensee plus the US$ 1.5 billion pledged by the US Government.

The liability arrangements relating to contractual liability, though not resulting from international obligations, in a practical and policy sense are more important for private enterprise. The absence until now of operational privately-owned and -operated launch sites in the United States means that private launch providers will have to use the varioUS Governmental launch sites available. The contracts for such usage and the actual liability arrangements therefore become of crucial importance. In this respect, the Launch Act performs the function of a standard contract between the government and any private user. In its 1984-version, the Launch Act basically provided for full indemnification of the US Government for any damage suffered by it. *Vice versa* however the US Government refused to accept any liability for damage suffered by the licensee, except for cases of wilful misconduct or gross negligence – alternatively if either of a limited

[13] 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).

number of acts allowing for suits against the government is applicable, such as the Federal Tort Claims Act.

The Amendments of 1988 changed these provisions in favour of potential licensees as well. Now, licensees have to demonstrate insurance coverage or other financial resources up to a maximum of US$ 100 million per launch, or so much less as is warranted by 'maximum probable loss' or 'maximum insurance available at reasonable rates' calculations. Furthermore, to the extent that the United States or any of its agencies is involved in a particular launch under a contract, a reciprocal waiver of claims is to be applied. In principle it applies to amounts (as to damage on the governmental side) greater than the aforementioned maximum, determined under the applicable provisions. Moreover, it may be noted that in the relationship between licensees and any of their contractors, subcontractors or customers, a reciprocal waiver is obligatory.

The newest developments in law-making focus on dealing with new developments in space activities – obviously. Thus, the Commercial Space Act of 1998 included in the scope of the licensing obligations under the Launch Act the re-entry of space vehicles, in view of arising plans to return private spacecraft to Earth (for example with valuable mineral resources).

Similarly, the latest spectacular success of SpaceShipOne, as the first fully private vehicle with sub-orbital capacity unhinges the door to space for private tourists, and will (have to) lead to further amendments of the Commercial Space Launch Act[14] as currently under discussion, in order to clear the way for a viable space tourism industry. The bill will probably not be enacted as quickly as hoped for by many, but with the plans of Mr. Richard Branson and others to capitalize on the success of SpaceShipOne, there is little doubt that, somehow, such legislation will soon be enacted. In conclusion, the focus of the international liability regime on launching is mirrored by the extensive care taken by the Launch Act to deal with liability. In this regard, the Launch Act deals not only with third party liability but also with an important category of inter party liability issues. Imposing relevant uniform ceilings on inter party liability in the case of the United States was prompted by the desire to promote a level playing field at least within the United States.

Satellite Communication Activities

In 1934, the Communications Act[15] was enunciated in the United States, in order to deal with communications on the federal level. The Federal Communications Commission (FCC) declared in 1970 that the Communications Act applied to space telecommunications as well.[16] Meanwhile, the Communications Act has been partially overtaken by the 1996 Telecommunications Act[17] and the 2000 ORBIT Act[18]; such changes however did not fundamentally impinge upon the system of licensing private entities for relevant activities.

The licensing obligations under the Communications Act apply to any person using or operating "any apparatus for the transmission of (...) communications or signals by radio (...) from [a] place in (...) the United States". Thus, it seems, only the territorial jurisdiction of the United States is exercised. Potential international responsibility of the United States is not covered in the

[14] Commercial Space Launch Amendments Act of 2004, H.R. 3752.
[15] Communications Act, 19 June 1934; 47 U.S.C. 151 (1988); 48 Stat. 1064.
[16] Communications Satellite Facilities, First report and Order, 22 FCC 2d 86 (1970), Appendix C, p. 1.
[17] Telecommunications Act, Public Law 104-104, 104th Congress, 3 January 1996, signed into law 8 February 1996; 110 Stat. 56.
[18] Open-market Reorganization for the Betterment of International Telecommunications Act (hereafter ORBIT Act), Public Law 108-180, 106th Congress, 17 March 2000.

case where a US company operates completely outside US territory, especially if it does not also operate with a US-registered space object.

Liability, as far as it is regulated by the Liability Convention, depends upon involvement of a State in the launch of the communications satellite and not on that satellite's operations *per se*. Therefore, the United States can incur liability for any damage caused by such operations only to the extent that it qualifies as a launching State. As a result, any domestic obligation of indemnification of the government by private entities of such liability also depends upon the Launch Act. Thus, the Communications Act essentially ignores international space law liability. The Act only applies on the basis of nationality, not on that of territory. At the same time, potential applicability of Article VI of the Outer Space Treaty is also ignored thereby.

As active US involvement in the context of the World Trade Organization to enhance global liberalization and privatization of satellite communications and the ORBIT Act in particular have shown, US policy over the last years has largely focused on *international* aspects of the sector. In many ways, the US market is considered mature enough not to require fundamental or even revolutionary domestic legislative activities; the focus is rather on making existing procedures (even) more flexible and business-friendly. The major legal issue involved in this context is that concerning the possible auctioning and ownership of frequency assignments, which is why one might expect the major national policy and legislative developments to arise in that area.

Satellite Remote Sensing Activities

In 1984, the Land Remote Sensing Commercialization Act[19] was enacted to stimulate the commercial development of space remote sensing especially by the private sector. Involvement of the US Government in the development, construction, launch and operation of the Landsat remote sensing satellites increasingly should be taken over by private enterprise; however, the cost of operating comprehensive space remote sensing systems, 'from the cradle to the grave' as it were, remained far above what could be reasonably recovered in any commercial market. The only company at the time actually involved in commercial remote sensing in the United States, Eosat, confined its activities to the marketing and sale of remote sensing data from the Landsat satellites. In order to remedy this situation, in 1992 the Land Remote Sensing Policy Act[20] was enacted, repealing the first Remote Sensing Act. Both Acts can be taken together for the purpose of analysis. The scope of the Acts and the licensing systems provided is rather broader – and hence from a government perspective more satisfactory – than that of the Communications Act, as the former cover all entities falling under the jurisdiction of the United States (personal as well as territorial) as opposed to those merely having US nationality. Minor issues relate to the uncertainties regarding the use of the term "control" by the Acts, and how much wider it should be interpreted than that of "jurisdiction", and the consequences of registration by the United States of a satellite that is under its control, but not under its jurisdiction formally speaking.

Under the 1992 Act, the license operates as a form of authorization and supervision. By virtue of such a license, the United States transforms the activities concerned into "national activities" as relevant under Article VI of the Outer Space Treaty. Hence, it also assumes international responsibility for them. Such responsibility would attach not on the basis of territory or nationality, but on the basis of the legal document(s) formalizing the control and the accompanying registration. Similar to the case of satellite communications, liability as an issue has not really been

[19] Land Remote Sensing Commercialization Act, Public Law 98-365, 98th Congress, H.R. 5155, 17 July 1984; 98 Stat. 451; Space Law – Basic Legal Documents, E.III.4.
[20] Land Remote Sensing Policy Act, Public Law 102-555, 102nd Congress, H.R. 6133, 28 October 1992; 15 U.S.C. 5601; 106 Stat. 4163.

dealt with at all in the remote sensing acts: since the international space law liability regime is focused so much on launching, after-launch operations like remote sensing are hardly relevant for the purpose of international liability as such.

With the recent provisional successes of private Very High Resolution (VHR) remote sensing satellite operators, however, we may find ourselves on the threshold of a new phase. If these private operations would show commercial promise and sustainability in the coming years, the existing domestic regimes may need to be revisited. From the contemporary perspective, the most important legal questions would arise in the areas of intellectual property rights, privacy and data protection, as well as (obviously) security, both civil and military. In turn, these may lead to policy initiatives not so much in the form of establishing or amending domestic *space* law, but (to the extent such initiatives would be of a legislative nature in the first place) through *other* legal regimes – namely, by intellectual property rights, privacy and data protection, and security-related legislation and regulation.

2. Norway

The 1969 Norwegian act on space activities[21] is the most concise of all national space laws, consisting of only three paragraphs – but at the same time, at least under the narrow definition of 'national space law' used in the present paper, also the oldest[22]. No matter how concise, however, the magic words are there: anyone launching an object into outer space from Norwegian territory or facilities requires permission from the Minister of Trade and Industry.

It should be noted that when the law was enacted neither the Liability Convention nor the Registration Convention had yet been concluded. Norway ratified the Outer Space Treaty on 1 July 1969 – two weeks after entry into force of the Norwegian Act. Consequently, Norway is also the only State so far whose enactment of a national space law even *precedes* its becoming party to the Outer Space Treaty, which the former supposedly provides for implementation of. During the process of ratification of the Outer Space Treaty the Ministry of Justice and the Ministry of Trade and Industry realized that further national implementing legislation had to be enacted: already seven years before ratification, launching activities from Andøya had started. However, the drafting fathers of the Act were of the opinion that it was not necessary to establish an elaborate law to satisfy the requirements of the Outer Space Treaty; a summary act would suffice.

The essence of the Norwegian Act is that permission is required to launch objects into outer space from Norwegian territory (including Svalbard and Jan Mayen) or anything that may be considered as such. Under the last category, the Norwegian Act understands Norwegian "outposts" (i.e. including Norwegian bases on Antarctica!), Norwegian vessels, Norwegian aircraft and the like. Finally, if any Norwegian citizen or permanent resident undertakes a launch falling within the material scope of the Act, when this occurs from outside any State's territorial sovereignty he or she also requires permission. Consequently, in terms of Article VI of the Outer Space Treaty, the authorization- and continuous supervision-requirement is applied both to Norwegian territory and to Norwegian nationals where no other State's territorial sovereignty applies: a rather comprehensive scope of the Act *ratione personae* is the result.

[21] Act on launching objects from Norwegian territory into outer space, No. 38, 13 June 1969; National Space Legislation of the World, Vol. I (2001), at 286.

[22] With the US FCC in 1970 declaring the 1934 Communications Act including its licensing system for private communication system operators to be applicable also to space communications, the United States could probably be said to have a national space law under the narrower definition used here from that moment onwards only.

The Act itself does not specify the requirements or conditions for obtaining permission. Certain terms might be established for such permission, further to which the Ministry is provided with the competence to actually issue regulations on control of the activities concerned. Apparently, in the absence of any detailed regulation as to which terms should or might be imposed, the Ministry retains full discretion in every case to require that certain conditions be fulfilled or not. This, of course, includes any elaboration on liability, e.g. as to a possible duty for any licensee to reimburse the Norwegian Government for international claims, which is therefore neither unequivocally established nor excluded at the outset.

In practice, as long as the semi-governmental operations at Andøya remain the only ones requiring application of the Norwegian Act, we are probably unlikely to see any developments or further elaboration in this regard soon. At least, there seem to be few signs currently of any policy bent upon using the assets for attracting new space activities to Norway.

3. Sweden

On 18 November 1982 a national space act was promulgated in Sweden, followed by an implementing decree.[23] National implementation of obligations for Sweden deriving from the *corpus juris spatialis internationalis* relating for example to the implementation *vis-à-vis* private enterprise of relevant international rules provided the dominant motive here. The Swedish Act applies to space activities defined as including "activities carried on entirely in outer space" as well as "the launching of objects into outer space and all measures to manoeuvre or in any other way affect objects launched into outer space". This definition includes launching, satellite communications and satellite remote sensing activities, with the exception of the launch of sounding rockets, which is excluded even if they might reach outer space. Procurement of launches is excluded, as it does not constitute a space activity.

As to its scope (and that of its licensing obligations) in terms of jurisdiction, the Swedish Act firstly applies to all activities undertaken from Swedish soil, and secondly to all activities undertaken by Swedish natural or juridical persons "anywhere else". In this sense, the Swedish Act and Decree are rather comprehensive, and reflect an interpretation of the term of art "national activities" of Article VI of the Outer Space Treaty, which in this case encompasses both activities from a State's territory and activities conducted by a State's nationals.

Any claim against the Swedish Government as a consequence of licensed activities entailing its international third party liability will need to be fully reimbursed by the licensee. Only if "special reasons tell against this", the Swedish Government, read the National Board on Space Activities (NBSA), may, *ex ante* or *ex post*, decide to waive this right to unlimited recourse. Finally, it may be noted that there is no provision on (mandatory) insurance for any such activities, which might call into question in appropriate cases the possibility for the Swedish Government to be actually reimbursed as intended.

Whilst the location and facilities of Esrange at Kiruna would seem to provide interesting options for certain categories of private and/or commercial space launches, so far the current global slump in the launch markets has caused any such interests to remain hidden at best. Any policy actions in the area of privatization would therefore be likely to concentrate more on satellite

[23] Act on Space Activities, 1982: 963, 18 November 1982; National Space Legislation of the World, Vol. I (2001), at 398; Space Law – Basic Legal Documents, E.II.1; 36 Zeitschrift für Luft- und Weltraumrecht (1987), at 11; resp. Decree on Space Activities, 1982: 1069; National Space Legislation of the World, Vol. I (2001), at 399; Space Law – Basic Legal Documents, E.II.2; 36 Zeitschrift für Luft- und Weltraumrecht (1987), at 11.

communications, remote sensing and satellite navigation applications, including ground support for the satellite operations involved.

4. The United Kingdom

On 18 July 1986, the United Kingdom promulgated its Outer Space Act, which entered into force in1989.[24] The major reason for such legislative action was the growing need to implement domestically the relevant rules of international space law *vis-à-vis* private enterprise. The Act itself repeatedly refers to the international obligations of the United Kingdom in this respect. The Act in practical terms applies to the launching, or procuring of launching, of a space object, the operation thereof, or "any activity in outer space". Especially the inclusion of procurement should be noted. It is relevant, as a non-space activity, in terms of international space law liability. Even more sweepingly, carrying on an activity in outer space is defined as "causing it to occur or [being] responsible for its continuing". An individual involved anywhere down the chain of causation or responsibility could thus find himself included in the scope of the Act. As a consequence, he might be obliged to refund the government for any international liability claims awarded – this, moreover, without a right to participate in the proceedings itself.

As to space activities proper, the Act encompasses *inter alia* launching, satellite communication and remote sensing activities. Satellite communication activities include uplink and downlink activities, which were already undertaken by British Telecom and Mercury Communications. Depending on whether DBS or other telecommunication activities were concerned, additional licenses under other Acts were required. In terms of the legal scope of the Act as well as its licensing regime, it applies to "United Kingdom nationals, Scottish firms, and bodies incorporated under the law of any part of the United Kingdom". In view of the exclusive reliance on personal jurisdiction, activities undertaken by non-UK nationals from British soil do not fall within the scope of the Act.

One important requirement for licensees that will likely, though not automatically, be imposed is to take out insurance as a substantiation of the obligation to provide full indemnification for the UK Government once the latter is confronted with international third party liability claims. Whilst no reference is made to the possibility of providing a ceiling for such indemnification, the insurance obligation was capped at GBP 100 million at the time.

Finally, in the cases of AsiaSat-2 and the two Apstar satellites, spacecraft owned by Hong Kong legal entities, hence until 1997 of UK nationality, but launched from the territory of and by the People's Republic of China, special arrangements were made to deal with the liability issue. Under a June 1994 agreement, any compensation claims against the United Kingdom for damage arising from the launch phase would be indemnified by China.

Within the United Kingdom for some time a debate has been raging in particular as to whether the liability and insurance obligations are still in line with overall UK policies *vis-à-vis* private activities. One might expect activities such as those envisaged by Mr. Branson (a UK citizen) in setting up Virgin Galactic to raise the stakes in this debate even further. In particular issues of safety and liability, both third party and contractual *vis-à-vis* the passengers, would have to

[24] Outer Space Act, 18 July 1986, 1986 Chapter 38; National Space Legislation of the World, Vol. I (2001), at 293; Space Law – Basic Legal Documents, E.I; 36 Zeitschrift für Luft- und Weltraumrecht (1987), at 12.

be dealt with. No doubt the debate will make reference one way or another to similar contexts in civil aviation, whether or not it will in the end find its way into the UK Outer Space Act.

5. The Russian Federation

On 20 August 1993, the President of the Russian Federation signed the Russian law regarding space activities, thus bringing it into force.[25] Included within the aims of the Law is the regulation of any potential private involvement in the activities under consideration. While it should be noted that many issues are explicitly deferred to further future legislation, at this point from the perspective of private enterprise the following picture arises.

The scope of the Russian Law in practical terms – as does the license obligation – comprises all activities "immediately connected with operations to explore and use outer space". Space communications and space remote sensing are expressly enumerated as examples, while launch activities undoubtedly fall within the general circumscription as provided. Also included, however, by the relevant term "space activities" are the creation, use and transfer of "space techniques, space technology, and other products and services necessary for carrying out" space activities. Thus, the construction of spacecraft or financial arrangements relating to space activities such as loans and leases would also fall within the scope of the Russian Law. Hence, the Russian Law's provisions in this regard go much further than even the procurement included in the 1986 UK Space Act.

As to the scope of the Russian Law, it applies to "space activities under the jurisdiction of the Russian Federation". As becomes clear from closer analysis of relevant clauses seen together, this jurisdiction includes both territorial and personal jurisdiction with respect to the licensing regime. The exercise of the Russian Federation's jurisdiction is even expressly extended to include Russian-registered space objects. Finally, to the extent that Russian private entities are *de facto* involved in international space activities, the Russian Federation provides for the need to conclude additional agreements, allowing the authorities to cover any potential international responsibility arising with respect thereto.

From the requirements related to the safety of space activities as provided in the Law, a general duty for the licensees of arranging for insurance coverage *inter alia* covering third party property damage may be deduced. As is the case with other rules, however, this leaves much leeway for discretion, even arbitrariness of the governmental authorities– resulting in uncertainty on the side of private enterprise. Furthermore, the role of the Russian Aviation and Space Agency (Rosaviakosmos)– the central licensing authority– can be circumscribed on many, ill-defined occasions by the competencies of the Ministry of Defence, which is perhaps not a good sign for the transparency and uniformity of the legal practice that should arise eventually.

Certainly for someone not reading or speaking Russian, it is very difficult to foresee with any degree of confidence what may happen in the near future in the Russian Federation's space endeavours, including the legal and regulatory aspects thereof. It is clear on the one hand that the Russian Federation, both for reasons of a prestige and military nature and for cashing in on its tremendous achievements, experience and industrial capabilities, places an extra-ordinarily high

[25] Law of the Russian Federation on Space Activities, No. 5663-1, 20 August 1993, effective 6 October 1993; National Space Legislation of the World, Vol. I (2001), at 101.

value on space. The Russian commitments to the ISS and to re-boosting the GLONASS satellite navigation system to its original capabilities are clear proof thereof. In that context it is also clear that, ever since the end of the Soviet Union, hopes are that private enterprise would contribute to that, and to that extent future Russian space policies and legislation will likely work towards enhancing possible participation and contributions.

On the other hand, the general political and economic nature of Russian society today calls for considerable care. 'Private enterprise' and 'commercial markets' take on quite different meanings in that context, as do the possibilities and impossibilities to arrange for them by purely legal means. Whilst the general trend towards accommodating private enterprise as possible licensees will therefore certainly continue, at the individual level we can expect to see a lot of differentiation, *ad hoc*-deviation and complicated negotiation with prospective licensees – to the extent of course that we will actually *see* something in the first place.

6. South Africa

On 6 September 1993, the Space Affairs Act of the Republic of South Africa entered into force.[26] The Act largely was a response to the growing interest of South African industrial and service sectors in space.
The Act deals with "space activities", defined as "activities directly contributing to the launching of spacecraft and the operation of such craft in outer space". Launching operations, satellite communications and remote sensing activities are therefore clearly included in the relevant licensing obligations. Furthermore, "space-related activities", defined as "all activities supporting, or sharing mutual technologies with, space activities", also fall within the scope of the Act. South Africa's territorial jurisdiction has only been asserted with respect to the activities of launching itself and – presumably – operating a launch facility. The assertion of personal jurisdiction on the other hand is comprehensive, and applies to all space activities entailing obligations for South Africa under applicable international treaties.

The licensee may be required to reimburse the South African Government for any international third party liability claim to the full. At the same time, the governmental discretion seems to allow for only partial reimbursement or non-reimbursement, if the South African interest would so require. Next to this international third party liability that would ensue from the Liability Convention, in principle all other liability issues could be dealt with under the Act. Conditions may be inserted into the license as to the licensee's domestic liability for any damages occurring, and the financial security to be provided with respect thereto.

How this will work out in practice remains to be seen; however, it seems that few activities have been undertaken in that respect. Presumably, this has to do with other, more urgent political and socio-economic issues confronting the post-Apartheid governments. Still, it might be a valuable approach for South Africa to more actively develop its own involvement in private space activities: considerable benefits could be derived both from a regional-political and from a development perspective.

7. Ukraine

Ukraine established its national law on space activities[27] in 1996, adopted to regulate national activities in accordance with international obligations. It is stressed that Ukraine provides

[26] Space Affairs Act, 6 September 1993, assented to on 23 June 1993, No. 84 of 1993; Statutes of the Republic of South Africa – Trade and Industry, Issue No. 27, 21-44; National Space Legislation of the World, Vol. I (2001), at 413.

for the fulfilment of international obligations in the field of space activities and is responsible in accordance with universally recognized principles of international law and provisions of international agreements to which Ukraine is a party.

The National Space Agency of Ukraine (NSAU) is the central governmental body, responsible for realisation of the State's policy in the field of space activities. NSAU was established in 1992 according to Presidential Decree No. 117. It has, most prominently, the authority to administer licenses, subject to further elaboration of the activities that may be licensed in the first place, and of the procedures of licensing, to be developed by the government.
Both licensing and certification are important components of the State's regulation of space activities, especially when it comes to private entities – both domestic and foreign. Any subject, willing to provide space activities in Ukraine, or if outside of Ukraine, under its jurisdiction, must obtain a license from NSAU. In other words: this concerns all activities undertaken from Ukrainian territory or by Ukrainian nationals.

The liability ensuing from international space law is covered quite well by these provisions, allowing for legal control over space activities possibly leading to claims for compensation against Ukraine. Apart from the Law of 1996, provisions regarding the necessity of space activities licensing arise from the Law on Entrepreneurial Activities of 1991 and the Law on Licensing of Certain Types of Commercial Activities of 2000.
Finally, the future arrangement of obligations for licensees to insure their activities is provided for, giving substance to any reimbursement obligation to be included in future licenses. It may be noted here also, that the Law delegates to future legislation the issue of whether any limit would be imposed upon the possibility for the Ukrainian government to be reimbursed by a licensee in appropriate cases.

It is obvious that Ukraine, just like Russian Federation, previously part of the Soviet Union, in many respects finds itself in the same position as the Russian Federation, and has in its legislation effectively chosen very much the same approach. The main difference therefore is one of nuance: Ukraine more than its large neighbour has focused on international cooperative ventures, ranging from cooperation at an essentially private level (Sea Launch!) to cooperation on a, for the time being, fundamentally intergovernmental level, as with Brazil. The Ukrainian Law is but one element of that policy, and as long as the internal politico-economic situation in Ukraine continues to resemble that in the Russian Federation, the focus of policy and legislative initiatives will likely continue to lie elsewhere – namely at the international level.

8. The Hong Kong Special Administrative Region of China

In 1997, the current version of Hong Kong's Outer Space Ordinance[28] was enunciated. The obvious backdrop to this was the return of the Hong Kong territories to the People's Republic of China after having been part of the United Kingdom for many decades. With the United Kingdom having in place its Outer Space Act since 1986/89, with Hong Kong being a major focal point for (in particular) satellite communications activities and with the People's Republic of China recognizing this, as well as granting Hong Kong a special status from a legal and

[27] Law of the Ukraine on Space Activities, No. 502/96-VR, 15 November 1996: National Space Legislation of the World, Vol. I (2001), at 36.
[28] Outer Space Ordinance, An Ordinance to confer licensing and other powers on the Chief Executive to secure compliance with the international obligations of the People's Republic of China with respect to the launching and operation of space objects and the carrying on of other activities in outer space, 13 June 1997, as amended 1999, Chapter 523; National Space Legislation of the World, Vol. II (2002), at 403; 51 Zeitschrift für Luft- und Weltraumrecht (2002), at 50.

administrative point of view, the 1997 Ordinance was essentially targeted to deal with the legal consequences of Hong Kong henceforth constituting a Special Administrative Region within the People's Republic of China.

On the one hand, this concerned ensuring continuation of the possibilities for private parties to become involved in space activities in roughly the same fashion, as had been the case before. On the other hand, the People's Republic of China would now become the potentially responsible and liable State under international law for such activities. As a result of the latter, the Ordinance ensured compliance of any licensed activities with the People's Republic of China's international obligations; as a result of the former the Ordinance continued to be based very much on the British Act.

Thus, the licensing process in general terms is also provided for in similar general terms, and when it comes to liability, full indemnification of the People's Republic of China for any international liability claims is due. Insurance, as is the case under the UK Act, is a likely requirement to be included in the list of requirements to be fulfilled by any prospective licensee, even if once more it is not automatically included.

The major non-procedural differentiator with the UK Act would lie in the scope of activities included in the licensing requirement. Formally the Ordinance provides for any activities carried on from Hong Kong regardless of the nationality of the relevant actors to require a license (in addition to activities of Hong Kong 'nationals' elsewhere), whereas in the British case this was only mandatory for British citizens and entities undertaking such activities. In other words: foreign entities or persons undertaking such space activities from Hong Kong do require a license, whereas in the case of the United Kingdom such was not the case. In this sense, the Ordinance may be considered more comprehensive than the UK Act.

Hong Kong, representing the 'half' in the 'nine-and-a-half States with national space laws' referred to before, is a very interesting policy case though difficult to analyze for the same reason. Hong Kong, one of the areas in the world that boasts considerable expertise with space activity licenses, continues to be an attractive place for all kinds of business even as the People's Republic of China tries to slowly tighten the reins. Since the People's Republic of China at the same time is bent upon increasing its role in outer space as well as carefully feeling its way into the world markets at various levels and in various fields, Hong Kong may either serve as a testing ground or act as a competitor with other ambitious areas within the People's Republic of China (or more likely both at the same time). Which way the balance will tilt will have a major impact on further policy, legislative and regulatory development in this area – but cannot be predicted easily.

9. Australia

On 21 December 1998, the Australian parliament assented to the Space Activities Act.[29] The objectives of the Act were mentioned as regulating space activities either from Australia or by Australian nationals from outside Australia, as well as to implement the United Nations treaties on space. Upon closer look, however, the Act deals solely with launching and related activities (return of space objects to the Earth), in order especially to deal with the possibility of international liability arising for Australia as a consequence of such activities. For example, satellite communication activities are not covered in and of themselves by the Act. Also, undertaking space activities with space objects registered with Australia under the Act do not lead to triggering any licensing obligation.

[29] An act about space activities, and for related purposes, No. 123 of 1998, assented to 21 December 1998; National Space Legislation of the World, Vol. I (2001), at 197.

Depending upon the type of licenses – of which there are essentially four – either the territorial criterion or the nationality criterion or both are used to define the scope of the relevant requirement. Launches from Australia require a launch permit or exemption certificate; an overseas launch requires an overseas launch certificate. In addition, space licenses are required for the operation of launch sites in Australia. Whilst the launch permit involves the need to fulfil requirements related to third party liability under Article VII of the Outer Space Treaty and the Liability Convention, this need is absent in the case of a space license.

The relevant clauses of the Liability Convention are duly incorporated into the liability-related provisions of the Act. They give rise to insurance obligations (or in the alternative the duty to provide proof of sufficient financial responsibility) to cover, in principle, the maximum probable loss – largely along the lines of the 1988 US Commercial Space Launch Act. The Act was expanded upon in this respect in 2001 by Space Activities Regulations (Statutory Rules No. 186), which elaborate on and clarify the licensing process and requirements, most notably confirming the use, and detailing the calculation of 'maximum probable loss' for purposes of determining the relevant reimbursement obligations. The Commonwealth is explicitly mentioned as the insured entity.

The focus of the Australian Act on launching is obvious, in light of the direct connections between launching and liability; however, it may not be sufficient in the light of the uncertainties surrounding especially the practical implications of State responsibility. Its novelty in dealing with the return of space objects on the other hand is interesting in view of the specific Australian situation – large deserts offering themselves as landing spots for returning spacecraft.

The Act was established at the time as a rather unequivocal effort to stimulate private activities in the launch sector, in particular the hoped-for establishment of a few private spaceports. Due to a combination of economic (the general slump in the launch business) and political (post 9/11 security and Iraq-related) reasons, however, nothing much has happened so far. While having a detailed legal and regulatory regime readily available for anyone who is interested, Australia starts to look like a sleeping beauty. Any space-related focus is shifting to security-induced support of, especially, US activities in this field, and if any legislative action will result, it will likely be to serve those causes, rather than those of private enterprise that anyway seemed to have hedged its interests for the time being.

10. Brazil

The most recent addition to the list of States with a proper national space law is Brazil, where in 2001 an Administrative Edict was issued dealing with the most prominent aspects of private participation in outer space activities.[30] In doing so, Brazil became not only the first Latin American but also the first developing nation with proper national space legislation, which causes it to be of special interest from the perspective of globalization and 'normalization' of space activities.

The Edict, which was issued by the Brazilian Space Agency (AEB) under the authority of the Ministry of Science and Technology, actually consists of two parts. The Edict is a binding piece of law under the Brazilian legal system, and may be directly invoked before a court of law. The Edict proper contains four operative Articles, the first of which is the most important. It

[30] Administrative Edict No. 27 (hereafter Edict), 20 June 2001; National Space Legislation of the World, Vol. II (2002), at 377.

provides for approval of the Regulation that is attached and that in turn deals with the substance of private involvement in space activities.[31]

Further to the Edict, the Office for Standards and Licensing may enact implementing regulation on technical and administrative actions related to the licensing procedures. The Edict itself revokes a previous Administrative Edict that dealt with AEB's role *vis-à-vis* possible private participation in space activities[32], whilst the Regulation entered into force upon publication in the Brazilian Union's Official Gazette. Now, the AEB has the competence to issue such licenses, as well as controlling and supervising them, and if necessary, taking enforcement action with respect to them.

The Regulation focuses exclusively on *launching* activities to begin with. It may be noted that as far as satellite communications are concerned, in general terms it would fall within the scope of the authority of the Brazilian Ministry of Communications, and within the scope of applicable Brazilian legislation on telecommunications.[33] The intention of the Edict and Regulation clearly however is to focus on the possibilities offered by Brazil's operating launch site at Alcantara, in Maranhão (and possibly also the launch site at Barreira do Inferno in Natal) to attract and generate interesting economic activities and the related economic development. The scope of the Edict plus Regulation and the ensuing licensing obligations are obviously confined to launching activities from Brazilian territory.

The Regulation furthermore explicitly focuses on *private participation* in such launch activities: it does *not* apply "to space launching activities that could be carried out by Brazilian governmental organizations or bodies". Whilst of course this means that *foreign* governmental launch activities from Alcantara would in principle also fall under the regime provided for by the Regulation, it is rather hypothetical such a case would arise without a specific State-to-State agreement superseding the Regulation's provisions on relevant points.

It may be noted further in this regard that licenses shall "only be granted to juridical persons, single as well as associations or consortia, having headquarters or a representation in Brazil". The first category – having headquarters in Brazil – actually reflects the traditional general international law-criterion for the nationality of a private legal entity. In other words: the Regulation refers here to Brazilian private entities recognized as such under international law. The second category – having a representation in Brazil – refers consequently and by contrast to non-Brazilian private companies, which are thus offered an interesting opportunity to join in activities involving Alcantara.

Under the Liability Convention, Brazil qualifies as a "launching State" – and hence a liable State – in respect of every space object launched from Brazilian territory. The consequences of Brazil's international liability for every launch, including every private one, from Alcantara is obvious: for damage caused to another space object thus launched Brazil would be held liable to the extent the claimant could prove fault on the part of Brazil (or of the entity actually in charge);[34] whereas if the damage were caused by such space object would have been inflicted upon the Earth's surface (or to aircraft in flight), Brazil would not even be allowed to plead

[31] Regulation on Procedures and on Definition of Necessary Requirements for the Request, Evaluation, Issuance, Follow-up and Supervision of License for Carrying out Space Launching Activities on Brazilian Territory (hereafter Regulation).
[32] Administrative Edict No. 8, AEB, of 14 February 2001.
[33] General Law on Telecommunications No. 9.472, of 16 July 1997, in particular Chapter III on the organization of telecommunications services, including those provided by satellite.
[34] Cf. Art. III, Liability Convention.

absence of fault, since absolute liability applies in such cases.[35] It may be noted that the Regulation defines relevant cases of damage closely following the terms of the Liability Convention. Once liability has been established, moreover, the compensation that Brazil would have to provide to the claimant would be in principle without limit, since it has to result effectively in *restitutio in integrum*.[36]

It is obvious – as is clear also from the other existing national space laws to the extent that they deal with launches – that in any given case the license offers an excellent option to deal with these issues. In the case of Brazil, there seems to be room for granting a cap to the reimbursement obligation in a given case: the AEB may "assess liabilities" in case of an application for a license. Also, the "economic and financial qualification" of a particular license applicant will be considered in the licensing process. In this context finally the "purchase of insurance to cover possible damages to third parties, according to the degree of risk of the activities to be carried out by the applicant, where appropriate, in the value previously established by the AEB" has to be proven.

Whilst nowhere a direct provision may be found in the Regulation that such insurance coverage includes the reimbursement of possible claims that the Brazilian Government may face under the Liability Convention as a consequence of the licensee's activities, it may be assumed that in the license proper such reference will be included. Following from this, then, the phrasing of "in the value previously established by the AEB" indicates that somehow such liability, respectively reimbursement obligation, will, or at least in individual cases may, be subjected to an – as of yet unspecified – maximum. For proper legal certainty, however, one would have to wait for a new and broader law currently under discussion, where the tendency seems to be towards adopting the 'maximum probable loss' approach found in the national space legislations of the United States and Australia.

Finally, coming back to the issue of foreign private participation in launching activities involving Brazilian territory, read launch sites, in particular for a developing country like Brazil, in order to develop the economy in such a highly technological and expensive sector as the space industry, notwithstanding the impressive home-grown capabilities in this area substantial participation in one way or another of foreign capital – in particular of a private nature – and know-how is evidently desirable, if not plainly necessary.

Developing countries in such a situation are always confronted with a dilemma, however. The best way to attract foreign capital and foreign participants is to allow them a large measure of freedom and discretion in handling their business affairs; yet the larger such freedom and discretion is, the more the country concerned runs the risk of losing not only control over, but also major benefits from the economic activities thus generated. Moreover, usually also wider issues of sovereignty, e.g. as to national security, are at stake.

How this balance is going to be achieved in the case of Brazil is not yet fully elaborated. The Regulation provides the first general parameters: for a start, in principle it allows – as mentioned – foreign legal entities to be granted a license in the case of representation of such an entity in Brazil. 'Representation' in this context refers to physical presence through a local office; by contrast, e.g. the presence of a person empowered to represent a company in contractual negotiations or of a bank account of the company with a Brazilian bank is not sufficient. This provision is further elaborated in that, alongside other relevant documentation, a decree of authorization has to be shown in order for a license application to be successful, and even more

[35] Cf. Art. II, Liability Convention.
[36] Cf. Art. XII, Liability Convention.

concretely, "documentary evidence that the applicant has legal representation in Brazil with express powers to be subpoenaed and to answer both at administrative and court levels".

Additional particular controls in regard of foreign applicants to protect Brazilian sovereign interests are also to be found. The applicant has to confirm being informed about "local conditions, including the Security Regulations and Procedures established by the AEB or by the Launch Centre". He has to commit himself to safeguarding applicable technology transfer regulations, "as determined by the pertinent authority of the Brazilian Government". The AEB reserves its right to consult in the course of the licensing process *inter alia* with Brazilian governmental bodies on security and foreign policy interests of Brazil, and how these should be reflected in a particular license.

Article 14 of the Regulation furthermore is exclusively dedicated to foreign licensing applicants. It obliges such entities to present proper documents from their respective home States "as to their being licensed to perform the launching activities intended." An interesting issue would arise wherever such home State does *not* itself have a relevant licensing system in place, but apparently such cases are for the time being left to be dealt with in a pragmatic *ad hoc* manner.

Also, the AEB is expressly authorized to make grant of a license dependent upon the existence of safeguard agreements relating to technology transfer between the home State of the foreign enterprise and the Brazilian Government, which amongst others fulfils Brazilian obligations under international law to ensure non-proliferation of particular military or dual-use goods for example under the Missile Technology Control Regime (MTCR).[37]

Thus, the Regulation seems to provide in particular the AEB with sufficient competencies and instruments to ensure that Brazil's interests – not just of an economic nature, but certainly including those – can be duly protected in the course of licensing foreign launch service providers interested in Alcantara. Whilst these provisions seem fair and reasonable –for example, no specific economic or financial restraints in terms of capital transfers are provided for by the regulation– the proof of the pudding is in the eating: whether foreign entities involved in launch service provision will come to a similar conclusion will probably depend on the way the first few licenses will turn out to deal in detail with these issues.

In this respect, the recent tragedy at Alcantara, of necessity causing authorities to revisit some of the salient aspects of existing Brazilian policy and law, will likely result in considerable delays. Fortunately, however, at the same time the Brazilian government has unequivocally made clear it is intent on pursuing the goals and objectives behind the Edict and Regulation with the appropriate involvement of both domestic and foreign private enterprise, and ensuring that in spite of the enormous costs and huge risks associated therewith, benefits from using space will also sufficiently accrue to Brazil.

11. The special case of France

France may be considered the most important European State in terms of space activities; in politico-philosophical terms moreover it is a liberal capitalist State. It therefore would seem to provide a clear-cut case for the need to regulate private space activities domestically. Peculiarly, however, so far France by way of fundamental policy choice has not established a national space law of comprehensive scope and *a priori* operation to deal with such activities. Rather, as far as legal activities went, it has dealt with one particular private entity of French nationality,

[37] Brazil became a member of the MTCR in 1995.

Arianespace. It has done so moreover by means of complex legal and almost *ad hoc*-arrangements, of necessity involving the European Space Agency (ESA), (many of) its Member States and France's own Centre National d'Etudes Spatiales (CNES). This is a result also of the situation concerning Kourou in French Guyana.

The legal framework dealing with the various international legal accountabilities for Arianespace's activities consists of a number of documents. Firstly, there is the Arianespace Declaration of 1980, which is renewed basically every ten years.[38] Under this Declaration, the Member States of ESA, participating in the commercialization of Ariane by means of Arianespace, amongst others undertake to support Arianespace in many ways. Furthermore, a Convention was signed between ESA and Arianespace providing for more details regarding *inter alia* the obligations of ESA in respect of Arianespace and *vice versa*.[39] Finally, an agreement was concluded by means of a continuing series of protocols between France and ESA concerning the use of the Centre Spatial Guyanais (CSG).[40]

By definition, the structural aspects of the legal framework elaborated above are confined to one case, that of Arianespace. Arianespace's activities concern launching and launch-related activities only. Other space activities such as satellite communications and remote sensing at the outset are therefore not at all covered by this legal framework. As a consequence, in first instance it is the liability of France as a launching State which is taken care of.[41] The international responsibility of France for any of Arianespace's activities, however, obviously also exists. Arianespace is a French company, and operates from French territory – at least until now. In the case where Arianespace violates any obligations of international space law France will be held internationally responsible on both counts.

The conclusion that the Arianespace Declaration, the Arianespace Convention and the CSG Agreement taken together essentially perform the function of a license for Arianespace is reinforced by taking a closer look at their contents. The most salient aspects of licensing systems for private entities, the substantive aspects of liability, are dealt with in relatively considerable detail by these documents.

First, the relationship between France and ESA with regard to international third party liability claims draws attention. France and ESA both qualify as launching States under the definition of Article VII of the Outer Space Treaty and Article I(c) of the Liability Convention.[42] The former at least because its territory is used for all of Arianespace's launching activities, the latter in view of the use of its facilities and, in many cases, its procurement of the launch contract.

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[38] Declaration by Certain European Governments Relating to the Ariane Launcher Production Phase (hereafter Arianespace Declaration), done 14 January 1980, entered into force 15 October 1981; 6 Annals of Air and Space Law (1981), at 723. The first Renewal of the Arianespace Declaration took place 4 October 1990, and entered into force 21 May 1992.

[39] Convention between the European Space Agency and Arianespace (hereafter Arianespace Convention), signed 24 September 1992.

[40] The version concluded in 1993 and valid until the end of 2000 is the Agreement between the French government and the European Space Agency with respect to the Centre Spatial Guyanais (CSG), 1993-2000 (hereafter CSG Agreement). Excerpts of French version: 80 ESA Bulletin (Nov. 1994), at 67.

[41] Alternatively ESA, as an international organization which has declared its acceptance of the rights and obligations under the Liability Convention, also qualifies as 'launching state'; cf. Art. XXII, Liability Convention, and ESA's Declaration of the acceptance of rights and obligations under the Liability Convention.

[42] In the case of ESA, it is ESA's Declaration under the Liability Convention that allows for this conclusion in legal terms.

In the CSG Agreement on the use of the Centre Spatial Guyanais, France legally protects ESA and its Member States against claims arising from launch activities undertaken by Arianespace.[43] This presents a reversal of the arrangement applicable between France and ESA with respect to the Ariane development programme.

Secondly, cases between Arianespace and France where the activities of Arianespace would lead to international third party liability claims against France were provided for. Arianespace would be required to reimburse the French government up to a maximum amount of FF 400 million, which now equates to € 60 million. Hence, France effectively acts as an insurance provider for Arianespace for any amount of damage occurring in a single accident that exceeds € 60 million.

On inter party liability, ESA agrees to waive all claims for compensation against France, in as far as these claims result from launch operations at the Centre Spatial Guyanais. The exception provided here pertains to damage caused by "*faute lourde, (...) acte ou (...) omission déliberés*" on the French side. This phrase should probably be translated as 'wilful misconduct' or 'gross negligence', but it is apparently for French courts to interpret when legal disputes arise on the matter.

The solution of implementation of international space law on the private level in the case of France is particularly interesting. Aspects of potential French State responsibility are dealt with, at best, in an even more summary fashion than in the other cases discussed. On the other hand, the core issue of liability is dealt with by this *de facto* license for Arianespace. This even includes, as the only case apart from the US Launch Act, both an unequivocally limited derogation of compensation and the issue of inter party liability. Therefore, in a way the French case provides the best example of focusing on the *pars pro parte pro toto* of national implementation: documents constituting little more than a license, dealing mainly but rather in detail with liability questions.

From that perspective, CNES could be viewed as a licensing agency exercising its competencies in a very informal but absolute fashion – as a majority shareholder. The lack of formal clarity, as well as the intricate relationship between Arianespace, CNES, the French government, ESA and its Member States may reflect the complex nature of the European space arena in a very illustrative manner. Whether such a structure might be feasible from the point of view of a level playing field for (future) competition, and for a uniform and transparent legal protection of the public interest, should however be seriously doubted – and indeed France has now taken the fundamental decision to go about establishing a proper national framework space law.

12. Future developments – the example of the Netherlands

As indicated already, there are a number of other States seriously contemplating the establishment of national space legislation in the fashion discussed above. Each of them, no doubt, in addition to feeling the need or desire to implement international space treaties and to address some generally applicable types of domestic legal concerns, has its own policy approach to inject into such legislation. No doubt, on many counts those projects to establish national space laws will differ considerably. Rather then dealing with them all therefore, the author takes the liberty of highlighting the Dutch example, since from a policy perspective it may serve to illustrate at least some of the major processes behind any State's activities in the area of establishing a (new) national space law.

[43] ESA and the Member States could in the end also qualify individually as launching States; cf. Artt. V, XXII *in toto*, Liability Convention, and ESA's relevant Declaration.

Until fairly recently in the Netherlands the opinion prevailed that, at least from the perspective of implementing international space law and providing for national law, no necessity existed to take general and comprehensive action in this area by means of establishing a national space law.

This was due to the fact that those private space-related activities taking place under the influence of the Dutch government amounted to the following:

- Industrial activities as sub-contractors to ESA-led projects, the legal aspects of which were taken care of within the ESA legal framework;
- Industrial activities in any case not as such amounting to private "activities in outer space" as Article VI of the Outer Space Treaty would hold those to be "national" activities of the Netherlands (such as the establishment of the European Aeronautic Defence and Space consortium (EADS) in Amsterdam, producing hardware for space purposes but not itself operating any space objects, or any entity's role as contractor or subcontractor to foreign entities);
- Activities which were dealt with in an *ad hoc*-manner, as originating from a previous situation, where regulation properly speaking was not even necessary to comply with Article VI of the Outer Space Treaty [notably this concerned the activities of the former Dutch signatory to the International Telecommunication Satellite Organization (INTELSAT, now ITSO), International Mobile Satellite Organization (INMARSAT, now IMSO), European Telecommunications Satellite Organization (EUTELSAT), the Dutch state-owned post and telecommunications company (PTT), later KPN, which was a public entity before being privatized in recent years]; or
- Activities where, from a liability perspective, no domestic legislative action was considered necessary since the launching State(s) with respect to the space objects involved in those activities did not include the Netherlands (notably this concerned the case of New Skies Satellites (NSS), which had inherited five satellites from INTELSAT that had been in orbit already for a number of years, hence did not involve the Netherlands or NSS as crucially involved in the launch with a view to the criteria for becoming a "launching State" under the Liability Convention).

Over the past few years however, this paradigm changed fundamentally for the Netherlands. Firstly, the ongoing privatization taking place within the European Union, in particular in the satellite communications field, made clear that a former public telecommunications operator could no longer rely on its former rather exclusive status with the government for being allowed to undertake space activities properly speaking. Special rights, let alone monopoly rights, in terms of access to space segment capacity for instance, in principle were to be abrogated, and only to be maintained under stringent conditions – a set of requirements as to need, proportionality, transparency and like would have to be complied with. The markets also for satellite communications were to be liberalized, and basically telecommunications including satellite communications was now a matter for private entities to conduct in the framework of a level playing field.[44] In other words: instead of an *ad hoc* relation or special arrangement taking

[44] See e.g. Commission Directive amending Directive 88/301/EEC and Directive 90/388/EEC in particular with regard to satellite communications, 94/46/EC, of 13 October 1994; OJ L 268/15 (1994); Commission Directive amending Directive 90/387/EEC with regard to personal and mobile communications, 96/2/EC, of 16 January 1996; OJ L 20/59 (1996); Commission Directive amending Directive 90/388/EEC with regard to the implementation of full competition in the telecommunications markets, 96/19/EC, of 13 March 1996; OJ L 74/13 (1996); and Directive of the European Parliament and of the Council on a common framework for general authorizations and individual licenses in the field of telecommunications services, 97/13/EC, of 10 April 1997; OJ L 117/15 (1997).

care of Dutch duties under international space law, an open and transparent legal system would be obligatory– read: a licensing system not principally excluding anyone.

Secondly, the ongoing concentration and diversification taking place in the European space industry opened perspectives for a consortium like EADS and its constituent companies to extend their activities from terrestrial industrial activities to also include proper space activities, e.g. by means of turn-key delivery of satellites in orbit. If such a development were to materialize, in view of the Dutch nationality of EADS as a consortium (as opposed to the nationalities of its individual constituent member companies) would then directly trigger application to the Netherlands of such rules of international space law as concerning responsibility and liability.

Thirdly, there were some new activities with at least one foot in the Netherlands, which might engage Dutch international responsibility and/or liability under space law. Notably this concerned MirCorp, the US-funded private entity that was key to sending the first tourists into outer, space – and officially located in the Netherlands. (Since then, however, it has been renamed and relocated to the United States, likely at least partially because the Netherlands was seen to be moving into the direction of a proper national space law-*cum*-licensing regime.)

Fourthly, NSS started to procure the launch of its own new satellites, which – in contrast to the satellites inherited from INTELSAT – did immediately lead to the question whether the Netherlands would not be held to qualify as a launching State for these new satellites in case of relevant accidents. This, of course relates to the discussion as to the precise scope and meaning of the "launching State", as defined by Article I(c) of the Liability Convention: would the Netherlands constitute a 'State procuring a launch' in the meaning of that definition by virtue of a Dutch private company NSS doing the actual procurement?

These developments, which may be considered illustrative for the changing situation and paradigm in many respects at least in Europe, triggered the Dutch government into action, and in 2001 it started a serious investigation into the need or desirability for a Dutch national space law. Two reports by persons active in the field were solicited, one focusing on the narrower legal issues and aspects as *inter alia* arising from the space treaties, the other dealing with the broader setting and including economic and policy issues and aspects.

Both efforts came to the same conclusion: national Dutch legislative action was indeed considered necessary on a number of counts, and desirable on a few more. The sole question remaining was, whether such legislative action could be confined to additions here and there to existing legislation, or whether it would require a new (framework) law.

After internal consultations between the various relevant ministries, Economic Affairs being the leading Dutch Ministry in space and others – notably Foreign Affairs, Justice, Transport and Waterways – providing the relevant input from their own perspectives, it was decided that the former option would not suffice. Too wide-spread, too varied were the legal issues to be dealt with, with a view to private space activities taking place under the jurisdiction of the Netherlands; too specific also were the outer space-aspects of the envisaged activities, to be appropriately dealt with by means merely of extending an existing licensing system and adding some scattered provisions e.g. to existing intellectual property rights- or securities-related national legislation.

Consequently, in September 2003, the Council of Ministers of the Dutch Government gave the green light for drafting a proper national Dutch framework space law. Following the

major recommendations from the reports, as further elaborated in the intra-Ministerial consultation and co-ordination process, such a law was notably to provide for:

- A licensing system with respect to any private entities interested in undertaking space activities;
- The accompanying general requirements that would be imposed upon any licensee in order to strike a fair balance between his *bona fide* interests in undertaking space activities and the duty of the Dutch government to protect the public interests, both national and international;
- An arrangement of liability issues in the context also of the international treaties including further mandatory insurance or other financial guarantees as appropriate; and
- An arrangement for registration by the Dutch government in a national register of all relevant space objects (to the extent that an interim measure establishing such a register on a stand-alone basis would not suffice or would need to be incorporated in the national law).

The roadmap, pushed in particular by the ambitious new Minister of Economic Affairs, Mr. Laurens-Jan Brinkhorst, now foresees a first draft law for parliamentary discussion in the course of the current year, and a specific senior official was tasked within the Ministry to direct the drafting of such a law.

Conclusions: towards a Latin-American perspective?

The aforementioned, extremely brief analyzes of the few pieces of national space legislation existing around the world and some of the policies behind them point out the major issues to be solved by national space legislation as much as the main justifications for establishing such legislation.

At the same time, it is clear that at the international level a number of important uncertainties arise as to the principles and concepts crucial for domestic implementation. Such uncertainties pertain for example to the definition and scope of the phrase "national activities in outer space" (do they encompass only activities by a State's nationals, only activities conducted from a State's territory, or both, or is there yet another scope to this?) or of the concept of the "launching State" (does the launching or procurement of a launch by a private entity cause the State of nationality of that entity *ipso facto* to be a "launching State" for the purpose of Liability and Registration Conventions?). This has in practice indeed led to a number of varying solutions on the national level.

From a policy perspective, an increasing number of States are confronted with the reality of private involvement in space activities under their sway and simply *need* to act. In doing so, these States have to make a choice – their *own* choice – in the absence of much international authoritative guidance on proper interpretation and implementation of some of the relevant key principles and concepts. Such choices are, to a considerable extent, unavoidable, for reasons of different national socio-economic, political, technological and other capabilities – but also for strictly legal reasons. With space increasingly coming down to Earth, thereby attracting the attention of private entrepreneurs, which was seen as the major development behind national space laws, also many other legal regimes become involved – since space results in a specific input into practical and terrestrial applications that,, normally, have existed for a number of years.

Individual States' legislation on telecommunications or intellectual property rights may show vast differences, and these do not go away merely because telecommunications now are using satellites as part of the network or because also remote sensing data now need to be protected by

means of intellectual property rights. Any new national space law to be established will obviously need to fit harmoniously with such national laws, before any international 'harmonization' can be tackled.

The resulting diversification is to be lamented on a number of counts, which would call for international efforts to try and harmonize – as far as, indeed, necessary or desirable – such interpretations and the consequent implementation. If these developments are perhaps ultimately to be carried and sanctioned by the Legal Subcommittee of COPUOS, the International Institute of Space Law (IISL) of the International Astronautical Federation (IAF) could maybe provide some guidance as to where such harmonization could and should go. It may be an interesting option therefore, for the IISL to draft a Statement[45] for publication on its website elucidating the theoretical sides to the debate and the optimum solution from that perspective, to guide any further discussions on these issues in COPUOS.

Any such exercise to harmonize at least the scope and implementation of the basic concepts need not be as politically far-fetched as it sometimes seems. Within Europe, a major impetus is certainly provided by the existence of ESA as the long-time harbinger of European (as opposed to French, British or German) presence in space as well as the recent and rapidly growing interest and involvement of the European Union in matters of space policy and law. The licensing of satellite communications providers for example is harmonized within the European Internal Market to a considerable extent at least in theory – it will take some years for practice to follow, but it will come.
Also outside the specific European context, there is more room for such efforts than perhaps meets the eye. Australia has chosen to follow the US approach to calculate maximum liability reimbursement by licensees on the basis of 'maximum probable loss' – in an area where experience is so scarcely available yet so necessary to calculate risks and ultimate costs with any precision, States still try to look at, and learn from each other. Furthermore, there are a number of regional initiatives to achieve closer coherence and co-operation of national economies – not least here in Latin America, with Mercosul/Mercosur and the Andean Pact – which may serve as a starting point for developing coherence of policy and co-ordination of laws in matters of space as well.

One of the few common features already preponderant in all cases of national space law, both existing and prospective, concerns the central role played by the licensing system in dealing with liability, especially third party liability. Effectively, liability is probably the only international space law concept sufficiently concrete and directly relevant, for private enterprise as well as the public at large, to warrant extensive elaboration in a national space law. On most other issues, the mechanism of national space agencies monitoring at any moment in time the status quo of the actual rights and obligations to be discerned under international space law, seems to be the most effective and reasonable one to deal with domestic implementation. The need for domestic implementation as such, however, is beyond any doubt.

Most importantly, a derogation clause may be inserted in the license, essentially obliging the licensee in applicable cases to reimburse any international third party liability claim that the government concerned would be obliged to honour under the Liability Convention. So far, two general approaches to the derogation issue can be distilled from the existing examples of States that have established some form of national space legislation.

[45] The IISL has thus recently published on its website the first IISL Statement on legal matters of current importance for space activities; see Statement by the Board of Directors Of the International Institute of Space Law (IISL) On Claims to Property Rights Regarding The Moon and Other Celestial Bodies; at http://www.iafastro-iisl.com/; under "Important Events".

Either reimbursement is statutorily comprehensive, allowing at best for the option on the part of the government to *ad hoc* desist from claiming full reimbursement, or a statutory or regulatory limit to compensation is provided for. In the latter case, the clear intention of the governments is to stimulate private launch activities by offering launch service providers a realistic possibility to either self-insure or obtain commercial insurance, and consequently accepting that in catastrophic cases the national treasury will have to be called upon to bear the part of the claim over and above the maximum.

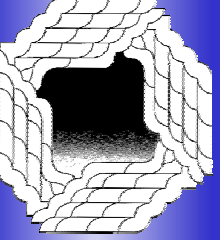
Secondly, the license may provide for obligatory insurance – usually up to a maximum amount – in order to ensure that in any real-life case the financial resources would be there to actually reimburse the government – at least to the extent of the maximum insurance. This approach is followed by some if not all of the national space laws so far enacted.

In most cases, finally, one should note the general level of discretion with the responsible governmental authorities as to imposing actual and detailed conditions upon (prospective) licensees. On the one hand, this obviously stems from the desire or even need to judge each request for a license on its own, usually rather individual merits. In other words, much will depend upon further practice. On the other hand, however, it is likely also the result of some prevailing uncertainties at the international level as to such key concepts as "national activities" and the "launching State".

In conclusion, for the purpose of heeding the public-private paradigm in space law, national implementation by means of a national law with a licensing system at its core presents the most feasible and comprehensive option. It would, indeed, tie private space entrepreneurs and their activities to the international space law framework in a *bona fide* and mutually advantageous manner. It would offer such private entrepreneurs a fundamental level of legal certainty and transparency and a general commitment of the public authorities to the interests of private enterprise, and in a number of cases additional incentives to join the human space endeavour – and lessen financial governmental burdens in that respect. Last but not least, it represents the most comprehensive implementation of the obligation under Article VI of the Outer Space Treaty of "authorization and continuing supervision" of private "national activities in outer space".

It may be pointed out, finally, that discussions within the ongoing Futures Projects on the Commercialization of Space undertaken by the Organization for Economic Co-operation and Development (OECD) tend to look favourably upon such roles for national space legislation. For the purposes of stimulating involvement of private enterprise in space activities in a beneficial manner, national space laws would seem to be desirable or even necessary where not yet established, in a number of cases would need to become more business-friendly (obviously as long as justified public interests are or remain duly protected) where existing, and would as a consequence need to deal with such issues as private involvement in activities of a public good or public service nature as well as space infrastructure building and operation through means of carefully devised Public-Private Partnerships (PPPs).

As a consequence, in all States where it is currently allowed or contemplated for the near future for private enterprise to become involved in space activities in a substantial manner, the establishment of national space laws is to be highly recommended, if it is not, indeed, outright required. This is as much a matter of law as it is of policy – or at least, it *should* be.



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Current and future development of national space law and policy

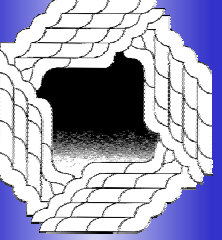
Dr. Frans G. von der Dunk

Director, Space Law Research

International Institute of Air and Space Law

Current and future development of national space law and policy

UN Workshop, Rio de Janeiro



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- Of policy and law
- The rationale of national space law
- Nine-and-a-half national space laws – a bird's eye perspective
- The near future of national space legislation
- Concluding remarks: towards a Latin-American perspective?

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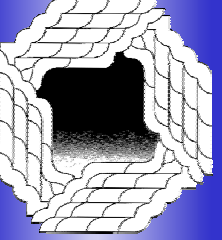

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Of policy and law

- Space activities are special…
  - ➔ Policy: flexible, day-to-day, fluid & multi-faceted
  - ➔Law: stable, long-term & strictly delineated
- Bi-directional relation
  - ➢ 'Law' parameter for 'policy'
  - ➢ 'Law' instrument of 'policy'
- Point-of-departure here: the 'law'

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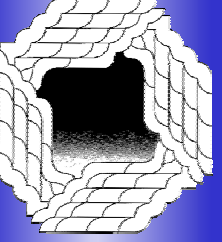

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The rationale of national space law (1)

- Private involvement in space

←→ Public nature space law

  - States makers & breakers int'l space law →

1. National space law implements:
   - Art. VI OST: duty authorisation & supervision
   - Art. VII OST: incentive on reimbursement
   - Art. VIII OST: incentive on registration
   - Liability: incentive on insurance

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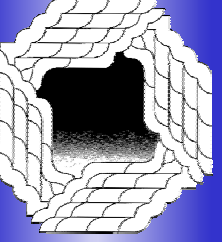

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The rationale of national space law (2)

2. National space law for nat'l effects:
   - E.g. liability
3. National space law for nat'l policy:
   - E.g. support for private participation
     - Liability; tax; R&D support

- Comprehensive character
  - Cf. ' spider-in-the-web' approach

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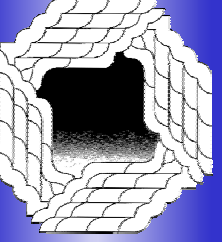

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Nine-and-a-half national space laws

- Int'l space law parameters
  - State responsibility
    - "National activities in o/s", "appropriate State"
  - State liability
    - "Launching State" vs. private parties
  - Registration ➔ state jurisdiction
- If licensing is the crucial criterion, then 9½ national space laws…

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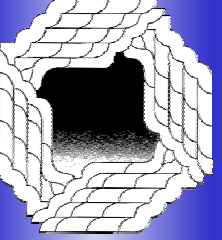

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United States (1)

- From NASAct 1958 …
- … to Commercial Space Act 1998
- Policy paradigm changes behind
  - Increasing private participation: space tourism in particular
  - Increasing impact security issues ➔ export control; intra-institutional tugs-of-war

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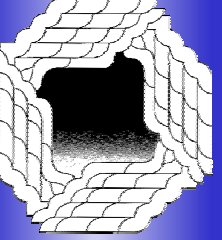

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United States (2)

- Launch
  - From Commercial Space Launch Act 1984 to Amendments 1988 & beyond
  - Liability critical issue: policy support for private participation
  - Space tourism: discussion on passenger liability
  - Re-entry issues: possibilities for commercial re-usable vehicle operations

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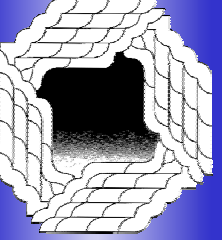

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United States (3)

- Satellite communications
  - From Communications Act 1934 to Telecom Act 1996 & beyond
  - Liability *not* much of an issue here
  - ORBIT Act 2000
    - Privatises COMSAT; pushes for privatisation INTELSAT & INMARSAT
  - Policy focus since:
    - International issues (WTO; ITU)
    - Auctioning of frequency slots

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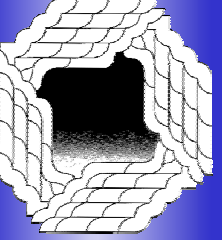
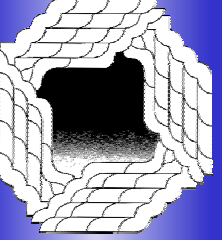


United States (4)

- Satellite remote sensing
  - Land RS Commercialisation Act 1984 & Land RS Policy Act 1992
  - Reflects change of focus: from opening sector to private enterprise to guaranteeing availability of data
  - Recently: provisional successes of VHR
    - Intellectual property rights
    - Data access vs. data protection
    - Specific security issues: shutter control & buy-to-deny



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Norway & Sweden

- N: 1969 Act on space activities
  - Focuses on launching: Andøya ...
  - … but effectively dormant
- S: 1982 Act & Decree
  - Comprehensive in scope
  - Esrange would offer possibilities for private usage, but no signs yet…
  - Navigation & satellite communication areas more likely to generate (private) interest

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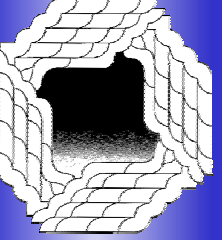

United Kingdom

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- 1986 Outer Space Act (1989)
  - Comprehensive in scope
  - Number of licenses provided (satcoms!)
  - Liability issues because of HK sats
  - Policy issues:
    - Liability reimbursement of the govt. & insurance
    - Space tourism: Virgin Galactic …?

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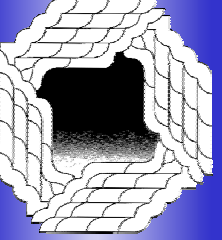

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Russian Federation

- 1993 Law on space activities
  - Comprehensive in scope
  - Complicated situation as to privatisation
  - Policy issues:
    - Providing for clear liability & insurance provisions, & other licensing details ➔ further regulation
    - Problems with unspecified role MoD
    - Russian commitment to ISS
    - Russian commitment to GLONASS

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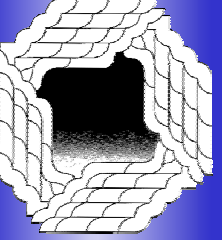

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South Africa & Ukraine

- SA: 1993 Space Affairs Act
  - Complicated situation as to scope
  - Policy issues:
    - Providing for clear liability & insurance provisions
    - Low priority of space…
- U: 1996 Law on space activities
  - Following Russian example very much…
  - Policy focus on international co-operation
    - Private level: Sea Launch
    - Public level: Brazil

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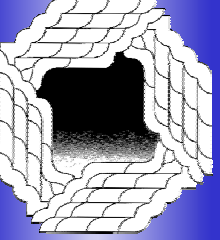

Hong Kong

- The ½ in 9½!
- 1997 Outer Space Ordinance
  - Return HK from UK (& UK Act) to PRC
  - Some HK satellites already licensed
  - Overriding policy issue: PRC attitude to HK
    - HK very private enterprise-oriented, considerable experience with satellite operations & licenses
    - HK as testing ground? As competitor with other PRC regions? Or even both …?

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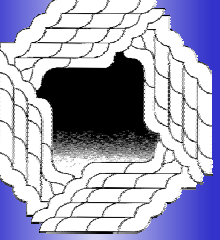

INTERNATIONAL INSTITUTE OF AIR AND SPACE LAW

Australia

- 1998 Space Activities Act
  - Policy optimism for role in commercial space
    - LEO-systems; unmanned re-entry flights
  - 2001 Space Activities Regulations
  - *Then history took a different turn, however:*
    - Economic problems with satcoms
    - Australia also party to 1979 Moon Agreement
    - Policy post-9/11: siding with the US
      → security interests now overriding other concerns

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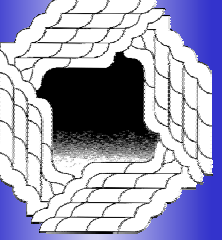

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Brazil (1)

- 2001 Admin. Edict & Regulation
  - Focus on launching
    - Alcantara; Barreira do Inferno
  - Not applicable to Brazilian launch activities
  - Foreign governmental launch activities: ad hoc-agreements
  - Private launch activities
    - Of Brazilian nationality
    - Of foreign nationality

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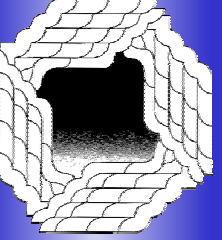
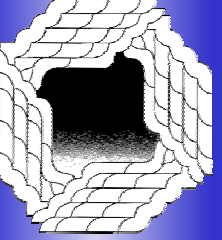


Brazil (2)

- Key policy issue for developing states: sovereignty vs. business…
  - Sovereign control through licensing process & requirements
    - 'Physical' presence in Brazil
    - Powers to be subpoenaed
    - Awareness of local & national regulations (MTCR!)
    - Other documentation
  - Only practice will tell: is it too little? Is it too much?



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… The Netherlands!

- So far …
  - Industrial activities; non-"activities-in-o/s"; *ad hoc*-arrangements; no liability issues
- … but then …
  - EU privatisation; turn-key solutions; new activities; NSS's new satellites
- … so now
  - 2001 investigation ➔ 2003 decision
    - Licensing, incl. requirements; insurance; registration

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Concluding remarks …

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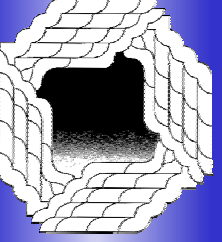
- Uncertainties at the int'l level

←→ States have to deal with realities

→ IISL Statement …?

→ Harmonisation drivers

  - In Europe: EU & ESA developments
  - Examples of experience – Australia following US: MPL-concept
  - Need to preclude 'flags-of-convenience', 'license-shopping'



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The near future of national space legislation

- The special case of France
  - No national space legislation so far …
  - … but special legal constructions for Arianespace & SPOTImage
  - Also France now working towards nat'l law
- … as do Belgium, Germany, Italy, PRC, India, South Korea, … and:

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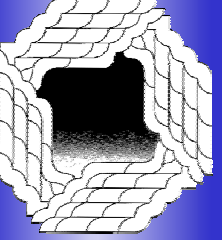

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… A Latin-American Perspective?

- Mercosul/r; Andean Pact?
- Brazilian/Argentine agreement
- Core issues for national (law) policy
  - Licensing
  - Liability arrangements
    - Limited or unlimited reimbursement
  - Insurance obligations
    - Up to limits of compensation? Separate limits?
  - Proper role public sector (PPP's)

Current and future development of national space law and policy

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National Space Activities and Legislation in Latin America

Sylvia Ospina,
S. Ospina & Associates – Consultants, Colombia

This paper is divided into two parts. The first one will present a general overview of existing international organizations that have helped shape space-related laws, policies and regulations. The overview includes three perspectives: *technical* (the International Telecommunication Union, ITU); *economic* (the World Trade Organization, WTO, and private contractual agreements), and *legal* (the United Nations Committee on the Peaceful Uses of Outer Space, UNCOPUOS). The second section will present a general overview of issues related to drafting national laws on space activities in the Americas, and more specifically, Latin America.

Introduction

The space age began with the launch of Sputnik in 1957, and since then, space activities have been increasing on a yearly basis. Space activities can be put into a few broad categories: the launch vehicle sector, which is needed by all who plan to launch any object to outer space. The scientific /research /space probes sector, whose goals and missions are frequently long-term, and funded by governments (e.g., missions to the Moon, the Mars mission, probes sent to Jupiter and Saturn, the International Space Station (ISS)). A third sector, and perhaps the most important or at least the one that has been the most lucrative of space activities, is the area of satellite communications, whether used for radio navigation, for voice telecommunications, or broadcasting (TV or radio). Nowadays, there are few, if any countries that do not have access to at least one satellite system, and that cannot communicate with the rest of the world.

Whereas at the beginning, these activities were dominated by two or three governments, nowadays, the private sector is playing a more important role in the development and operation of these major sectors. Further, with the "globalization" of economic activities, the private sector is also playing a greater role in developing governmental policies in many countries. Globalization also entails a blurring of national boundaries, and diminishing influence of international organizations. They still play a fundamental role, as the first part of this paper will attempt to demonstrate.

I. Space Activities: International Aspects

1. Technical Issues: the International Telecommunication Union

Since the late 1950s, the ITU Convention and Radio regulations have grown in importance in establishing norms for the use of the radio frequency spectrum (RFS) by space objects, whether satellites, launch vehicles or scientific probes. More than 180 States are members of the ITU, and participate in the periodic World Radio Conferences, which amend the

ITU's Radio Regulations (ITU-RR)[1]. Most countries abide by the ITU-RR, to minimize harmful interference with their communication systems, whether space-based or terrestrial.

The ITU-RR are applicable to all space and terrestrial systems that utilize the RFS, such as microwave systems and communication satellites, radio determination, radio navigation systems, Earth observation, or remote sensing satellite systems, space probes; all are subject to the ITU's regulations.

The ITU Radio Regulations are applicable on an international, regional and national basis[2], and in many countries, they are the basis of national legislation and regulations dealing with satellite telecommunications. Most countries have at least one Earth station with which to communicate with the rest of the world, and so they usually adhere to the ITU-RR. In some instances, the regulations on satellite communications may be the only ones that are related to space activities. Thus, it could be said that these nations have some space legislation, even though it is of a technical nature and limited to satellite communications.

2. Economic Policies and Space Activities

The main economic regulator of satellite communications used to be Art. XIV(d) of the 1973 Intelsat Operating Agreement, which required co-ordination with the International Telecommunication Satellite Organization (INTELSAT, currently ITSO) to minimize any "significant economic harm" to that organization.

Various events, however, have led to the virtual demise of economic co-ordination with Intelsat. For one, in the early 1990s Intelsat itself raised the threshold of what it deemed "significant economic harm". Further, in 1997 most countries adopted the WTO's Annex on Telecommunications, making specific commitments to the economic liberalization of this sector[3]. These commitments supersede some multilateral and bilateral agreements on international satellite communications services. Thus, the WTO Agreement has become an important economic regulator of space communications, even though it does not refer to issues such as satellites launches and use of the RFS.

At the beginning of the space era governments provided most of the funding, and were in control of satellite systems and operations. At present, the private sector plays a major role, due to the "privatization" of major international satellite organizations (ISOs), such as INTELSAT, the International Mobile Satellite Organization (INMARSAT, currently IMSO)[4] and the European

[1] The ITU Constitution and Convention are revised at the Plenipotentiary Conferences

[2] The ITU RR, Art. S1 (S1.16 - S1.18) provides specific terminology and definitions: *allocation* (of a frequency band) is done on an international basis; *allotment* of a radio frequency or radio frequency channel, for use by one or more Administrations in one or more identified countries or geographical areas and under specified conditions (I.e., allotment is regional). *Assignment* (of a radio frequency or radio frequency channel) is the authorization given by an Administration (i.e., national government) for a radio *station* to use a radio frequency or by an Administration for a radio station to use a radio frequency or radio frequency channel under specified conditions (Italics in the original).

[3] The WTO Agreement aims at opening the telecom markets, creating a "level playing field". WTO commitments are averse to granting "exclusive" rights to any one corporation or service provider. These policies weaken the monopolies that many government- owned service providers and operators used to enjoy. Further, some countries, notably the USA, filed exemptions to the WTO Annex on Telecommunications, so that satellite transmitted TV is not subject to the WTO Agreement. *See* www.wto.org for a list of the commitments and exemptions

[4] INMARSAT was privatized in 2000, and INTELSAT in 2001, under terms set forth in the US' Public Law 106-180, 17 March 2000, the "Open-market Reorganization for the Betterment of International Telecommunications Act, the ORBIT Act" (Cited hereinafter as the ORBIT Act). The ORBIT Act

Telecommunication Satellite Organization (EUTELSAT), and the "globalization" of corporations, operations and services.

The rise and demise of the non-geostationary satellite systems (e.g., Iridium, Globalstar, ICO, *inter alia*), raise questions as to the growing importance of the private sector in the financing and provision of global telecommunication services. These systems also raise questions as to the private sector's liability and responsibility in space activities, including financial interests in the RFS and licenses, as proposed in UNIDROIT draft Protocol on Space Assets[5].

Several issues need to be addressed, both at the international and national levels. For example, should space activities be left in the hands of the private sector, whose major aim is monetary profit? Do governments still have obligations to their citizens, to provide them basic public services, such as low-cost communications?[6]

3. Legal Concerns: the United Nations Treaties and Space Activities

Since its inception in 1958-59, the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) has been a key player in formulating treaties and resolutions with regard to outer space activities. The 1967 Outer Space Treaty[7] remains a seminal document, providing a general framework for undertaking activities in outer space. That these activities are of great importance to an increasing number of countries is reflected in membership in COPUOS: when first established, it had 11 members; in 2004, 65 States are represented at COPUOS, and several others aspire to become members.

Further evidence that more countries believe that space activities need to be regulated is reflected in the growing number of States that have signed and ratified the Outer Space Treaty[8], the Liability Convention[9] and the Registration Convention[10]. At the same time, several of these States are drafting national space laws, and establishing space agencies. Some of these endeavours will be looked at below.

The above sketch is intended to provide a general context of the international legal, technical and economic aspects of space activities. In addition to the treaties, principles, and

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essentially did away with the Intelsat 1973 Agreements, including Art. XIV(d), and has led to the restructuring of the international satellite organizations (ISOs) into competitive, privately owned corporations. Under the terms of this Act, Inmarsat and Intelsat must issue an Initial Public Offering (IPO) of their shares.

[5] Draft Protocol to the UNIDROIT Convention on International Interests in Mobile Equipment on Matters Specific to Space Assets. Capetown, 2001 (Cited hereafter as the Space Protocol). UNIDROIT's Space Protocol and its definitions of "space assets" are of concern to the "spacialists". *See* www.unidroit.org, for the text of the Draft Convention on Mobile Equipment and various Protocols.

[6] The recent "auction" of Intelsat to a consortium of private investors is a case in point: according to its Agreement, which was amended in 2001, the "new" International Telecommunication by Satellite Organization (ITSO), is still obliged to ensure the provision of universal services via satellite. It will be interesting to see if the new owners will comply with this obligation, even if it is not economically profitable

[7] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. Entered into force 10 October 1967 (Cited as the Outer Space Treaty hereinafter).

[8] Ibid

[9] Convention on International Liability for Damage Caused by Space Objects. Entered into force 1 Sept. 1972 (Cited as the Liability Convention hereinafter).

[10] Convention on Registration of Objects Launched into Outer Space. Entered into force 15 Sept. 1976 (Cited as the Registration Convention hereinafter).

resolutions drafted by COPUOS, many bilateral and multilateral treaties regulate other aspects of space activities. For example, intellectual property rights and patent laws that may apply to the International Space Station (ISS); copyright conventions that protect satellite broadcasting, whether of radio or television signals[11], *inter alia*. In brief, at the international level, there is a fair amount of legal protection of different facets of space activities, especially those undertaken by developed countries.

One major drawback to international treaties, whether the WTO Agreements, or the United Nations treaties on outer space, is that there are few mechanisms to enforce them. Most of them State that any dispute arising from the treaty or convention is to be resolved by diplomatic means; i.e., through governmental negotiations, which can be lengthy. Even though some treaties provide for settlement by arbitration (e.g., the WTO Agreements), this too is a time-consuming process, since it also involves governments willing to submit to arbitration on behalf of their nationals.

4. Regional space legislation

Currently there is no regional space law, although the European Union (EU) is beginning to formulate its own space policies. Both the EU and the European Space Agency (ESA) are unique, in that they are the only supra-national, regional organizations of their kind. While most EU Member States have signed and ratified the United Nations treaties, not all have subscribed to the ESA Convention[12]. Further, there are varying levels of national space legislation between the EU and ESA Member States. Harmonization of national space laws at the EU level is an important means of providing a general legal framework for pan-European Union space activities. That there is a need for such legislation is evident in the growing number of workshops, conferences and publications on this subject[13].

On the one hand, the European Commission (EC) must take into account national legislation and space policies in its formulation of a pan-European space policy. On the other hand, national laws will have to take into account the EC's policies. Until now, there are few space sector-specific Directives or Decisions, except for those related to satellite communications. The EC's "White Paper on Space Policy", issued in 2003, may fill this void[14]. The EC White Paper covers a range of activities: Research and Development, infrastructure development, services and technology, and amongst its objectives are the allocation of roles and responsibilities for the Member States involved and establishing annual budgets.

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[11] UN General Assembly Report of the Special Political Committee (A/37/646), 100th Plenary Meeting, 10 Dec. 1982. See also the 1984 Brussels Convention on satellite broadcasting. Issues related to TV broadcasts, copyright, intellectual property rights and patents could be the subject of other Articles, and will not be elaborated upon in this paper.

[12] It should be recalled that not all EU Member States participate in ESA activities, while some non-EU States (e.g., Canada) collaborate in ESA projects

[13] See Project 2001 and Project 2001 Plus, "Global and European Challenges for Air and Space Law at the Edge of the 21st Century." Inst. of Air and Space Law, Univ. of Cologne; Dr. Stephan Hobe, Bernhard Schmitt-Tedd, Kai-Uwe Schrogl, editors. The Proceedings of the workshops convened by Project 2001+ include papers on various aspects of harmonizing national laws in EU Member States. *See* "Towards a Harmonised Approach for National Space Legislation in Europe." Proceedings of the Workshop, Berlin, Germany, 29/30 January 2004 (Cited as the Berlin Proceedings hereinafter).

[14] The EC White Paper on European Space Policy was presented by the Commission, and was formally adopted in the EU Council of Ministers meeting on Competitiveness on 27 November 2003. EC Publication *COM (2003) 673* (2003) (Cited hereinafter as the EC White Paper). For the complete text, see http://europa.eu.int/comm/space/

A European Space Policy would be implemented in two phases: the first (2004-2007) will consist of implementing the activities included in the recent European Community-ESA Framework Agreement[15] on the joint ESA-EU GALILEO and Global Monitoring of Environment and Security (GMES) undertakings[16]. The second phase (post 2007) would be carried out once the European Constitutional Treaty enters into force. This treaty would establish space as a shared competence between the Union and its Member States[17].

Implementing many of the EC White Paper's recommended actions and policies, while using space technology, should lead to "bridging the digital divide at a global level, [and ensuring] that all parts of the world can reap the benefits from the information society."[18]

One "regional" initiative, the Galileo Global Navigation Satellite System (GNSS) is the kind of project that will lead to the growing international/global influence of the only regional space agency, ESA. What has begun as a "regional" undertaking, based in Europe, is developing into a global project, involving the major space powers and other countries as well. China, India, the Russian Federation and Ukraine, have signed agreements with ESA, and in the Americas, Brazil, Canada, Mexico, and the US also have signed agreements to participate in the Galileo Joint Undertaking (GJU). (The nature and scope of the agreements varies from country to country, and will not be elaborated upon here).

II. Space Activities: National Aspects

This part of the paper will deal with national aspects of space activities in general terms. It will not offer a close analysis of any particular legislation, but will make a few recommendations as to some issues that should be taken into account in drafting national space legislation. As in the preceding section, the technical, economic and legal aspects of space activities will be reviewed.

1. Technical Regulations

Most countries have Earth stations to access communication satellite systems, and they adhere to the ITU-RR to minimize any harmful technical interference. Most countries also have national regulations related to the technical aspects of the RFS utilization, and to satellite communications.

In the majority of developing countries, "space activities" are limited to satellite communications, which not only provide them access to the rest of the world, but also provide them foreign revenues. Most countries, even those with national satellite systems are dependent on a few industrialized countries that manufacture hardware (spacecraft and launch vehicles) and other equipment, as most of them do not have native facilities for their production. (There are exceptions, such as Brazil, China, India, Israel and Republic of Korea, which have the capability of producing satellite components and launch vehicles).

[15] This Framework Agreement entered into force on 28 May 2004.
[16] EC White paper. GALILEO is Europe's Global Navigation Satellite System (GNSS), a joint EU/ESA project comprised of a constellation of 30 satellites in medium Earth orbit. GALILEO will provide users with highly accurate timing and positioning services. GMES (Global Monitoring for the Environment and Security) is also a joint EU/ESA initiative combining space and in-situ observing systems to support EU's goals regarding sustainable development and global governance.
[17] Ibid.,p.49.
[18] Ibid., p.18. (quote taken out of its context by this author).

Furthermore, with the exception of a few island countries or territories, the majority of nations have access to one or more fixed or mobile[19] communication satellite systems[20]. One of the goals of the Global Mobile Personal Communication Satellite Systems (GMPCS) was/is to provide global coverage by means of satellite "constellations". These systems have been less successful than anticipated, in part due to the high cost of the terminal equipment, and in some instances, due to regulatory hurdles, e.g., terminals not licensed could not be used in some States[21]. Further, the growth of terrestrial mobile telephony systems, providing cheaper links and handsets, seems to have obviated the need for the GMPCS systems.

In the 1970s, many developing countries joined the "satellite club", and launched their own geostationary satellite systems. India and Indonesia were among the pioneers of national satellite systems. In the Americas, Argentina began studying the feasibility of a national/regional satellite system as early as 1969, while Brazil, Mexico and the Andean Pact countries started feasibility studies on their systems in the 1970s. Brazil and Mexico launched their first-generation satellites in 1985, Argentina in the early 1990s, and the Andean Pact system is still under consideration.

Several other "developing countries" now have their own satellite system(s), the majority of them for communications, although some satellites are for remote-sensing/Earth observation. All of them rely on the ITU's co-ordination procedures and the ITU-RR, to ensure the proper operation of their system(s)[22].

It should be stressed that the satellite system operators are the ones who choose the frequencies to be used, as well as location of satellites in a particular orbit, or orbital positions. These choices are co-ordinated with other existing and planned systems, following the ITU-RR and ITU's guidelines. These seemingly technical decisions and choices, which are often subject to the hardware suppliers' national and international policies, have great impact on the economic viability of the system(s).

2. National Economic Policies and Space Activities

Technical decisions, as noted above, affect the economic viability of any satellite system, and politics and economic policies beyond the national level also influence these decisions. Having a national satellite system does not guarantee an adequate return on the investment, nor the best use of the satellite's capacity. Thus, prior to launching a first satellite, or follow-on spacecraft, countries aspiring to join the "satellite club" should closely examine the economic aspects (e.g., the potential return on the investment) of their proposed system. While it may have been "fashionable" a decade ago to have a national satellite system, Argentina, Brazil and Mexico have had to make alliances with foreign satellite systems in order to thrive economically.

The importance of the economics of space-based communication systems, and of private investments in them, whether national or international, is reflected in the 1997 WTO Annex on

[19] The ITU-RR, Ch. S1, Art. S1 provides definitions of various satellite services: Fixed (FSS): point-to - point transmission service (telephony); Broadcast (BSS /DBS): point-to multi point transmissions (Radio, TV broadcasting); Mobile (MSS) include maritime mobile, aeronautical mobile, land mobile services.

[20] Intelsat, Inmarsat, Panamsat, SES-Astra (now SES-Global and/or SES-Americom) are among some of the geostationary satellite systems with nearly global coverage

[21] The reasons for the rise and causes of the demise of the GMPCS systems are beyond the scope of this paper.

[22] Algeria, Argentina, Brazil, Chile China, Egypt, Greece, India, Republic of Korea, Malaysia, Mexico, Nigeria, Saudi Arabia, Thailand, Turkey, and the UAE are among the countries "members of the satellite club", having launched their own spacecraft, either for telecoms or remote sensing.

telecommunications[23]. While the majority of nations have made specific commitments to liberalize their telecom sector, few countries have national laws or regulations covering a wider range of space activities, despite their involvement in many of them[24].

The situation is further complicated by the fact that all countries are increasingly interdependent on each other, due to the "globalization" of nearly all economic activities, of corporations, even of satellite systems. Developing countries are at a disadvantage, however, as they depend on industrialized countries, not only for equipment and hardware, but also look to them for technical standards, as well as for economic assistance to further their national developmental efforts.

Another difficulty is lack of adequate funding, which seems to be a perennial problem, not only for the incipient space agencies, like Brazil's, but also for the US NASA, ESA, the Russian Space Agency, etc.. Long-term planning (and funding) is needed for most space activities, but governments, which change every 4 or 6 years, seem to have shorter-term plans and goals. Thus, the budgets of most space agencies are subject to annual review, and perhaps to annual cuts. This lack of economic certainty is bound to affect the space programmeme of even the most economically solid agencies and countries.

The economic uncertainty also affects international and bilateral space projects, such as participation in the International Space Station (ISS), the GJU, or rebuilding the launch pad in Alcantara, Brazil, launch pad that was destroyed by an explosion in 2003[25].

While in most countries the Ministry of Communications regulates satellite communications and use of the RFS, other space programmes are shifted from one ministry to another. Some governments do not seem quite sure as to which official entity should be in charge of their space activities, and so they create additional uncertainty. Thus, space activities may be the concern of the Ministry of Defence (e.g., in Chile the Air Force will be in charge of the Chilean Space Agency); or of the Ministry of Science and Technology (Brazil). In some instances, the Ministry of Foreign Relations may be in charge[26], or they may be the purview of quasi-independent civilian agencies (e.g., NASA, the French Centre National d'Etudes Spatiales, CNES, among others). Funding for space activities may also be subject to budgetary largesse or constraints of the ministry overseeing them.

What should developing countries that aspire to have a native space agency and to expand their national space programmes do, in view of a rather tenuous economic future? Should they rely only on government funding, or should this sensitive sector be opened to (private) foreign investors? These are economic as well as policy and legal issues, which need to be addressed by the respective authorities.

Should developing countries adopt the economic policies of the industrialized countries, which may be a condition for supplying them equipment? Should national legislation of space

[23] See note 3, www.wto.org for the specific commitments and exemptions taken by each country to the Annex on Telecommunications

[24] The UN Office of Outer Space Affairs has a listing of national space legislation; when compared with nations that are involved in space endeavours, or that have national satellite systems, it becomes obvious that not all of them have laws related to space activities. Also see Berlin Proceedings, note 13

[25] Space News, 20 Sept. 2004, p.22, interview with the President of the Brazilian Space Agency. He attributes the explosion to lack of adequate funding, in addition to technical problems that may have been the cause

[26] The Colombian Ministry of Foreign Relations is the seat of the Pro-Tempore Secretariat of the IV Pan-American Space Conference, held in Colombia in 2002

activities be based on laws drafted by and for industrialized countries? It should be recalled that, while national *laws* can be enforced only within a country's borders[27], national *policies* do transcend geographic barriers. National policies and politics both play important roles, and have great impact on space activities and initiatives of other countries.

3. Legal/Policy Aspects of Space Activities in the Americas

The United States is perhaps the country with the most highly developed space-related sector, as well as the country with the most legislation and regulations on a variety of space activities. A plethora of departments (ministries), agencies and commissions, each with differing scope or reach, is involved in the implementation and regulation of space activities, beginning with the 1958 NASA Act that created the National Aeronautics and Space Administration (NASA).

Other influential entities include the Federal Communications Commission (FCC), which licenses and regulates communication satellite systems; the Department of State (DOS), the Department of Commerce (DOC), even the Treasury Department. The Federal Aviation Administration's Office of Commercial Space (FAA/AST) licenses launch vehicles, while LANDSAT's remote sensing activities are regulated by another agency. Various dependencies of the Department of Defence also play a major role in space activities (the US Air Force, Navy, in particular.)

The policies of each of these agencies, in turn, may limit the kind of technical and developmental aid that the US will make available to countries aspiring to develop space-related activities and centres. Other limitations, both in the US and in some other countries, are restrictions on foreign ownership and investment in certain sectors, such as telecommunication systems and airlines.

Most of the Latin American countries rely heavily on developed countries' space industries and agencies, not only for hardware but also for technical assistance. Argentina, Brazil, Chile, Ecuador and Mexico are among the countries that have entered into several bilateral agreements with ESA, NASA, the Canadian Space Agency, the Indian Space Research Organization (ISRO), as well as with the Chinese and Japanese governments. These agreements vary in scope; in some instances, the Latin American countries assist the foreign space agencies with tracking activities (Chile's Easter Island is a potential emergency landing site for the US Space Shuttles). Other countries (Argentina, Brazil and Chile) are involved with the French SPOT and the US LANDSAT remote sensing programmes, as well as with the tracking of launches and satellites and data collection.

Argentina, Brazil and Mexico have national telecommunication satellite systems, launched to further their national development. These spacecraft have very good coverage of most of the South American continent, yet this regional capacity is underutilized, for a variety of non-technical reasons.

In brief, despite sharing a similar Spanish cultural heritage and language (except for Brazil), attempts at setting up regional co-operative programmes in some sectors (telecommunications, air travel) have not been very successful in Latin America. Thus, setting up

[27] Exceptions exist, such as the US "ORBIT Act", supra, note 4, which essentially abolished treaty-based international satellite organizations (INTELSAT, INMARSAT), compelling them to "privatize."

a regional space agency, similar to ESA, seems to be a remote possibility[28]. Countries that already have some native space industries (and limited budgets) are likely to allocate more time and energy to their national endeavours.

III. National Space Agencies and/or Commissions in Latin America

In the 1970s and 1980s, many countries joined the "space club" and launched national satellite systems. Currently, many countries seem to want to "upgrade" their membership in the "space club" by creating national space agencies[29]. Several of the Latin American countries have commissions and/or centres for space studies and/or research, some recently formed, others dating back several years. Argentina and Brazil have the most developed space programmes in Latin America, and some of their accomplishments are highlighted.

1. Argentina

Argentina's Comisión Nacional de Actividades Espaciales (CONAE) was created by National Decree No. 995/91, of 28 May 1991, although Argentina has been involved in space activities since before 1991. CONAE has cooperated in many programmes with NASA and ESA, most of them of a scientific nature. Argentina has been quite involved in Earth observation, has a small Earth observation satellite in orbit and plans to launch at least one more[30].

CONAE's space activities, however, have little to do with NAHUELSAT, the national telecom satellite system. One linkage exists, however: the Secretariat of Communications regulates the radio frequencies that are used by these spacecraft. Even though it has few national laws relating to space activities, Argentina has signed and ratified the major outer space treaties, and thus is bound by their terms.

2. Brazil

Brazil's involvement in space activities dates back to 1961, when the Brazilian government established an Organizing Group for the National Commission on Space Activities (GOCNAE), to promote Brazil's space activities[31]. The CONAE evolved over the years, and in 1994, the Brazilian Space Agency (AEB) was formally established.

Brazil, like Argentina, has a domestic satellite system, whose operations and regulation have little relation to the AEB's activities or to those of the Institute of Space Research (INPE), except for the ITU regulations related to using the RFS.

Brazil, like Argentina, has also entered into many bilateral agreements with NASA, ESA, the China National Space Administration (CNSA), and with the Ukrainian government. The agreement with China centres on remote-sensing/data collecting satellites, while the agreement

[28] Four Pan-American Space Conferences have been convened, the first one in March 1990 in Costa Rica, and the fourth in 2002, in Colombia. One of their purposes has been to study the feasibility of establishing a regional space agency, but few funds or personnel have been allocated to these efforts.

[29] Space agencies' importance is growing so much that it has become the topic of some symposia. Euroconsult (Paris, France), held a "World Space Agencies Forum" on 10 Sept. 2004, to which more than 26 national space agencies / commissions were invited. It had convened a similar symposium/forum in previous years.

[30] See www.conae.gov.ar, for an extensive description of Argentina's space activities and long-term plans.

[31] J. Monserrat Filho, "Brazilian Launch Licensing Regime." Presentation included in the documents of the UN-sponsored Workshop on Capacity Building, The Hague, NL, November 2002. (Complete text may be found at www.oosa.unvienna.org).

with the Ukrainians is aimed at improving Brazil's launch capabilities at Alcantara, with plans to eventually compete with other countries' launch systems[32]. (Brazil's launch sites are in an excellent geographic position to compete with the French /ESA launch centre in Kourou, French Guyana, as all three are very near to the Equator).

Brazil's plans to offer commercial launches suffered from a serious setback in August 2003, when a rocket exploded on the launch pad at Alcantara, destroying it, and killing more than 20 persons. Despite this setback, the AEB plans to revitalize its mission, and go forward with its space programmes. Adequate funding for these may be problematic, however[33].

3. Chile

Chile has been providing NASA and ESA technical support for many years, and some of its desert areas have been used as testing grounds for NASA experiments (e.g., landing on the Moon). Chile has also been quite involved in remote-sensing activities, and has two university-based centres in Santiago for space studies and/or research, and to track data obtained from the US Landsat and the French SPOT satellites. It also launched a small Earth observation satellite a few years ago. In addition, Chile was the host country for the second Pan-American Space Conference, convened in 1993.

Despite its years of involvement in space activities, until now the Chilean government has not drafted any space legislation. At the fourth Pan-American Space Conference, held in Colombia in 2002, Chile announced that it would be establishing a space agency, and presumably, drafting some space-related legislation. An update on these efforts was provided during this symposium /workshop.

4. Other Latin American Countries

Several other countries in Latin America are involved in space activities, but do not have a national space agency as such. A few countries however, have had astronauts in space. A Cuban cosmonaut spent some time on board a Soviet spacecraft; Costa Rica's Franklin Chang Díaz became a US citizen, so that he could accomplish one of his dreams, to be an astronaut. A Mexican astronaut "accompanied" the launch of the first Morelos satellite in 1985, from the Space Shuttle.

In Colombia, Mexico and Peru, the Ministry of Foreign or External Relations is in charge of space activities, except for satellite communications; these are the purview of the Ministry of Communications. Uruguay has a research centre, Centro de Investigación y Difusión Aeronáutico–Espacial (CIDA-E), and publishes a journal with Articles on both air and space law. Peru would like to revive its Space Research Centre, but has no funds to do so. A university in Venezuela has a centre dealing with some space activities. Recently, the Venezuelan government announced its intention to establish a Commission on the Peaceful Use of Outer Space, under the aegis of the country's President[34].

All of the countries in Latin America, however, have several Earth stations, accessing a variety of communication satellites, whether in geostationary orbit, or in lower orbits. For example, Colombia and Peru agreed several years ago to have "gateway" Earth stations,

[32] Ibid
[33] Space News, 20 Sept. 2004, p.22, interview with the President of the Brazilian Space Agency
[34] El Universal (Venezuela), 30 Dec. 2004

connecting to Globalstar, one of the GMPCS[35] systems. Iridium also had plans to install gateways in several countries.

Conclusions and Recommendations

1. Conclusions

With the exception of Brazil and Argentina, few countries in Latin America have active space commissions or agencies, let alone laws or regulations related to space activities, other than those issued by the entity in charge of satellite communications. The latter are usually based on the ITU's Radio Regulations and Recommendations, and thus, limited to mostly technical issues related to satellite communications and use of the RFS by other types of satellites.

Funding for the development and expansion of most sectors is limited, due to budgetary constraints and government priorities; funds for expensive space programmes are not always first on the list. For example, even though Brazil wants to continue participating in the ISS programme, it may have to cut back, because of inadequate funding[36].

Developing countries with no space industry or programmes face special challenges: do they need legislation for a sector that has yet to develop in their country? Should they decide that they need national space laws, they should keep in mind the principles embedded in the main outer space treaties, as well as any regional legislation[37]. If a country decides to draft some legislation, based on the law of another State, it should also take into consideration differences in legal systems (common law, civil law). Terms such as "liability", "responsibility", "assets", "property" have different meanings under these two different legal regimes[38]. On the one hand, should they remain open to the possibility of establishing joint ventures with foreign space agencies and corporations, as Brazil is doing with Ukraine and China? Or on the other hand, should they enter into arrangements whereby their sense of national sovereignty may be compromised?

One implication of the term "globalization" is the blurring of State boundaries; differences between Nation States tend to disappear, and with them, deference to State sovereignty is likely to diminish. The ever growing use of the Internet and other global telecommunications networks allow for communications across time and space in an unprecedented manner, resulting in the disappearance of borders, at least in "cyberspace".

Countries that try to resist the trend toward globalization may be fighting a losing battle, as their national priorities become less important *vis-à-vis* this trend. For example, in the 1970s many States sought to have greater control over the reception of satellite-transmitted television, and succeeded in passing a Resolution at the UN's General Assembly, essentially requiring their

[35] GMPCS is the acronym given to the Global Mobile Personal Communication Systems, which comprise satellites in geostationary orbit and several non-geostationary orbits. Many of the GMPCS systems that were proposed in the early 1990s were not been launched (Skybridge, Celestri), or have either merged with others (ICO-Teledesic), or have been reorganized under Chapter 11 of the US Bankruptcy Code (Iridium, Globalstar).

[36] Ibid.

[37] See Berlin Proceedings, note 13

[38] E.g., the definitions of "space property" (now "space assets") included in the Space Protocol, note 5, have been the subject of much discussion, due to the different import of these terms in the common and civil law systems. In regard to differences in terminology, see S. Ospina, "International Responsibility and State Liability In an Age of Globalization and Privatization." Annals of Air and Space Law, Vol. XXVII, 2002, pp. 479 - 493. See also Berlin Proceedings, note 13.

consent prior to down linking the TV programmes[39]. Today, this is a moot point, in part due to technological advances, in part due to their prior consent not being sought by the global BSS/DBS operators. Another practice that moots this issue is the "pirating" of TV programmes, and music. This is a major "industry" in some countries, resulting in economic losses in the millions of dollars, or so producers of films and TV programmes allege. Copyright holders, however, obtain some compensation from the agencies in charge of administering the royalties under the different copyright conventions. (The principal ones appear on the "Status of Treaty" chart, appended).

Some countries would do well to analyze some of their laws and policies, which may impede the development of a national space sector or participation in a regional space programme. For instance, the Colombian and Ecuadorian Constitutions state that their national sovereignty extends to parts of the geostationary orbit. Since Colombia has not ratified the three principal space treaties, it is not bound by their terms. Ecuador and Peru, however, have signed and/or ratified them. Thus, how does one reconcile their position with other countries in the region[40], and with the 1967 Outer Space Treaty, which states that "outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."[41]

2. Recommendations

Having national space legislation and perhaps a national space commission or agency to draft and enforce regulations might be a noble ideal for some countries, but an unrealistic goal for others. It is submitted that, prior to drafting national space laws, let alone creating a national space agency, a few preliminary measures should be taken.

The first step would be to ensure that the State signs and ratifies the space treaties, thereby giving notice that it is committed to upholding the principles embodied in them. A second measure that should be taken is to study and analyze the need for such legislation, as well as analyze other current national laws, to avoid conflicts and discrepancies at the national level. Then, should a national law be drafted, the State would be in a better position to ensure that there are no discrepancies between provisions in its national laws and the international treaties related to space activities (the WTO Agreements on Telecoms, the ITU-RR, and of course, the United Nations treaties).

Issues of liability and responsibility, as well as mechanisms for indemnifying an injured Party should be closely analyzed, to ensure that measures that are being proposed would not be in conflict with other national laws and regulations[42]. Perhaps the insurance sector should be consulted in this regard.

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[39] UNGA Report, note 11

[40] These claims to sovereignty and the fact that the five Member Countries of the Andean Pact (Bolivia, Colombia, Ecuador, Peru and Venezuela) have not ratified the same treaties have impeded the progress of their regional satellite project, the "Simón Bolivar", formerly "Project Condor". Some issues that were raised thirty years ago, when the regional satellite project was first proposed, still have not been resolved. This author has written numerous Articles on Project Condor.

[41] Art. II, Outer Space Treaty, note 6. The Equatorial countries' claims to sovereignty over segments of the geostationary orbit have been debated at the UNCOPUOS for years, and have been the subject of numerous writings.

[42] See note 37, S. Ospina, "International Responsibility and State Liability in an Age of Globalization and Privatization."

Countries that already have satellites in orbit, but which have not signed or ratified the Registration Convention[43], should do so, and also establish a national Register of their space objects, as required by Article II of this Convention. Having a national register of space objects launched, and perhaps of other space activities, may be helpful in securing additional funding from their government; at least the government would know where some of its funds are being expended.

In this regard, two other recommendations will be offered. Firstly, the government should be aware that any space agency, commission or programme that is envisioned will require adequate funding, and should ensure that those monies are available *ab initio*. These funds should be budgeted for a few years, so that initial or start-up operations can be sustained, without the fear of lacking funds in the near future.

Secondly, it is recommended that, prior to setting up a national space agency or centre, a thorough survey should be carried out of the different entities - governmental agencies, non-profit organizations and private entities - that may be using satellite capacity, as well as data or images obtained from satellites. In some countries, the government itself has no idea how much its various dependencies are paying for satellite images, and in some instances, paying more than once for the same data. Duplication of expenditures (and efforts) could thus be avoided.

Once an in-depth survey is carried out, and the results properly analyzed, the government would be in a better position to know where it is expending funds, and to determine which entity should be responsible for managing and coordinating space-related activities. An argument against undertaking this kind of initial survey could be based on lack of trained personnel, and lack of funds for such endeavours. A counter-argument is that in most countries there are institutions (public and private) that specialize in carrying out surveys, and which could undertake one related to space activities.

As to the argument that there are no funds for this basic research, perhaps the government should reconsider whether it "needs" a national space agency or centre. If there are no monies for such a fundamental task, it is questionable whether monies will be available for something on a bigger scale, let alone long-term funding for a national space agency or commission.

Prior to creating a space agency or drafting legislation, perhaps the developing countries interested in doing an initial survey of their country's use of satellite-transmitted data or images, could request assistance from the United Nations Office for Outer Space Affairs, and/or from IISL members, to assist them in these initial drafting activities. These could result in long-term, and even permanent, national space-related endeavours.

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[43] Registration Convention, note 10. See Status of Selected Treaties Table, appended to text of this paper

Status of Selected Treaties Table

Treaty *	1967 OST	1968 ARRA	1972 LIAB	1975 Reg	1979 MOON	1974 BRS	Berne Union	Universal Copyright Convention	Interamerican Copyright Convention
Country									
Antigua	R	R	R	R					
Argentina	R	R	R	R		S	Y	Y	Y
Bahamas	R	R					Y	Y	
Barbados	R	R	R					Y	
Bolivia	S	S	S						Y
Brazil	R	R	R			S	Y	Y	Y
Canada	R	R	R	R			Y		
Chile	R	R	R	R	R		Y		Y
Colombia	S	S	S					Y	Y
Costa Rica		S	S				Y	Y	Y
Cuba	R	R	R	R				Y	Y
Dominican Republic	R	S	R					Y	Y
Ecuador	R	R	R					Y	Y
El Salvador	R	R	S					Y	Y
Guatemala			S					Y	
Guyana	S	R							
Haiti	S	S	S					Y	Y
Honduras	S		S						Y
Jamaica	R	S							
Mexico	R	R	R	R	R	R	Y	Y	Y
Nicaragua	S	S	S	S				Y	Y
Panama	S		R					Y	Y
Peru	R	R	S	R	S			Y	Y
Suriname							Y		
United Status of America	R	R	R	R			Y	Y	
Uruguay	R	R	R	R	R				
Venezuela	R	S	R				Y	Y	

R = Ratified **S = Signed** **Y = Member Signatory**

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

1968 ARRA: Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Rescue Agreement)

1972 LIAB: Convention on International Liability for Damage Caused by Space Objects (Liability Convention)

1975 REG: Convention on Registration of Objects Launched into Outer Space (Registration Convention)

1979 MOON: Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement)

Plan

1.- Policy and Law

2.- The Rationale of National Space law: Private Involvement in Space Activities

2.1 Primary items

2.1.1 Authorization and continuing supervision of activities

Consequence : Register 1.- space objetcs

2.- space operators

2.1.2. Clear liability rules

Consequence : Insurance or other financial guarantees

3.- International Space Law and National Space Legislation

3.1.- Argentina

3.1.1 International commitmement.

3.1.2 CONAE D. 99591 Only acomplement agency to design, execute, control and administer outer space proyects and endevours.

3.1.3 Argentine National Registry of Objects Launched to Outer Space . Dec. 125/95.

3.1.4 Register of Space Operators, Res. 463/97

3.1.5 Authorization and continuos supervision of activities, Res. 330/96.

4. - Conclusion

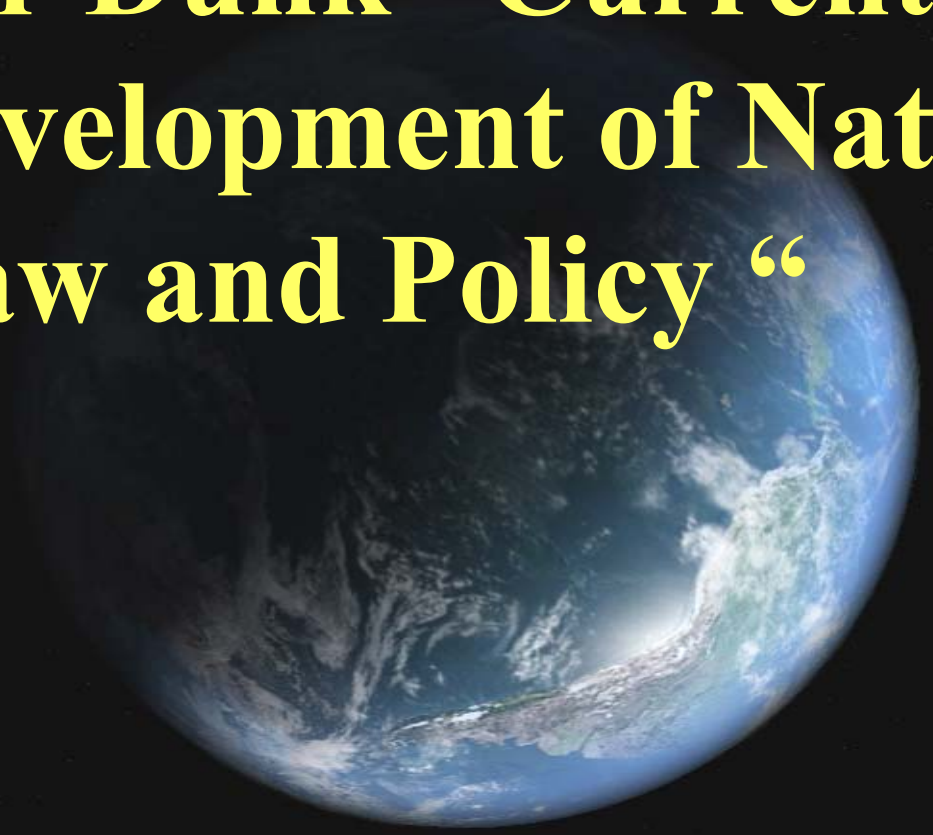
4.1 Priority of Law

4.2 Role of non political bodies

4.3 Ratification of Space Treaties

4.4 Improve cooperation in the Latin-American area

Comments on Dr. Franz von der Dunk “Current and future development of National Space Law and Policy “



by Prof. Dr. Oscar Fernàndez-Brital
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Space Law and Technological Cooperation

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Introduction

Cooperation among States is foreseen in the 1967 Outer Space Treaty, which establishes in its Article XIII:

> "*…the provisions of this Treaty shall apply to the activities of State Parties to the Treaty in the exploration and use of outer space, including the Moon and other celestial bodies, whether such activities are carried out by a single State Party to the Treaty or jointly with other States, including cases where they are carried out within the framework of international intergovernmental organizations".*

Therefore, even at the time when the Outer Space Treaty was issued, when space activities were carried out essentially by two States – the former Soviet Union and the United States of America – technological cooperation among States had already been considered. What could not be imagined was the level of complexity, which space activities would attain. The huge participation of private entities in space activities could also not be foreseen at that time.

Currently, technological cooperation is not restricted to States, but it is extended to cooperation between States and private companies, between agencies from different States (such as International Telecommunication Satellite Organization (INTELSAT currently ITSO); the International Mobile Satellite Organization (INMARSAT currently IMSO); the European Telecommunication Satellite Organization (EUTELSAT); and the European Space Agency (ESA), or between private companies from different States. The best example of such cooperation is probably the "Sea-Launch Programme", a maritime platform maintained by Norway, the Russian Federation, Ukraine, and the United States, which provides launchings into outer space. The complexity of such extensive cooperation in space activities has been challenging lawyers around the world. Such topics as intellectual property, division of responsibility, a cross-waiver of liability clause and applicable law, have provided food for thought and have been the subject of several legal Articles. This paper discusses how these legal questions have been dealt with in the cooperative agreements Brazil has signed with China, Ukraine and the United States.

I. The Role of the United Nations

Since the beginning of the space era, the United Nations has been encouraging cooperation among States, through resolutions adopted by its General Assembly, as a way of assuring the peaceful use of outer space.

Resolution 1348 (XIII) of 13 December 1958, for instance, recognized "*the great importance of international cooperation in the study and utilization of outer space for peaceful*

purposes". At the time, an *ad hoc* Committee was established to study the areas of future cooperation among States and the problems that might arise.

This eventually led to Resolution 1472 (XIV) of 12 December 1959, which established a permanent Committee, and more recently, Resolution 57/116 of 12 December 2002. This latter Resolution reaffirmed "*the importance of international cooperation in developing the rule of law…"* and also noted the progress achieved "*…in various national and cooperative space projects, which contribute to international cooperation and the importance of further developing the legal framework to strengthen international cooperation in this field"*.[1]

II. The Brazilian Policy

The general objective of the National Policy for the Development of Space Activities (PNDAE), prepared by the Brazilian Space Agency, in fulfilment of Article 3, Law # 8.854 of 10 February 1994[2], is to further enable the country to solve national problems and benefit Brazilian society through the legal use of space activities.

International cooperation is also considered in the Brazilian space policy, because space projects are extremely expensive and such cooperation is a national choice for making them economically feasible. According to the Brazilian space policy some guidelines should be followed:

(a) Proposals for international cooperation should State clearly and pragmatically the benefits to be accrued for the parties involved, and the basic interests on the Brazilian side should be within the ambit of this policy;
(b) Cooperative scientific projects should be encouraged, seeking to establish favourable conditions for the interchange of personnel, equipment and data, as well as assuring beneficial participation for Brazil in the major international scientific programmes;
(c) Opportunity for cooperation in space engineering, technology and systems, and the corresponding infrastructure, should be taken advantage of whenever within the interests of the country;
(d) Cooperative initiatives with countries, which share problems and difficulties similar to those of Brazil, should merit special attention; and
(e) The establishment and adoption of international standards should be supported, so as to ease the exchange of information, and assure a growing compatibility in space systems between cooperating organizations around the world".[3]

1. Brazilian Cases

Due to the growth of its space activities, Brazil has signed several international agreements for establishing cooperation in this field. Three of them will be presented in this paper, namely, the agreements established with China, Ukraine and the United States.

[1] Data regarding the United Nations General Assembly Resolutions were kindly provided by Ambassador Carlos José Prazeres Campello, Head of the Department of Space Cooperation of the Brazilian Space Agency.
[2] The Brazilian Law # 8.854 of 10 February 1994 created the Brazilian Space Agency as a civil organization and addressed related matters.
[3] National Space Activities Program – 1998/2007, edited by the Brazilian Space Agency in 1998 (page 67).

A Brief History

Brazil was one of the first developing countries to institutionalize space activities through the establishment of government organizations in the early 1960s.

The Organizing Group of the National Commission for Space Activities (GOCNAE) was created in 1961. Later, in 1971 GOCNAE became the National Institute for Space Research (INPE), an organ subordinated to the Ministry of Science and Technology.

In 1964, the Ministry of Aeronautics created the Executive Group for Space Project Activities and Studies (GETEPE), which in 1969 gave rise to the Institute of Space Activities (IAE), subordinated to the Ministry of Defence.

INPE is in charge of studying and developing space applications, notably in the areas of remote sensing, meteorology and space technology, with special emphasis on satellites and ground systems; IAE has concentrated mainly on the development of sounding rockets and launch vehicles. The Brazilian Space Agency was created in 1994 to coordinate the development of space activities of national interest.

The block of institutions dedicated to space activities in Brazil also includes the Barreira do Inferno Launch Centre (CLBI) and the Alcântara Launch Centre (CLA).

CLBI was inaugurated in 1965, in Natal, in the State of Rio Grande do Norte, and it provides facilities for the launching and tracking of Brazilian and foreign sounding rockets. CLA, in the State of Maranhão, is well placed to become an internationally competitive centre for satellite launches, because of its privileged location, close to the equator.[4]

Cooperation with China

In the 47th Colloquium on the Law of Outer Space[5], which was held in Vancouver, Canada, from 4 to 8 October 2004, the paper "Evaluation of Space Cooperation Between China and Brazil: An Excellent Example of South-South Cooperation", written by Prof. Yun Zhao, Lecturer of the City University of Hong Kong, was presented.

In tracing the history of the cooperation between China and Brazil, Prof. Zhao notes that:

> "…Brazil is among one of the earliest countries to have cooperative projects with China. CBERS[6] project, set up in 1986, was jointly financed by China and Brazil and the Protocol on Research and Production of the Earth Resource Satellite was signed by both Governments, in 1988. However, the first consequence of the Protocol came only after eleven years when the CBERS-1 was launched in 1999 from the Chinese base in Taiyuan. It was China's first generation transmition Earth resources satellite developed by China and Brazil (…) In view of such joint creative work, both parties were able to reach further cooperative protocol in 2002. Soon after, CBERS-2[7] was launched from Taiyuan in October 2003 (…) Plans, which can be found in the 2002 Protocol, have been confirmed to launch two more satellites in the future, the CBERS-3 (launch forecast for 2006) and

[4] Idem, pages 11/2.
[5] This Colloquium is annually organized by the International Institute of Space Law (IISL).
[6] China and Brazil Earth Resources Satellite.
[7] INPE has provided around 40,000 images of CBERS-2 to ,.000 Brazilian users by October 2004. This huge number of images testifies the high quality of images provided by CBERS-2.

CBERS-4 (launch sometime in 2007), which will have more advanced cameras than the previous two satellites".

On 24 May 2004, China and Brazil signed a Memorandum of Understanding to extend the scope of the China-Brazil Earth Resources Satellite (CBERS) Programme, in order to commercialize CBERS data. A new Protocol should be issued by 2004 and it will establish the commercialization policy of CBERS data. Until such a Protocol goes into effect, the commercialization of CBERS data beyond the boundaries of China and Brazil is discussed on a case-by-case between the two Governments.

Cooperation with Ukraine

On 21 October 2003, Ukraine and Brazil signed a "Long-Term Cooperation in Utilization of the Cyclone-4 Launch Vehicle at the Alcântara Launching Centre", which established the first international legal framework for the commercialization of space launches from the CLA[8]. Under the agreement, a joint venture company, "Alcantara Cyclone Space" was created, defined by the agreement as "an international entity for economical and technical purposes". On the same occasion, the Brazilian Space Agency and the National Space Agency of Ukraine signed a "Memorandum of Understanding on Future Bilateral Projects", expressing

> "*their commitment to expand their cooperation further, through the exploration of additional fields of collaboration and the commitment to the joint development of new technological endeavours and projects, such as those related to the areas of liquid propulsion both for satellites and launchers, systems of guidance and control and upgrading of launch vehicles"*.

According to the agreement, the Cyclone-4 Space Launch System should be operative by 30 December 2006.

Such cooperation is worthwhile for Ukraine, which has the opportunity to put its new and promising Cyclone-4 vehicle into the world market; and for Brazil, which is advancing in its strategic plan to introduce the CLA, as an attractive and competitive site for launchings into outer space.

Cooperation with the United States

On 14 October 1997, the United States and Brazil established a cooperative programme covering the detailed design, development and operation of on-board equipments and payloads, which the Brazilian Space Agency would develop and provide to NASA[9] as part of its contribution to the International Space Station (ISS) Programme.

According to the Implementing Arrangement established between the United States and Brazil, the Brazilian contribution to the ISS Programme should include the following equipment:

(a) The Technology Experiment Facility (TEF), which should provide long-term exposure to the low Earth orbit space environment for active and passive experiments;

[8] The Brazilian House of Representatives and Senate approved the Agreement between Ukraine and Brazil respectively, on 10 August 2004 and on 17 September 2004.
[9] National Aeronautics and Space Administration.

(b) The Window Observational Research Facility Block 2 (WORF-2), which should provide the ISS capability devoted to observational science and remote sensing development;
(c) The Express Pallet, which serves as an interface mechanism that may be utilized to attach small payloads to the U.S. truss segment P3 or S3;
(d) The Unpressurized Logistics Carrier (ULC), which is a platform for transportation of unpressurized cargo, and it may be attached to the U.S. truss segment;
(e) The Cargo Handling Interface Assembly (CHIA), which is the flight support equipment that provides a method of attaching cargo to ULCs and allows for orbit a handling of the cargo; and
(f) The Attach System Z1-ULC, which provides mounting accommodations for external passive payloads and experiments.

Due to financial constraints, Brazil has not been able to provide all items originally established. Therefore, the Brazilian scope of participation in the ISS Programme will be reduced, in order to accommodate Brazil's commitment with its available budget. Representatives from NASA and the Brazilian Space Agency have been discussing how to define the new parameter of cooperation that will be established between both parties.

III. Legal Matters

The complexity of international cooperation in space activities has brought up many legal matters that must be solved.

1. Applicable Law

One of the legal matters in international cooperation is to define which national law will prevail in case of disputes.

The international legal framework will be applicable as a general rule; however, national laws will deal with minor questions, such as claims from employees, duties and fees, safety procedures and environment protection, among others.

Just to illustrate the problem, the words of Prof. Armel Kerrest, regarding space traffic management, are very appropriate, as usual:

> "While there is only one territorial jurisdiction for a national territory, there are many personal jurisdictions applying to international space if nationals or many States are using this space. When traffic management is concerned, the problem is obvious. Who is going to make the rules, who is going to control their implementation, who is going to punish violations? As a matter of principle, if no special international regime is created, only personal jurisdiction applies. The State of nationality, registration, flag is the only competent State to set the rules, control and punish"[10].

For instance, the 2002 Protocol established between China and Brazil contains, according to Prof. Zhao, "*clear rules on dispute resolutions"*. He States that

[10] In its Article "Space Traffic Management: Comparative Legal Aspects" presented in the IISL/ECSL Symposium on Prospects for Space Traffic Management on occasion of the 41st Session of the Legal Subcommittee of COPUOS held in Vienna, Austria, on 02 April 2002.

> "According to the Protocol, a Coordination Committee is created to solve problems during its implementation. This Protocol further establishes a Joint Project Committee as an executive body enjoying a large competence. Misunderstandings or disputes concerning the interpretation or application of the Protocol can be settled by mutual consultations between the parties within the framework of the Joint Project Committee. The second and final instance, at the request of either party, will be the Coordination Committee. This Committee is different from the formal dispute resolution body. Through years of cooperation, they have a trusting relationship. This informal dispute resolution mechanism can function well and maintain a good relationship between the two parties".

On the other hand, Article 15 of the Treaty[11] established between Ukraine and Brazil, in the words of Prof. José Prof. Monserrat Filho[12],

> "Adopts a logical, adequate, and fair system of application of Brazilian and Ukrainian laws. Brazilian laws shall be applied to all agreements and disputes between the Company and Brazilian citizens, persons residing in Brazil, and Brazilian organizations. In such cases, the lawsuits and arbitration procedures shall be under the jurisdiction of the Federal Supreme Court of Brazil. Ukrainian laws shall likewise be applied to the agreements and disputes between the Company and Ukrainian citizens, persons residing in Ukraine, and Ukrainian organizations. And the lawsuits and arbitration procedures shall be under the competent Ukrainian judicial authorities. Brazilian law also shall apply to agreements and disputes between the Company and citizens, residents and organizations of other countries, falling once again under the jurisdiction of the Federal Supreme Court of Brazil".

Commenting on the agreement, Prof. Moserrat Filho draws attention to another interesting point: a loophole for taxes and duties is granted to the Company; however, there is not yet any constitutional law permitting such an exemption. Prof. Moserrat Filho considers that

> "The most practical and rapid solution probably would be to pass a specific law, exempting the Company from all federal taxes. The same remedy could be used in relation to State and Municipal taxes, with the respective exemption depending on the local Administrations".

The question of applicable law in the context of the ISS Programme, according to Prof. Maria Helena Fonseca de Souza Rolim[13], has to be considered

> "With all recognized sources of international law. These legal criteria establish a space law teleology flow-down where the Space Station Intergovernmental

[11] The Brazilian authorities has decided to call the instrument "Treaty" and not "Agreement" as it would be common, in order to clearly associate the new endeavour with the successful bi-national Treaty of Itaipu, signed in 1975 between Paraguay and Brazil for the construction of a hydroelectric dam.

[12] In his paper "Brazilian-Ukrainian Agreement on Launching Cyclone-4 from Alcantara: Impact on Brazilian Legislation", presented at the 47th Colloquium on the Law of Outer Space, in Vancouver, Canada, from 4 to 8 October 2004.

[13] In her paper "The USA-Brazil Implementing Arrangement on the International Space Station: Interpretation and Application" – Proceedings of the 44th Colloquium on the Law of Outer Space – AIAA – 2002 (pages 87 to 99).

> Agreement (IGA) and the principles Stated at the United Nations International Treaties on Space Law prevail".

2. Liability to Third Parties

Liability is undoubtedly the major legal problem to be faced in international cooperation agreements.

Dispositions from national legislations should try avoiding conflicts with the 1972 United Nations Liability Convention; however, this has not always been taken into account.

Prof. Zhao States that the 2002 Protocol established between China and Brazil does not deal with liability. He says:

> "Reference might be made to the dispute resolution arrangement, through which disputes concerning liability of each party can be resolved. However, this arrangement does not affect the situation when a third party is involved. It is thus helpful to refer to the 1972 Liability Convention for possible resolution".

According to Article 14 of the agreement between Ukraine and Brazil, both States define their liability for damages to third parties in accordance with the 1972 Liability Convention. Prof. Moserrat Filho States:

> "…both countries commit themselves to engaging in immediate bilateral consultations about demands for compensation for losses and about all lawsuits, using the 1972 Liability Convention as their legal basis. They agree to bear the cost of compensation for losses caused to third parties by the launch of Cyclone-4 equally. The Company, in turn, must compensate both countries with an amount to be established through a special agreement between both countries."

As for liability, international agreements, such as the 1988 Intergovernmental Agreement on the International Space Station (IGA) has contemplated the "cross-waiver of liability" clause, which means, that each party is committed not to present any judicial claim against the other. In the case of damage or loss each party will accept their losses. IGA's Article 16 (1) states *in verbis:*

> "The objective of this Article is to establish a cross-waiver of liability by the Partner States and related entities in the interest of encouraging participation in the exploration, exploitation, and use of outer space through the Space Station. This cross-waiver of liability shall be broadly construed to achieve this objective".

Afterwards, Article 16(3) explains that the cross-waiver shall apply to any claims for damage, whatever the legal basis for such claims against: (1) another Partner State; (2) a related entity of another Partner State; and (3) the employees of any Partner State or related entity.

However, such a clause does not have any effect in terms of avoiding claims from natural persons. According to the Brazilian Constitution, for instance, any person is able to submit his claims to court. So, the IGA commitment is not extended to Brazilian citizens, including those who may be involved in space activities.

This is a rule that is true worldwide. It is important to remember that Article VIII (1) of the Liability Convention foresees that "*a State which suffers damage, or whose natural or juridical persons suffer damage, may present to a launching State a claim for compensation for such damage"*. Notice that a natural person may present a claim to any launching State and not necessarily to the one where he was born, has lived or has been working for. In this context, an employee from a subcontractor, for instance, may present a judicial claim against any Partner State; however, due to the "cross-waiver of liability" clause, if the Partner State is convicted, it may recover its losses through presenting an administrative or a judicial claim against the Partner State that was responsible for contracting that mentioned employee. Article 14 of the Implementing Arrangement established between the United States and Brazil also foresees the "cross-waiver of liability" clause in the same conditions as those, which were established in the IGA.

3. Intellectual Property Rights

Protection of intellectual property rights deserves special attention in bilateral and multilateral agreements.

Talking about this topic in the 2002 Protocol between China and Brazil, Prof. Zhao says that such Protocol

> "contains only simple wording, requiring future particular arrangements. Protection of intellectual property is critical to the success of the project, especially for those involved in research and development efforts through collaborative relationships. The creation, use, transfer, ownership and protection of intellectual property are of utmost importance to both parties. Accordingly, a detailed set of rules concerning intellectual property rights should be in place, pulling together the different national laws of both parties. Furthermore, both parties should also agree that they shall respect the proprietary rights in and the confidentiality of property identified and appropriately marked data and goods".

Article 12, §2º of the Treaty established between Ukraine and Brazil assures protection of the intellectual property rights of whatever is created while such Treaty is effective. However, according to Prof. Moserrat Filho

> "§1º states there shall be a legal exception extended to intellectual property rights registered by either country that pertain to activities outside the Treaty or that precede the Company's legal existence. These remain unchanged, and nothing in the Treaty can be construed as a concession or expectation of a concession of rights on invention, patents or anything else covered by intellectual property right laws".

Concerning property rights under the Implementing Arrangement signed between the United States and Brazil, Prof. Maria Helena states

> "NASA will respect proprietary rights in, and confidentially of, AEB's[14] appropriately marked data and goods to be transported on the space Shuttle. AEB may implement measures necessary to ensure confidentiality of AEB data passing through the ISS communications and data systems and other

[14] Brazilian Space Agency.

> communication systems being used in conjunction with the ISS. A clear policy for the proprietary information and intellectual property is one of the pillars and focal points for the use of the ISS".

Conclusions

Although the United Nations has encouraged international cooperation in space activities, it should be noted that developing countries have been facing obstacles to establish agreements with developed countries, especially in remote sensing area. According to INPE's Director of Earth Observation, Dr. Gilberto Câmara,

> "…the current trend in developed nations is to consider that their countries' taxpayers should not subsidize the use of spatial data by the developing nations. Therefore, such nations are increasingly dealt with as customers of the developed countries' commercial sector"[15].

Since the cooperation between developed and developing countries faces some obstacles, cooperation between developing countries that carry out space activities seems to be the best solution. The agreements that Brazil has signed with China and Ukraine may be considered good examples of such cooperation.

The development of a comprehensive national space legislation and the adherence to the United Nations Treaties on Space Law are other topics that deserves special attention in the question of international cooperation. These topics express the State's commitment with its space activities and with the international legal framework as well. National space law might set ceilings for insurance premium, and might establish criteria for protecting property rights, defining the applicable law, regulating liability to third parties and respecting the United Nations Treaties on Space Law.

Currently, space activities in Brazil are regulated by Directives from the Brazilian Space Agency. Of course, Brazil should be proud of having established rules that will be useful for developing space activities in its territory; however, the need to develop Brazilian space legislation still remains.

[15] In his paper "Frameworks for Sustainability of GIS and Earth Observation Technologies in Developing Countries", presented at the 18th International CODATA (Committee on Data for Science and Technology) Conference, Montreal, Canada, October 2002.

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Introduction

As most astronauts declare when they come back to Earth, our planet, our common spacecraft, planet Earth appears rather small and fragile from outer space. Space endeavour is mostly difficult and costly. Therefore, many programmes are the result of international cooperation. As Dr. Alvaro Fabricio dos Santos has highlighted in his outstanding presentation, cooperation may join States or private entities that may be organized under different legal frameworks. In Europe, the European Space Agency enables the European States to cooperate. This collaborative organization itself cooperates with others, for instance in the International Space Station programme. In the field of private activities, international cooperation is also a necessity. In the beginning, the international intergovernmental organization legal framework was used for cooperation in telecommunication. Although international cooperation remains, it is now changing to involve private entities.

Given the very wide extent of the issue and considering the very interesting remarks made by Dr. Álvaro Fabricio dos Santos, I will focus on a particular kind of cooperation: the cooperation between what is called for simplification "North" and "South", to avoid the disputable "developed" and "developing" countries terminology. In fact, the distinction between space faring countries and non-space faring countries may be more suitable, some States from the "South" being much more advanced that some from the "North".

In the first part of my exposé, I will indicate how space law supports international cooperation and in the second part, following a very useful remark by Dr. dos Santos, I will consider some legal problems arising from such cooperation.

I. Space law supports international cooperation.

This cooperation was of major importance during a time when few countries conducted space activities. In that respect, space law is unique when compared to other fields of international law.

As a professor of public international law formerly involved in the law of the sea, I was interested to compare the Montego Bay Convention with the space treaties. The most significant difference, as far as law-making process is concerned, is that the Montego Bay Convention deals with a domain where many activities have taken place for centuries. On the contrary, in 1963 at the time of the *Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space* and even in 1967 at the time of the Outer Space Treaty, a

few activities had taken place in outer space. From a legal point of view, this practical difference had an important consequence. In the law of the sea, the work of the law makers was mainly to codify a current common practice. In space law, this was not the case. Law makers had to propose rules *de lege ferenda*, having few possibilities to refer to current practice. The result was that, as proposed rules need a strong base, space law is very much oriented and based on ethical and moral principles. The proposed rules could not be based on common practices.

At the time of the treaties, only two States were conducting space activities. Currently, many countries, developed and developing, are involved in such activities. As far as space activities are concerned, this distinction does not seem to be relevant any more.

In order to be accepted by every State, the drafters wrote many provisions on international cooperation giving rights to non-space faring and developing countries. These rules still apply, and influence the way in which space activities should be conducted.

I will examine those legal principles in the context of technological cooperation. I will make a distinction between those providing non-space faring States with some benefits that may be considered as passive, and some whose application requires a more active cooperation.

1. The general aim of space activities: the benefit of all countries.

The main rules are already accepted in the 1963 Declaration, they are detailed in the 1967 Treaty in Article I:

> "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 (…)"[1]

This is the very first principle of space law, the first phrase of Article I of the fundamental treaty. The freedom of use is only in the second sentence. Of course, it means a lot, it is not only a principle like those referred to in the preamble, it is a legal and compulsory rule even if it may be subject to difficult interpretation. The reference to the *"degree of economic or scientific development"* of the countries indicates that it refers not only to non space faring countries but also and especially to developing countries.

The rule of non-appropriation of Article II is of course to be mentioned here as it prevents space faring States from appropriating outer space and celestial bodies by occupation, as recognized in general international law. This rule is accepted, but in some cases, it is not fully implemented especially in the case of the utilization of the geostationary orbit and radio frequencies.

Article III declares that activities shall be carried by States, "in the interest of maintaining international peace and security and promoting international co-operation and understanding".

The "Principles Relating to Remote Sensing of the Earth from Outer Space" recognize some rights for every State. Like any other space activity, remote sensing "shall be carried out for the benefit and in the interests of all countries".

Remote sensing activities shall be conducted on the basis of

[1] The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (the Outer Space Treaty) Article I.

> "…respect for the principle of full and permanent sovereignty of all States and peoples over their own wealth and natural resources… Such activities shall not be conducted in a manner detrimental to the legitimate rights and interests of the sensed State."[2]

The principle that all countries benefit permits countries to benefit in a passive way. Many other provisions give them, indeed, a much more active role.

2. A right to cooperate: exploration and use of outer space is under the responsibility of the entire humanity.

The first reference to an active role to be played by non-space faring or by developing countries in space activities is to be found in Article I, point I.

It is the well known but sometimes wrongly quoted "province of all mankind" principle. This Article does not deal with the status of outer space. It does not mean that outer space is the common province of mankind or "*apanage commun de l'humanité*". This Article deals with the "exploration and use" of outer space, which is recognised to be the "common province of mankind". Contrary to what is sometimes said, this Article does not qualify outer space, it qualifies indeed the "exploration and use", i.e. utilization of outer space. Then what does it mean?

If we look in the dictionary, we can find that either "province" in English or "*apanage*" in French may be used in two ways. According to the Oxford dictionary[3], "province" means first: "an administrative division of a country or State", which cannot obviously apply to "exploration and use". We have to go on reading and we find in point II of the same Article in the same dictionary: "The sphere of action of a person or body of persons, duty, office, business, function, department". This figurative meaning is the right one here.

If we have a look up the French word: "*apanage*", we also find both meanings. One refers to a territory, the other one, figurative, refers to "ce qui est le propre de quelqu'un"[4].

The Spanish text uses a quite different wording.[5] It does not qualify "exploration and use" by a noun but by a verb. This text that has the same value as the other four[6], clarifies the situation:

> "La exploracio y utilizacion del espacio ultraterrestre … incumben a toda la humanidad". It clearly means that exploration and use is incumbent to humanity, in other words: is the business of humanity, in practical terms is the business of every State.[7]

This principle, which is in the first phrase of the Treaty, means that every State has the right and certainly the duty, to care the "exploration and use of Outer Space". This rule renders the

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[2] Principles Relating to Remote Sensing of the Earth from Outer Space (Principle IV)
[3] Oxford English Dictionary in 12 volumes; Volume VII Oxford Clarendon press 1961
[4] (Dictionnaire le Robert tome 1)
[5] So does the Portuguese text*: "e são incumbência de toda a humanidade".*
[6] The English, Russian, French, Spanish and Chinese texts of the OST are equally authentic
[7] Spanish: incumbir: to be the duty of, to concern somebody (Collins and Harper N.Y. 2003.
Portuguese: incumbir (Grande Dictionario Portuuês-Francês Bertarnd Lisboa 1953.)
English: to incumb, to be incumbent. Incumbent : resting or falling upon a person as a duty or obligation from latin: Incumbere.

United Nation General Assembly and its subsidiary organs to be at the centre of developing international space law.

In many occasions, the treaties stress the obligation to enter into cooperation.

In the following text, the Outer Space Treaty goes further with principles supporting international cooperation. It is the case in Article 1, which affirms that "States shall facilitate and encourage international co-operation in such [scientific] investigation".

Article IX sets important obligations in favour of all States. Activities

> "…shall be guided by the principle of co-operation and mutual assistance" and "with due regard to the corresponding interests of all other States Parties to the Treaty".

Articles X and XI recognize the right to observe the flight of space objects and to be informed about these activities.

In the "Principles Relating to Remote Sensing of the Earth from Outer Space", international cooperation is very much supported. A general rule is set by principles V, VI and VII..

Principle XII recognizes some special rights of the sensed State. It shall have access to primary and processed data "on a non-discriminatory basis and on reasonable cost terms".

Principle XIII considers the obligation of States carrying out remote sensing to enter into consultations with sensed States, especially developing countries,

"…in order to make available opportunities for participation and enhance the mutual benefits to be derived there from".

Of course, the obligation to cooperate is something that is difficult to consider as a legal obligation, nevertheless, it is such an obligation, and in accepting it a State must apply it in good faith like any other legal obligation. This is the well-known distinction between "*pactum de contrahendo*", namely the obligation to conclude agreements, and "*pactum de negotiando*", that is the obligation to negotiate future agreements[8].

II. Legal problems arising from international cooperation

Space law poses some legal problems when cooperation takes place. As Dr Dos Santos very clearly pointed out, this issue is important. To simplify, we can say that cooperation gives every State the possibility to enter into space activities. This is very much in accordance with the principles of space law, but from a legal point of view, it may also pose some problems.

Entering into a space-related cooperation, a State may become responsible for a "national activity" according to Article VI of the Outer Space Treaty. It may therefore have to authorize and continually supervise this activity. As Article VI clearly declares, this responsibility exists if

[8] On the issue of differences and effects of *pacta de contrahendo* and *pacta de negotiando* see*:* Antonio Cassese*, The Israel-PLO Agreement and Self-Determination,* European Journal of International Law. *Vol. 4 (1993) No.4.,* http://www.ejil.org/journal/Vol4/No4/art7-01.html: L. Marion, *La notion de `pactum de contrahendo' dans la jurisprudence internationale*, 78 *RGDIP* (1974) 351; P. Reuter, *Droit international public* (7th ed., 1993) 48, 128.

the State conducts the activity through its governmental agency, but also if its private entities do so. States must be aware of the important and very original obligations of Article VI, which assimilates private activities into governmental activities of the State of nationality of the actor. This should prevent States from giving their nationality, too easily, to companies conducting activities in outer space. The technique known as "flags of convenience" or "registration of convenience" has no future in space if States are aware of the rules of space law. If they are not, they will be at risk of being responsible for activities they cannot control. Meetings such as those organized by the Office for Outer Space Affairs are very useful in that respect.

Entering into a space-related cooperation, a State may become liable for damages caused by a space object in its capacity as a launching State, according to Article VII of the Outer Space Treaty and to the Liability Convention. This liability is particularly heavy when the damage is caused to persons on Earth. I do share the concern often expressed by the Brazilian delegation to the United Nations Committee on the Peaceful Uses of Outer Space on that issue. In some cases, the current mechanism established to protect the potential victims on Earth may be unfair to some States. It is specially the case for the State or territory, which is sometimes involved only a little in the activity but is nevertheless responsible for the whole activity. As I have already had the opportunity to propose, I think there is a solution, which is acceptable and does not put the whole system at risk. States should consider passing agreements such as those referred to in Article V of the Liability Convention:

> "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"...

I understand that it may be difficult in some cases to discuss sharing the risk for every operation; this is the reason why I suggest that some standard agreements should be agreed upon on a general basis between potential launching States. For the time being it should be possible to create an international group of experts to propose such standard agreements. Such texts may detail the repartition of the burden of the risk among launching States, for instance according to every phase of space activities.

An other point that had been highlighted in the presentation by Dr. dos Santos is the liability between States taking part in a common activity. Systematic waivers of liability may be used as noted by Dr. dos Santos.

Conclusions

As a conclusion, I will not come back to summarize these short remarks on space cooperation. I would like to make a proposal in order to ease international cooperation, particularly with regard to space activities for developing countries. The main problem is of course the money that is needed. Even if they may be very efficient, space techniques are usually expensive.

My proposal follows a common proposal that has been made a few weeks ago by President Lula da Silva of Brazil, President Ricardo Lagos of Chile, UN Secretary-General Kofi Annan and President Chirac of France. They tried to find a way to obtain money to improve international cooperation and economic development.

I would propose a way to acquire that money. Radio frequencies and orbital positions are common resources. They are considered as "*res communis*", i.e. every body can use them but nobody can appropriate them or "abuse" them, for instance through selling. The fact that many States receive them for free, then sell them for a large amount of money, seems shocking to me. My proposal is that, when frequencies or orbital positions are sold, the money should be given to an international fund that may subsidize the development of less developed countries in particular to reduce the digital divide.

Space Law and the World Launching Industry

Space Law and Launching Industry in the Russian Federation and the Republic of Kazakhstan

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Introduction

The Russian Federation, Ukraine and Kazakhstan are the main successors of the former Soviet Union's space potential. The space activity in the USSR was framed on the united all-Union national economic complex. Most of the Union's republics had their own segment in this complex. At the same time, none of those republics executed the complete cycle of the space activity. During the production of space parts, the execution of scientific research, the organization of space launches and the maintenance of space infrastructure, the republics acted as "small screws of the united machine" managed by the general centre. Such an approach was also spread over property relations including the intellectual property existing in the space industry. It was united and indivisible.

The Soviet legislation regulating space activities should be especially highlighted. This legislation was exceptionally all-Union. When the system of legislation in the USSR as a whole was formed by the Union-Republic principles (for instance, basic legislation was adopted at the level of the USSR and formed the legislation of the union republics), the space system was one of the few sectors related to exclusive control of the USSR through the highest bodies of the government and management. It was natural that under such conditions State control in the appropriate sphere was conducted only by federal ministries.

Such an approach caused difficulties for the new independent States after the collapse of the USSR because of the necessity to divide space property of the former Soviet Union and to form systems of legislation and public administration for the industry.

I. Principle of the division of the Soviet Union space property

While determining the legal consequences arising from succession, States after the collapse of the USSR were guided by the Vienna Convention on Succession of States in respect of State Property, Archives and Debts dated 31 December 1983, which determined the general principle applying to the division of State property of the predecessor State.

Applying appropriate rules of international law to dividing the former Soviet Union's property and also taking into account the fact that successor States were new independent States, ownership of State immovable property of the predecessor State (the USSR), located on the territory being the object of succession, was transferred to the successor State.

[*] At the workshop the paper was presented by Mr. Olexandr Serdyuk on behalf of Ms. Malysheva.

Appropriate legislation was also adopted in the new independent States, especially in Ukraine. The Decree of the Supreme Council of the Ukrainian Soviet Socialist Republic (SSR) on 6 June 1991 "On Transfer under the Ukrainian SSR's Jurisdiction of State Enterprises and Organizations of Union Subordination Located on the Republic's Territory" determined that State enterprises and organizations of the Union subordination located on the republic's territory should be transferred under Ukrainian jurisdiction.

At the same time, property and financial resources of enterprises, institutions, organizations and other objects of the Union Subordination, located on the Ukrainian territory, should became the State property of Ukraine (the Law of Ukraine, dated 10 September 1991 "On Enterprises, Institutions and Organizations of the Union Subordination Located on the Territory of Ukraine"; the Decree of the Presidium of the Supreme Council, dated 30 September 1991 "On Transfer of Enterprises, Institutions and Organizations of the Union Subordination Located on the Territory of Ukraine into the State Property").

Similar acts were adopted both in the Russian Federation and Kazakhstan.

According to the analytical report "Ukraine and Russia: the Modern Situation and Prospective of Mutual Relations" prepared by Razumkov's Centre on 1 May 2001, outer space exploration activity directly involves 140 enterprises and institutions, employing 200,000 people. At the same time, Ukraine inherited almost one third of the space industry of the former USSR.

Confirming the necessity to regulate the law of property as the base for establishing full-fledged intergovernmental relations, the Treaty on Mutual Recognition of Rights and Regulation of Property Relations was concluded in Bishkek by the States - participants of the Commonwealth of Independent States (CIS), on 9 October 1992. The Treaty determines that sides should mutually recognize the transfer of the ownership exercised in accordance with their national legislation including financial resources, enterprises, institutions, organizations, their building blocks and units of former union subordination located on each side's territories. Each side of the Treaty recognizes ownership of the other side, its citizens and legal entities related to enterprises, institutions, organizations and other objects (subsidiaries, shares, stocks and other property), being on 1 December 1990 under control of the governments of the other republics of the USSR and being the property of other legal entities and natural persons.

Issues concerning usage of intellectual property over objects of the former USSR were solved in a certain way. Appropriate issues were settled on the basis of bilateral intergovernmental agreement. Therefore, the Agreement between the Government of Ukraine and the Government of the Russian Federation on Collaboration for Protection of Industrial Property dated 30 June 1993 contained the rule that foresaw the so-called "right of Parties for prior use". In accordance with that right, both Parties recognized that any natural person or legal entity that has been *bona fide* using the invention (industrial design) or made necessary preparation for it before the date of presenting application to issue national patent in accordance with the application to issue certificate of authorship (certificate) of the USSR or in accordance with certificate of authorship (certificate) of the USSR for interest of its business in Ukraine or in the Russian Federation, has a right to keep the invention (industrial design), using invention (industrial design) or use it in accordance with such preparations without conclusion of licensee agreement. At the same time, the relevant body pays in full to authors of inventions (industrial design) a reward in accordance with the legislation of the State where such usage or preparations have taken place.

II. The modern State of the space complex in the Russian Federation, Ukraine and the Republic of Kazakhstan

After the collapse of the USSR, newly formed States managed to preserve the potential of the space industry. The Russian Federation, Ukraine and the Republic of Kazakhstan continued within their national bounds what had started in the USSR, first of all – the transfer of the space industry into the civil sector of economy and the expansion of international collaboration in the sphere of space exploration.

1. The Russian Federation

The Russian Federation was and remains the leader of the space industry not only on the post-soviet territory but in the world.

Russian orbital spacecraft constellations perform a number of important tasks in the social and economical spheres (satellite communication, TV-broadcasting, navigation, monitoring of natural resources, Earth remote sensing, fundamental space research, etc).

More than 100 successful space launches were carried out from Russian territory since 1992. An intensively developing area of the Russian Federation space activity is the injection of foreign payloads by Russian launch vehicle. The Russian Federation gained great scientific and technical experience in manned space programmes. Russian enterprises take part in many international space projects including commercial ones. The Russian Federation has a segment in the International Space Station (ISS), which is planned to be prepared for research activities by 2006.

2. Ukraine

Since its independence, Ukraine managed not only to keep but also expand the potential of its space industry. Independently and in cooperation with the Russian Federation, Ukraine updates and develops such world-known launch vehicles as “Zenith”, “Cyclone” and “Dnepr”. More than 100,000 people work in the space industry of Ukraine. Since 1991 more than 70 successful launches of carrier rockets produced by the Ukrainian enterprises have been made. Ukraine is a participant of many international space projects.

The space industry of Ukraine involves more than 100,000 people. The Ukrainian space industry is among a few branches of national economics that already has rather considerable export potential (more than 50% of space industry product are exported).

3. Kazakhstan

At the present time, the space complex of Kazakhstan is a structure, which performs activities on research and uses of outer space, the implementation of space equipment and technology, and commercial launch services. The space industry of the country consists of the Baykonur Space Centre (which was rented by the Russian Federation for 20 years in 1994) and some industrial enterprises and research and development centres and organizations directly or indirectly related to space activities.

Kazakhstan together with the Russian Federation, Ukraine and other States participate in the development and realization of some space projects.

III. International legal status of the Russian Federation, Ukraine and the Republic of Kazakhstan, participating in the development of International Space Law under the aegis of the United Nations

All three States are members of the United Nations (UN). The Russian Federation became a UN-member as successor to the Soviet Union. Ukraine gained this status in October 1945 as the Ukrainian SSR i.e. the subject of the federative State. Having become independent, Ukraine made its declaration about its succession of international obligations taken by the Ukrainian SSR. Kazakhstan became a member of the UN after having gained its independence in March 1992.

Together with the Russian Federation, Ukraine and Kazakhstan are members of the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS): Kazakhstan and Ukraine, since 1994, the Russian Federation, as the successor to the Soviet Union, since 1958.

In the framework of the UN Committee on the Peaceful Uses of Outer Space and its two Subcommittees (Legal and Scientific and Technical), the activities of all three States consecutively support strict adherence to the established international legal order, particularly, international legal procedure relating to space activities. The basis of these activities was formed by five UN international treaties. The Russian Federation and Ukraine have ratified four of them: the Outer Space Treaty, the Rescue Agreement, the Liability Convention and the Registration Convention. In 1997, the Republic of Kazakhstan joined indeed the five United Nations treaties on outer space, including therefore the Moon Agreement.

Our delegations to the Legal Subcommittee of the COPUOS, concurrently announced for codification of international space law and the drafting of a universal Convention on Space Law, believing that this way corresponds to the times and allows the rise of international space law to the quality level of development. At the same time our delegations support preservation of existing international legal procedure of space activity that is supposed to be a basis for future codification.

IV. National Space Legislation

Due to the rapid development of commercial space activities of the Russian Federation, Ukraine and the Republic of Kazakhstan, the appearance of non-governmental subjects in such activities and the expansion of international cooperation of these States, an urgent need has arisen to regulate the relations of States and other subjects in these activities and the development of national space legislation.

Such legislation is formed in the Russian Federation, Ukraine and the Republic of Kazakhstan.

At the same time, the basic laws determining the basis for the regulation of space activity in the Russian Federation and Ukraine were adopted. This is the Law of the Russian Federation “On Space Activity” dated 20 August 1993 and the Law of Ukraine “On Space Activity” dated 15 November 1996. These Laws with the subsequent amendments (last amendments to the Law of the Russian Federation “On Space Activity” were made on 22 August 2004 and they will come into force on 1 January 2005) determine the common legal basis for space activities on the territory of the State and under its jurisdiction beyond its bounds. Regulations of these Laws are extended to all kinds of activities related to the exploration and uses of outer space. In Kazakhstan a special law is being drafted.

All three States established special bodies for the management of space activities. They are:

- The Federal Space Agency of the Russian Federation (Governmental Decree of the Russian Federation dated 26 June 2004, No.314 "On approval of Federal Space Agency regulation");
- The National Space Agency of Ukraine (established in accordance with the Decree issued by the President of Ukraine "On establishment of the National Space Agency of Ukraine", dated 29 February 1992, No. 117, legal status is determined by the Decree issued by the President of Ukraine "On Regulation of National Space Agency of Ukraine", dated 22 July 1997, No. 665/97);
- The Aerospace Committee of the Ministry of Education and Science of the Republic of Kazakhstan (established on the basis of the Decree issued by the President of the Republic of Kazakhstan No. 1449, dated 29 September 2004 "On measures for further improvement of the public management system of the Republic of Kazakhstan", by reorganization of the Ministry of Education and Science of the Republic of Kazakhstan and joining Aerospace Committee of the Ministry of Transport and Communication of the Republic of Kazakhstan).

Space activities in the Russian Federation and Ukraine are carried out on the basis of National Space Programmes. The National Space Programme of Ukraine has been drafted on a five-year work plan basis and approved by the Supreme Council of Ukraine, upon submission of the Cabinet of Ministers of Ukraine. The current National Space Programme was approved by the Law of Ukraine on 24 October 2002.

The Federal Space Programme of Russia for 2001-2005 was approved by the Governmental Decree of the Russian Federation on 30 March 2000, No. 228.

Space activities of the Republic of Kazakhstan are carried out in accordance with the concept of the development of a space branch for the Republic of Kazakhstan, developed in 1998. The Draft of the State programme "Development of the Outer space branch of Republic of Kazakhstan for 2005-2007" is under development.

All three States have adjusted the matters of space activity licensing. Thus the Federal Law of the Russian Federation "On licensing of specific activities", dated 8 August 2001, indicated that space activities in the Russian Federation are subject to licensing. The order of such licensing has been adjusted by the Governmental Decree of the Russian Federation on 14 June 2002, No. 422 "On approval of regulation for space activity licensing". This Decree foresees that space activities, including the development and production of space equipment and infrastructure, spacecraft launches and flight control, utilization (operation) of space equipment, space technology and information obtained by space facilities; services on development, launch and utilization (operation) of space equipment; receipt, processing and dissemination of information obtained from Earth remote sensing spacecrafts, are subject to licensing.

The Law of Ukraine "On the Licensing of specific economical activity" dated 1 June 2000 foresees that development, testing, production, operation of launch vehicles, spacecraft and their components, ground space infrastructure and its parts, equipment being a space segment of satellite systems, is subject to licensing (Paragraph 22 of Article 9).

All kinds of space utilization activities, including development, production, operation, repair and updating of space equipment, utilization of ground infrastructure for activities support (range, command and control system, stands, etc.) in the Republic of Kazakhstan are subject to licensing on the basis of Article 9 of the Law of the Republic Kazakhstan dated 17 April 1995,

No. 2200 “On licensing”. The procedure of issuing licenses for carrying out of this activity has been established by the Governmental Decree of the Republic of Kazakhstan dated 21 March 2000, No. 431 “On approval of Rules of issuing of licenses for carrying out of activity related to utilization of outer space by legal and physical bodies.”

A considerable number of regulations in the legislation of the Republic of Kazakhstan and in bilateral Russian-Kazakhstan agreements is composed of statements regulating the status of the Baykonur Space Centre, the ecological aspects of space activities in this area, the legal regime for utilization of land and other natural resources, the administrative control over utilization of the space centre by the Government and authorized bodies of the Republic of Kazakhstan. These statements were adopted in accordance with the Agreement between the Russian Federation and the Republic of Kazakhstan on General Principles and Conditions of Utilization of the Baykonur Space Centre, dated 28March 1994, which foresees the transfer of the Baykonur Space Centre objects from the Republic of Kazakhstan to the Russian Federation. The Republic of Kazakhstan reserves a right for the Russian Federation to use the land occupied by the objects of the Baykonur complex and the areas provided for the separated parts of a launch vehicle to fall.

V. Participation in international space projects and programmes

1. The joint Ukrainian-Russian project – launch and operation of “Sich-1M”spacecraft for the Earth remote sensing

This project foresees the development of the Sich-1M space system for the Earth remote sensing as part of a system for the monitoring and ecological control of environment. Nowadays a series of activities is performed for the launch of the spacecraft and its further operation in December 2004. Preparation of the Cyclone-3 Launch Vehicle, a spacecraft with onboard devices with high-resolution characteristics, ground systems for control, receipt and processing of information, launch and technical systems on Plesetsk Space Centre, is almost finished. The Microsputnik satellite is planned to be launched together with the Sich-1M satellite. Devices for Earth remote sensing, oceans, study of geology, climate and ecology, will be also installed onboard of the spacecraft.

2. Ukrainian-Russian-Kazakhstan Dnepr programme

Between 1997-2004, the joint Ukrainian-Russian-Kazakhstan Dnepr programme for the launch of satellites using the Dnepr launch vehicle is being carried out. Dnepr is the conversion variant of the SS-18 intercontinental ballistic missile. There have already been 4 orbital launches of this launch vehicle made from the Baykonur Space Centre and the general amount of injected satellites was 20. Space companies from the UK, USA, Italy, Saudi Arabia, Malaysia and Germany were the clients. Contracts and treaties for launch services are concluded with famous companies and organizations such as Astrium (Germany), CNES (France).

The presence of a considerable fleet of Dnepr launch vehicles (about 150 units), a considerable term of guaranteed use (until 2020), infrastructure of technical and launching complexes on the Baykonur Space Centre, fall areas for detached parts of launch vehicles, a surface measuring complex, and the existing cooperation of developers enterprises, guarantee the stability of launch services.

3. International Sea Launch Space Project

In the framework of the realization of the international Sea Launch Project in May 1995, enterprises from Ukraine, the Russian Federation, the United States of America and Norway have established the company named Sea Launch.

Nowadays, the project is at the stage of practical realization. Yuzhnoye State design-office and Yuzhmash (Ukrainian participants) produced and delivered to the base port of Long Beach (USA) 16 Zenith-3SL Launch Vehicles. 14 launches of these launch vehicles with spacecraft on board were fulfilled.

4. Project for the establishment of Space Rocket Corporation of UEA member States and realization of Clipper-Zenith Project in the framework of UEA

At the summit of UEA member States held in September 2004 in Astana (Kazakhstan), the principle decisions on the preparation of documents for the establishment of the Space Rocket Corporation were taken. It is foreseen that the Corporation will be formed by leading enterprises of the space industry of Ukraine, the Russian Federation, the Republic of Byelorussia, and the Republic of Kazakhstan. Nowadays, proposals concerning the structure of corporate management, which is the main area of its activity as well as projects including intergovernmental treaties, constituent agreements and statutory documents of the Corporation, are being prepared.

One of the general projects of the future Corporation foresees the development of multiple launches of the Clipper-Zenith Piloted Space System, that is the great mission that cannot be performed by any State separately. The launch Clipper Piloted Space System is supposed to be executed by the Zenith-M Space Launch System located on the Baykonur Space Centre.

5. Project of long-term cooperation between Ukraine and the Federation of Brazil on utilization of the Cyclone-4 Launch Vehicle at the Alcantara Launch Centre and legal aspects of its realization

This project is carried out on the basis of the Treaty between Ukraine and the Federative Republic of Brazil on Long-Term Cooperation in Utilization of the Cyclone-4 Launch Vehicle on Alcantara Launch Centre dated 21 October 2003. The subject of the Treaty is the development of the Cyclone-4 Launch Site at the Alcantara Launch Centre and the provision of launch services in the interests of national programmes of the parties and commercial customers of launch services. By now, the Treaty has already been ratified by both parties and has come into force in accordance with the Article 17.

According to Article 9 of the Ukraine Constitution and Article 17 of the Law of Ukraine “On international agreements of Ukraine”, international agreements of Ukraine concluded and properly ratified are integral parts of the national legislation of Ukraine and are applied in the manner foreseen for the norms of the national legislation.

Therefore, the terms of this Contract have already become part of the legislation of Ukraine and are obligatory for fulfilment. Moreover, in cases where an international agreement of Ukraine concluded in the form of a law (as in this case) establishes regulations different to those foreseen by the national legislation of Ukraine, the regulations of the international agreement of Ukraine are applied. Otherwise, the Ukrainian national legislation establishes the priority of international agreements norm over national norm if they contradict each other.

In regards to the abovementioned, the Ministries and other State executive bodies of Ukraine responsible for issues regulated by the Treaty, provide fulfilment of obligations taken by the Ukrainian Party under the Treaty and control execution of rights arising from the Treaty for the Ukrainian Party (Article 14 of the Law of Ukraine "On international agreements").

According to the terms of the Treaty, a Ukrainian-Brazilian Alcantara Cyclone Space joint venture is to be appointed as responsible for development and operation of the Cyclone-4 Launch Site at the Alcantara Launch Centre.

In order to realize the subject of the concluded Treaty the Parties have distributed duties (Article 5 of the Treaty). So, the Ukrainian Party provides development of the Cyclone-4 LV, its units and assemblies, its complex test, the preparation of the production facility on request from Alcantara Cyclone Space, technological electromechanical model of the Cyclone-4 LV for tests and first pilot model of the launch vehicle. The Brazilian Party develops the general infrastructure of the Alcantara Launch Centre in accordance with the technical requirements of general infrastructure required for launches of the Cyclone-4 LV.

Besides, each Party to the Treaty is supposed to provide required financing of its obligations (Article 8 of the Treaty), namely: a) the Ukrainian Party – financing of the development of the Cyclone-4 LV, its units and assemblies, complex tests and the preparation of production facility; b) the Brazilian Party – financing of development of the general infrastructure of the Alcantara Launch Centre in accordance with the technical requirements of the Cyclone-4 extraterrestrial Space Launch System.

The Treaty determines the general legal framework for the international cooperation. At the same time a series of legal issues are required to be developed and reflected both in bilateral Statements (additional agreements to the Treaty), statements of interpretation and in national legislation of both countries.

So, property relationships, which appear in the process of the Launch Site development, will be determined taking into account provisions of the Treaty on the basis of specific contracts (agreements) concluded between the joint venture and shareholders (partners) of the enterprises, and the By-laws of the joint venture. It is necessary to note that some agreements concerning the settlement of corresponding issues between the enterprises of Ukraine and Brazil have already been concluded. However, as the joint venture will carry out its activity on the territory of the Federal Republic of Brazil and under its jurisdiction, the issue of the application of Brazilian legislation, which does not always provide access to Ukrainian lawyers, is a problem. This also concerns access to the legislation of Brazil regulating not only ownership issues but also the legal procedure of foreign investments, the legal status of the Ukrainian staff of the future joint venture which is incorporated according to the legislation of Brazil, the mechanism for dispute settlement and arbitration, guarantees for the protection of intellectual property rights, and others.

The investment refund mechanism for Alcantara Cyclone Space Joint Venture for development of the Launch Site and protection of intellectual property rights during realization of the Cyclone-4 project, foresees development of additional agreements.

I would like to express some concerns on the second aspect.

The Treaty determines the main principles of appearance, distribution and protection of intellectual property rights developed in the process of cooperation, admittance and protection of

rights for objects of intellectual property developed and registered earlier or as a result of independent researches but used for realization of the Treaty's goals.

The object of intellectual property is recognized to be the result of independent research and its rights are not subject to be allotted to the Parties of the Treaty if it were developed beyond the framework of joint activity and registered before the organization of the bilateral Ukrainian-Brazilian Alcantara Cyclone Space Joint Venture. The objects of intellectual property, the right for which are not subject to be allotted are, first of all, ones that in the aggregate make up the Ukrainian Cyclone-4 LV and its possible modified version. Nevertheless, Alcantara Cyclone Space gets an exclusive right to carry out commercial launch services using Cyclone-4 LV.

The objects of intellectual property rights, which are subject to common or agreed use and assignment are, first of all, those foreseeable ones developed in the process of the Cyclone-4 Launch Site construction (totality of technical complex of the Cyclone-4 LV, technical complex of a spacecraft, main block and starting complex), and those that will be developed as a result of the Cyclone-4 LV use at Alcantara Launch Centre and in the process of rendering services in the interests of the national space programmes of Ukraine and Brazil and also the commercial customers of launching services. The bilateral Ukrainian-Brazilian Alcantara Cyclone Space Joint Venture is responsible for the development and operation of the Cyclone-4 Launch Site on the Alcantara Launch Centre and obtains an exclusive right to use the Launch Site for the period of the Treaty's validity.

The subjects of proprietary rights for the mentioned objects of intellectual property are the Parties to the Treaty, if they do not transfer their powers in accordance with an Alcantara Cyclone Space special agreement. The transfer of results of common research to a third party can be an object of agreement between the Parties or corresponding organizations-participants of cooperation (NSAU and AEB).

At the same time, the obligation to provide protection to intellectual property, acquired in the process of activity in the framework of the Treaty, is imposed on Alcantara Cyclone Space.

Regulation concerning intellectual property stated in the Addendum to the "Framework Agreement between the Government of Ukraine and the Government of the Federal Republic of Brazil on Cooperation for Peaceful Uses of Outer Space" dated 18 November 1999, and additional special agreements concluded in case of necessity between authorized bodies, apply to intellectual property acquired in the framework of joint activity after the incorporation of the Alcantara Cyclone Space.

Unless the Parties to the Treaty, their executive bodies and common programmes determine others conditions, rights for the objects of intellectual property developed in the framework of cooperation will be allotted in accordance with the economic, scientific and technical contribution of each Party to the development of this intellectual property.

These and other legal matters that will obviously arise in the process of the Treaty implementation are to become a subject of common discussion between Ukrainian and Brazilian lawyers.

The Ukrainian Party considers the corresponding project to be a priority space project for Ukraine and is ready to do its best to provide its successful realization for the benefit of both space programmes of Ukraine, Brazil and third parties – customers of launch services.

Conclusions

Space activity of three States, main successors of former USSR' space industry, consistently develops in many areas such as in the space industry, scientific research of fundamental and applied character, and the development of the launching industry. The role of these States increases in international co-operation in the area of the exploration and peaceful use of outer space.

In their activities, the States get support from international space law, consistently developing national space legislation that becomes a part of the structure of the national legal systems of these countries.

SPACE LAW and LAUNCHING INDUSTRY IN UKRAINE, the RUSSIAN FEDERATION and the REPUBLIC of KAZAKHSTAN

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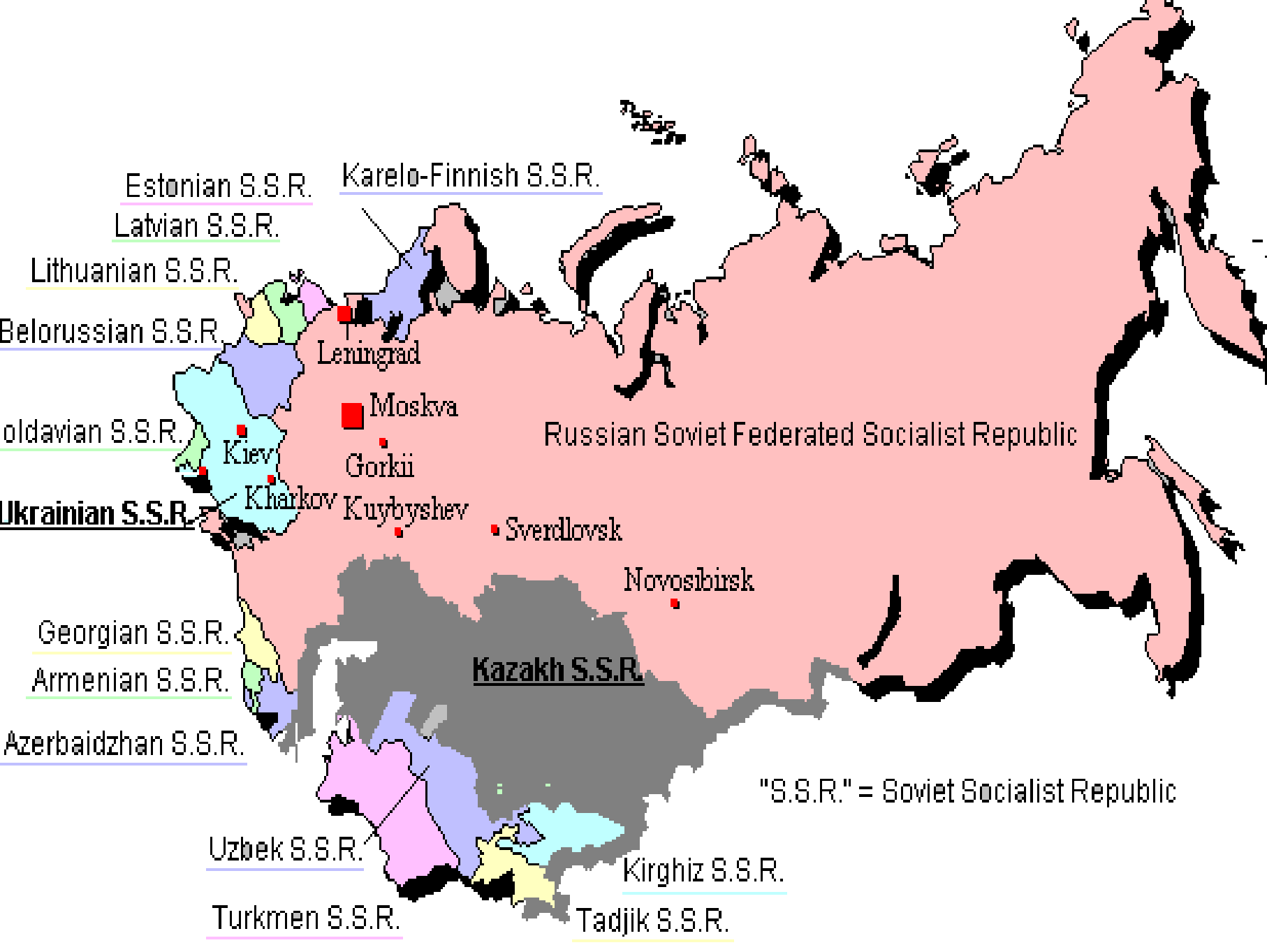
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Moskva
oldavian S.S.R.
Kiev
Gorkii
Kharkov
Kuybyshev
Ukrainian S.S.R.
Sverdlovsk
Russian Soviet Federated Socialist Republic
Novosibirsk
Georgian S.S.R.
Kazakh S.S.R.
Armenian S.S.R.
Azerbaidzhan S.S.R.
"S.S.R." = Soviet Socialist Republic
Uzbek S.S.R.
Kirghiz S.S.R.
Turkmen S.S.R.
Tadjik S.S.R.

Russian Federation, Ukraine and the Republic of Kazakhstan as the main successors of soviet space potential

- The Russian Federation, Ukraine and Kazakhstan are the main successors of the Soviet Union's space potential. The space activity in the USSR has been formed in the frame of the united all-union national economic complex. Most of union's republics had their own segment in this complex. At the same time none of these republics executed the complete cycle of the space activity. During production of space produce, execution of scientific researches, organization of space launches and maintenance of space infrastructure republics acted as "small screws of the united machine" managed by the general center. Such approach has been also spread over property relations including intellectual one existing in space industry. It was united and indivisible.

Russian Federation, Ukraine and the Republic of Kazakhstan as the main successors of soviet space potential

- The soviet legislation regulating space activity should be highlighted especially. This legislation was exceptionally all union. When the system of legal control in the USSR as a whole has been formed Union-Republic principles (i.e. basic legislation acts have been adopted at the level of the USSR and concretized in the legislation of union republics), the space system was one of the few sectors related to exclusive control of the USSR in the person of its highest bodies of the government and management. It was natural that under such conditions the public administration in appropriate sphere was conducted only by federal ministries.
- Such approach caused difficulties raised against new independent states after collapse of the USSR related with necessity to divide space property of the former union state and to form systems of legislation and public administration of the industry.

Principle of the division of the Soviet Union space property

- While determining legal consequences of use of institute of the succession, states appeared after the collapse of the USSR were guided by Vienna Convention on Succession of State Related with State Ownership, State Archives and State Debts dated December 31, 1983 which determined the general principle of division of state ownership of state-predecessor.
- Applying appropriate rules of the international law in respect of division of the Soviet Union ownership and also taking into account the fact that states-successors are new independent states, state immovable of the state-predecessor (the USSR) located on the territory being the object of succession should be preceded to the state-successor.

Principle of the division of the Soviet Union space property

- Appropriate legislation has been adopted also in new independent states, especially in Ukraine. The Decree of the Supreme Council of the Ukrainian SSR on June 6, 1991 “On Transfer under the Ukrainian SSR’s Jurisdiction of State Enterprises and Organizations of Union Subordination Located on the Republic’s Territory” has determined that state enterprises and organizations of the Union subordination located on the republic territory should be transferred under Ukrainian jurisdiction.
- At the same time property and financial resources of enterprises, institutions, organizations and other objects of the Union subordination located on the Ukrainian territory should became the state ownership of Ukraine (the Law of Ukraine dated September 10, 1991 “On Enterprises, Institutions and Organizations of the Union Subordination Located on the Territory of Ukraine”, the Decree of the Presidium of the Supreme Council dated September 30, 1991 “On Transfer of Enterprises, Institutions and Organizations of the Union Subordination Located on the Territory of Ukraine into the State Ownership”).
- Similar acts were adopted both in the Russian Federation and Kazakhstan.

Principle of the division of the Soviet Union space property

- According to analytical report "Ukraine and Russia: the Modern Situation and Prospective of Mutual Relations" prepared by Razumkov's Center on May 1, 2001, activity concerning outer space exploration involves 140 enterprises and institutions directly, which provide with work 200 thousands people. At the same time Ukraine inherited almost one third of the space industry of the former USSR.
- Confirming the necessity to regulate the law of property as the base for establishing value intergovernmental relations, on October 9, 1992 the Treaty on Mutual Recognition of Rights and Regulation of Property Relations was concluded in Bishkek by the states - participants of CIS. The Treaty determines that sides should recognize mutually the transfer of the ownership exercised in accordance with their national legislation including financial resources, enterprises, institutions, organizations, their building blocks and units of former union subordination placed on the territories of sides. Each Side to the Treaty recognizes ownership of other Side, its citizens and juridical persons related with enterprises, institutions, organizations and other objects (branches, shares, stocks and other property) been on December 1, 1990 under the control of the governments of other republics of the USSR and been the property of other juridical and physical persons.

Principle of the division of the Soviet Union space property

- Questions concerning usage of intellectual property objects of the former USSR were solved in certain way. Appropriate questions were settled on the basis of bilateral intergovernmental agreement. So, the Agreement between the Government of Ukraine and the Government of the Russian Federation on Collaboration for Protection of Industrial Property dated June 30, 1993 contained the rule that foresaw so-called “right of Parties for prior use”. In accordance with it both Parties recognized: any physical or juridical person who have been using bona fide for interest of his business in Ukraine or in the Russian Federation the invention (industrial design) or have made necessary preparation for it before the date of presenting application to issue national patent in accordance with the application to issue certificate of authorship (certificate) of the USSR or in accordance with certificate of authorship (certificate) of the USSR, have a right to keep using invention (industrial design) or use it in accordance with such preparations without conclusion of licensee agreement. In the same time mentioned person pays in full to authors of inventions (industrial design) reward in accordance with the legislation of the state where such usage or preparations have taken place.

The modern state of the space complex in the Russian Federation, Ukraine and the Republic of Kazakhstan

- After the collapse of the USSR newly formed states were good to preserve the potential of the space industry. The Russian Federation, Ukraine and the Republic of Kazakhstan continued in their national limits what had started in the USSR, first of all – the conversion of the space industry changing it into civil sector of economy the expansion of international collaboration in the sphere of the space developing.

a) the Russian Federation

- This State was and stays the leader of the space industry not only on post-soviet territory but in the world.
- The orbiting group of spacecrafts being exploited by Russia executes a number of important tasks in social and economical sphere (satellite communication, TV-broadcasting, navigation, monitoring of natural resources, Land remote sensing, fundamental space researches and so on).
- Since 1992 more than 100 successful space launches were fulfilled from the Russian territory. The direction of the space activity of the Russian Federation which is developing intensively is injection by Russian launch vehicle of foreign pay load. The Russian Federation gained great scientific and technical experience of pilot space programs. Russian enterprises take part in many international space projects including commercial. The Russia has its segment in ISS which is planned to be prepared for fulfilling research by 2006.

b) Ukraine

- For the years of independence Ukraine managed to save and multiply the potential of space industry. Independently and in cooperation with Russian Federation Ukraine updates and develops such world known carrier rockets as “Zenith”, “Cyclone”, “Dnepr”. More than 100,000 people work in space industry of Ukraine. Since 1991 more than 70 successful launches of carrier rockets produced by the Ukrainian enterprises have been made. Ukraine is a participant of many international space projects.
- Space industry of Ukraine involves more than 100 thousands people. Ukrainian space industry is among a few branches of national economics which has even now a rather considerable export potential (more than 50% of space industry product deliveries are carried out for export).

c) Kazakhstan

- At present time the space complex of Kazakhstan is a structure which performs works on research and use of outer space, introduction of space-system engineering and technologies, rendering of commercial services. The space complex of the country consists of space center “Baykonur” (was rented by Russian Federation for 20 years in 1994), objects of platform “ZD”, target ground “Sary-Shagan” and some industrial enterprises and research-and-development centers and organizations connected, directly or indirectly, with space activity.
- Kazakhstan takes part together with Russian Federation, Ukraine and other states in development and realization of some space projects.

International legal status of the Russian Federation, Ukraine and the Republic of Kazakhstan, participation in the development of the International space law under the aegis of UN

- All three states are the members of the UN. The Russian Federation became the UN-member as successor of the Soviet Union. Ukraine gained this status in October of 1945 being the Ukrainian SSR i.e. the subject of the federative state. Having become independent, Ukraine declared about its succession concerning such international obligations taken by the Ukrainian SSR. Kazakhstan became the member of the UN after having gained the independence starting from March 1992.
- Together with the Russian Federation Ukraine and Kazakhstan are the members of the UN Committee on the Peaceful Uses of Outer Space: Kazakhstan and Ukraine – since 1994, the Russian Federation – as the successor of the Soviet Union – since 1958.

International legal status of the Russian Federation, Ukraine and the Republic of Kazakhstan, participation in the development of the International space law under the aegis of UN

- In the context of work of the UN Committee on Outer Space and two its subcommittees (Legal and Scientific and technical) all three states advocate in series strict observance of established international legal order, particularly, international legal procedure of space activity. The base of its activity was formed by 5 UN international treaties. Nowadays the Russian Federation and Ukraine are the Parties in 4 of them: the Treaty on Outer Space, the Agreement on Rescue, the Convention on Responsibility, the Convention on Registration. In 1997 the Republic of Kazakhstan joined five main treaties in the sphere of exploration and use of outer space including the Treaty on the Moon.
- At the same time our delegations on the Legal Subcommittee of the UN Committee on Space declare for starting works on codification of international space law, for working out universal Convention on Space Law, believing that the very this way corresponds dictate of the time and let raise the international space law at the new quality level of development. At that our delegations advocate perseverance existing international legal procedure of space activity during codification. And it is proposed to be the base of future codification.

National Space Legislations

- Under the circumstances of stream development of space commercial activities of the Russian Federation, Ukraine and the Republic of Kazakhstan, appearance of non-governmental subjects of such activity, expansion of international cooperation of these states an insistent need in legal regulation of relationships of states and other subjects of this activity, in creation of national space legislation has arisen.
- The file of such legislations is formed in the Russian Federation, Ukraine and the Republic of Kazakhstan.

National Space Legislations

- In the Russian Federation and Ukraine the basic Laws were adopted determining foundations of legal regulation of space activity. This is the Law of the Russian Federation “On Space Activity” dated August 20, 1993 and the Law of Ukraine “On Space Activity” dated November 15, 1996. These Laws with the subsequent modifications (last modifications to the Law of the Russian Federation “On Space Activity” were made on August 22, 2004 and they will come into force from January 1, 2005). These statements determine common legal foundations of space activity fulfillment on the territory of the state and under its jurisdiction beyond its bounds. Regulations of these Laws are extended for all the kinds of activity connected with exploration and use of outer space.
- In Kazakhstan a special law is on the stage of development.

National State Administrations

- In all three states special bodies managing space activities were established:
- **Federal Space Agency of the Russian Federation** (Governmental Regulation of the Russian Federation dated June 26, 2004, No.314 "On approval of regulation about Federal Space Agency");
- **National Space Agency of Ukraine** (established in accordance with the Decree issued by the President of Ukraine "On establishment of National Space Agency of Ukraine" dated February 29, 1992, No. 117, legal status is determined with the Decree issued by the President of Ukraine "On Regulation of national space agency of Ukraine" dated July 22, 1997, No. 665/97);
- **Aerospace Committee of Ministry of Education and Science of the Republic of Kazakhstan** (organized on the basis of the Decree issued by the President of the Republic of Kazakhstan No. 1449 dated September 29, 2004 "On measures for further perfection of public management system of the Republic of Kazakhstan" by means of reorganization of Ministry of Education and Science of the Republic of Kazakhstan and joining Aerospace Committee of Ministry of Transport and Communication of the Republic of Kazakhstan).

National Space Programs

- Space activities in the Russian Federation and Ukraine are carried out on the basis of **national space programs**. In Ukraine the National space program is developed for five years and approved by the Supreme Soviet of Ukraine under submission of the Cabinet of Ministry of Ukraine. The current National space program was approved by the Law of Ukraine dated October 24, 2002.
- The Federal space program of Russia for 2001-2005 was approved by the Governmental regulation of the Russian Federation dated March 30, 2000, No. 228.
- Space activities of the Republic of Kazakhstan are carried out in accordance with the Conception of development of extraterrestrial complex of the Republic of Kazakhstan developed in 1998. The Draft of the State program "Development of the Outer space branch of RK for 2005-2007 is of the stage on development".

Licensing

- All three states have adjusted the matters of space activity licensing. Thus the Federal Law of the Russian Federation “On licensing of some kinds of activity” dated August 8, 2001, provides for that space activities in the Russian Federation is subject to licensing. The order of such licensing has been adjusted by the Governmental regulation of the Russian Federation dated June 14, 2002, No. 422 “On approval of regulation about space activity licensing”. This Regulation provides for that space activities that include creation and production of space-system engineering, creation and development of space infrastructure; launches and flight control over extraterrestrial objects, use (running) of space-system engineering, space-based processing and information, get by means of space facilities; rendering of services connected with creation, launch and use (running) of space-system engineering; receipt, processing and extending of information get from spacecrafts of land remote sensing are subject to licensing.

Licensing

- **The Law of Ukraine dated June 1, 2000 "On Licensing of some kinds of economical activity"** provides for that development, test, production, running of carrier rockets, spacecrafts and their components, equipment that is a form of space segment of satellite systems is subject to licensing (provision 22 of article 9).
- **In the Republic of Kazakhstan** all the kinds of space usage activity including creation, production, running, repair and updating of rocket-and-space-system engineering, use of ground infrastructure that provides its functioning (target ground, command-and-measuring complex, bench base and other) are subject to licensing on the basis of article 9 of the Republic Kazakhstan dated April 17, 1995, No. 2200 **"On licensing".** The issue procedure of licenses for carrying out this activity has been arranged by the Governmental Regulation of the Republic of Kazakhstan dated March 21, 2000, No. 431 **"On approval of Rules of issue of licenses for carrying out activity connected with space usage by legal and physical persons."**

Legal status of “Baykonur”

- Statements in which the status of space center “Baykonur”, ecological aspects of space activities in this area, legal regime of land usage and other natural resources, managerial control over use of the space center from the side of government and specially authorized bodies of the Republic of Kazakhstan have been arranged take up a considerable volume of regulation in the legislation of the Republic of Kazakhstan and in bilateral Russian-Kazakhstan agreements. These statements were adopted in accordance with the Agreement between the Russian Federation and the Republic of Kazakhstan on main foundations and conditions of space center “Baykonur” use dated March 28, 1994, which provides for that in order to assure further use of the space center in the interests of space activities of the Russian Federation, the objects of the “Baykonur” complex are let to the Russian Federation. The Republic of Kazakhstan reserve for the Russian Federation a right to use the land occupied with the objects of “Baykonur” complex and land allotted for fall of separated parts of carrier rockets.

Participation in international space projects and programs

a) The joint Ukrainian-Russian project – launch and exploitation of spacecraft for land remote sensing “Sich-1M”;
b) Ukrainian-Russian-Kazakhstan program “Dnepr”;
c) International space project “Sea Launch”
d) The project for creation of Space Rocket Corporation of member states to UEA and realization in the framework of UEA of the project “Clipper-Zenith”;
e) Project of long-term cooperation between Ukraine and the Russian Federation of Brazil concerning use of the carrier rocket “Cyclone-4” on the launching center Alkantara and legal aspects of its realization.

a) The joint Ukrainian-Russian project – launch and exploitation of spacecraft for land remote sensing "Sich-1M"

- According to this project the creation of the space system for land remote sensing as the part of monitoring system and ecological control for environment "Sich-1M" is foreseen. Nowadays the complex of works is executed which provides the launch of the spacecraft (SA) in December 2004 and its further exploitation. The preparation of launch vehicle "Cyclone-3" is finishing. This is the SA with airborne instrument with high separate characteristics, surface complex for control, reception and SA information processing, launching and technical complex on space-center "Plesetzk". At one time with the launch of SA "Sich-1M" the launch of the Ukrainian SA "Microsputnik" is planned. There will be instruments established on board of SA for execution of scientific researches of the Earth, oceans, study of geology, climate, ecology and so on.

b) Ukrainian-Russian-Kazakhstan program “Dnepr”

- During 1997-2004 the Ukrainian-Russian-Kazakhstan program for launch of satellites using launch vehicle – “Dnepr” is executed. “Dnepr” is the conversion variant of intercontinental ballistic missile SS-18. There are already 4 orbital launches of this launch vehicle made from space-center “Baykonur”, the general amount of injected satellites is 20. Space companies from UK, USA, Italy, Saudi Arabia, Malaysia and Germany were the clients. Contracts and treaties for launch services are concluded with famous companies and organizations among which are “Astrium” (Germany), KNES (France).
- The presence of considerable fleet of launch vehicle “Dnepr” (about 150 units), considerable term of guarantee use (until 2020), infrastructure of technical and launching complexes on the space-center “Baykonur”, fall areas for detached parts of launch vehicle, surface measuring complex, existing cooperation of enterprises-creator guarantee the stability of rendering services for spacecraft launch.

c) International space project “Sea Launch”

- In the framework of realization of international project “Sea Launch” in May 1995 enterprises from Ukraine, Russia, USA, Norway have created the company named “Sea Launch”.
- Nowadays the project is at the stage of practical realization. At design-office “Yuzhnoye” “PO “Yuzhniy Machine Works” (Ukrainian participants) 16 launch vehicles “Zenith-3SL”are produced and forwarded to Base port Long Beach (USA). 14 launches of such launch vehicles with spacecraft on board were fulfilled.

d) The project for creation of Space Rocket Corporation of member states to UEA and realization in the framework of UEA of the project “Clipper-Zenith”

- At the summit of member states to UEA which was held in September 2004 in Astana (Kazakhstan) principle decisions on preparing documents on creation Space Rocket Corporation were taken. It is foreseen that Corporation will be formed by leading enterprises of space industry of Ukraine, Russia, the Republic of Byelorussia and the Republic of Kazakhstan. Nowadays proposals concerning the structure of corporation management, main direction of its activity and projects of intergovernmental treaty, constituent agreement and statutory documents of Corporation are preparing.
- One of the general projects of the future Corporation foresees the creation of multi-launch piloted space complex “Clipper-Zenith” that is the grandiose task solution of which is beyond any state’s power. The launch of PSC “Clipper” is proposed to be executed by means of space rocket complex “Zenith-M” situated on space-center “Baykonur”.

e) Project of long-term cooperation between Ukraine and the Russian Federation of Brazil concerning use of the carrier rocket “Cyclone-4” on the launching center Alkantara and legal aspects of its realization

- This project is carried out on the basis of the Contract between Ukraine and the Federation of Brazil about long-term cooperation concerning use of carrier rocket “Cyclone-4” on the launching center Alkantara dated October 21, 2003. The subject of the Contract is to create ground complex “Cyclone-4” on the launching center Alkantara and to render services in the interests of national programs of the parties and commercial customers of launching services. By now the Contract has already been ratified by the both parties and in accordance with article 17 it has come into force.
- According to article 9 of the Constitution of Ukraine and article 17 of the Law of Ukraine “On international agreements of Ukraine” international agreements of Ukraine concluded and ratified properly are an integral part of the national legislation of Ukraine and are applied in the manner provided for the norms of the national legislation.

“Cyclone-4”

- Therefore, norms of this Contract have already become a part of the legislation of Ukraine and are binding for fulfillment. Moreover, in cases when the international contracts of Ukraine concluded in the form of law (as in this case) establish rules rather than provided for by the legislation of Ukraine the rules of international contract of Ukraine are applied. Otherwise, the Ukrainian national legislation establishes the priority of international contracts norm over national contracts norm if they do not contradict each other.
- In this connection Ministries and other state executive bodies of Ukraine terms of which reference cover matters, being able to be settled by the Agreement, provide for fulfillment of obligations undertaken by the Ukrainian Party under the Agreement, keep exercise of rights arisen from this Contract for the Ukrainian Party (article 14 of the Law of Ukraine “On international agreements”).

“Cyclone-4”

- According to conditions of the Contract a Ukrainian-Brazilian joint ventures “Alkantara Cyclone Space” is to be determined responsible for creation and running of the ground complex “Cyclone-4” on the launching center Alkantara.
- In order to realize the subject of the concluded Contract the Parties have allotted duties (article 5 of the Contract). So, the Ukrainian Party provides development of the carrier rocket “Cyclone-4”, its units and assemblies, its complex test, preparation of production plant on demand of “Alkantara Cyclone Space”, technological electromechanical model of the carrier rocket “Cyclone-4” for making tests and first flying model of the carrier rocket. The Brazilian Party provides creation of common infrastructure of the launching center Alkantara in accordance with engineering requirements to common infrastructure required for launches of the carrier rocket “Cyclone-4”.

“Cyclone-4”

- Besides, each Party of the Agreement is to provide required financing of its obligations (article 8 of the Agreement), namely: a) the Ukrainian Party – financing of development of the carrier rocket “Cyclone-4”, its units and assemblies, complex tests and preparation of production plant; b) the Brazilian Party – financing of creation of common infrastructure of the launching center Alkantara in accordance with engineering requirements to the extraterrestrial rocket complex “Cyclone-4”.
- The Agreement determines general legal framework of the international cooperation. At the same time a whole series of legal matters require to be developed further and reflected both in statements of bilateral settlements (additional agreements to the basic Agreement) and in statements of interpretation, and in national legislation of both countries.

Legal aspects of the project “Cyclone-4” realization

- So, property relationships which appear in the process of ground complex construction will be determined taking into account provisions of the Agreement on the basis of specific contracts (agreements) concluded between the joint ventures and corporate (partners) enterprises, and statute documents of the joint ventures. It is necessary to note that some agreements concerning settlement of corresponding matters between enterprises of Ukraine and Brazil have already been concluded.
- However, as the joint ventures will carry out its activity on the territory of the Federal Republic of Brazil and under its jurisdiction the question of application of Brazilian legislation access to which is not always provided for Ukrainian lawyers is a problem. This also concerns access to the legislation of Brazil settling not only matters of property but also legal regime of foreign investments, legal status of Ukrainian staff of the future joint ventures which is created according to the legislation of Brazil, mechanism of dispute settlement and arbitration, guarantees of intellectual property rights protection and some others.

Some legal aspects of the project “Cyclone-4” realization

- As to the refund mechanism of capital formations invested to the joint ventures “Alkantara Cyclone Space” for construction of ground complex and as to protection of intellectual property rights during realization of the project “Cyclone-4” it is provided for to develop additional agreements.

Intellectual Property rights under the project

- The Agreement determines main principles of appearance, assignment and protection of rights for intellectual property created in the process of cooperation, admittance and protection of rights for objects of intellectual property created and registered earlier or as a result of independence researches but used for realization of the Contract's purposes.
- The object of intellectual property is recognized to be the result of independent researches and thus right for it are not subject to be allotted to the Parties of the Contract if it was created beyond framework of joint activity and registered before organization of bilateral Ukrainian-Brazilian joint ventures "Alkantara Cyclone Space". The objects of intellectual property the right for which are not subject to be allotted are, first of all, that ones that in the aggregate make up the Ukrainian carrier rocket "Cyclone-4" and its possible modified version. Nevertheless "Alkantara Cyclone Space" gets an exclusive right to carry out commercial launching services using carrier rocket "Cyclone-4"

Intellectual Property rights under the project

- The objects of intellectual property rights for which are subject to common or agreed use and assignment are, first of all, that ones creation of which is provided for in the process of ground complex "Cyclone-4" construction (totality of technical complex of carrier rocket "Cyclone-4", technical complex of a spacecraft, main block and starting complex), and that ones that will be created as a result of the carrier rocket "Cyclone-4" use on the launching center Alkantara and in the process of rendering services in the interests of national space programs of Ukraine and Brazil and also commercial customers of launching services. The bilateral Ukrainian-Brazilian joint ventures "Alkantara Cyclone Space" bears responsibility for creation, running and provision of development of the ground complex "Cyclone-4" on the launching center Alkantara and gets an exclusive right to use the ground complex for the period of the Contract's validity.

Intellectual Property rights under the project

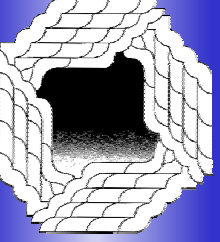
- The subjects of exercising proprietary for the mentioned objects of intellectual property are the Parties of the Agreement if they do not transfer their powers in accordance with a special agreement "Alkantara Cyclone Space". Transference of results of common researches to a third party can be an object of agreement between the Parties or corresponding organizations-participants of cooperation (NSAU and BSA).
- At the same time obligation to provide protection of intellectual property acquired in the process of activity in the framework of the Agreement realization is imposed to "Alkantara Cyclone Space".
- To intellectual property acquired in the framework of joint activity after organization of "Alkantara Cyclone Space" the Parties of the Agreement apply regulation concerning intellectual property stated in Addendum to the Framework agreement between the Government of Ukraine and the Government of the Federal Republic of Brazil on cooperation by use of outer space for peaceful purposes dated November 18, 1999 and additional special agreements concluded in case of necessity between authorized bodies.

Intellectual Property rights under the project

- Unless the Parties of the Agreement, their executive bodies and common programs determine others, rights for the objects of intellectual property created in the framework of cooperation will be allotted in accordance with economical, scientific and technical contribution of each Party to creation of this intellectual property.
- These and other legal matters that will obviously arise in the process of the Agreement realization are to become a subject of common discussion between Ukrainian and Brazilian lawyers.
- The Ukrainian Party considers the corresponding project to be one of priority space projects of Ukraine and is ready to do all its best to provide its successful realization for a benefit of both space programs of Ukraine, Brazil and third parties – customers of launching services.

Conclusion

- Space activity of three states - main successors of former USSR' space complex consistently develops in many directions: in space industry, in scientific researches of fundamental and applied character, in development of launching industry; the role of these states increases in international co-operation in area of exploration and peaceful use of outer space.
- In this activity the states lean against an International space law, national space legislation which develops consistently, structure in industry of the national legal systems of these countries.



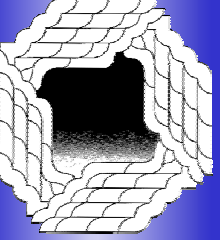
INTERNATIONAL INSTITUTE OF AIR AND SPACE LAW

Europe and the world launching industry

Dr. Frans G. von der Dunk

Director, Space Law Research

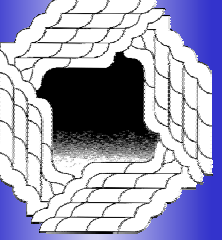
International Institute of Air and Space Law



INTERNATIONAL INSTITUTE OF AIR AND SPACE LAW

Contents

- Space law and launching
- The intergovernmental setting in Europe
- Later developments
- The EC / EU enters the picture
- Concluding remarks



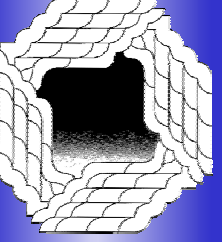
INTERNATIONAL INSTITUTE OF AIR AND SPACE LAW

Space law and launching

- Launching & liability
  - "Once a launching state, always a launching state"
- Launching & registration
  - Relationship with liability…
- Towards 'level playing field'?
  - US-Russia, -China, -Ukraine bilaterals
- MTCR & Wassenaar Arrangement

Europe and the world launching industry

UN Workshop, Rio de Janeiro



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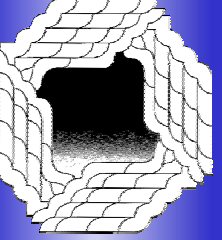
The intergovernmental setting in Europe

- Few national initiatives
- ELDO (early 60's)
- ESA – Convention 1975/1980
  - Mandatory activities
  - Optional activities
    - *Á la carte*-participation
    - Ariane programme (France leading role)
    - Privatisation: Arianespace (1980)

Europe and the world launching industry

UN Workshop, Rio de Janeiro



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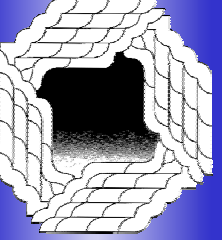
Later developments

- Sea Launch
- Starsem
- Eurockot
- Arianespace / Soyuz co-operation
- EGAS
  - With acceptance of the EU
- P.M.: Kiruna; Andøya; San Marco



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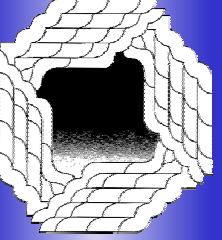
The EC / EU enters the picture

- Until 1985: no EC role in space
- EC vs. ESA
  - Fair return principle
- EC *on behalf of* ESA
  - TSI case ➔ interests European industry
- Co-operation ➔ Framework Agr.
  - I.a. acceptance EGAS

Europe and the world launching industry

UN Workshop, Rio de Janeiro



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Concluding remarks

- Concentration in the sector
  - Launching will remain govt. subsidised
    - No foreseeable role WTO
  - Europe is focusing on international co-operation *and* competition at the same time
  - …whilst still trying to guarantee its independent access to space
    - Intra-Europe: EU-ESA co-operation will rule
- Launching = special space sector
  - Security-considerations will rule

Europe and the world launching industry

UN Workshop, Rio de Janeiro

National Institutions and Education in Space Law

MINISTRY OF FOREIGN AFFAIRS OF PERU

DIRECTION OF AIR AND SPACE AFFAIRS
NATIONAL DIRECTION OF SOVEREIGNTY AND TERRITORIAL

TEMPLE OF PACHACAMAC
LIMA, PERÚ

FORTRESS OF SACSAYHUAMAN

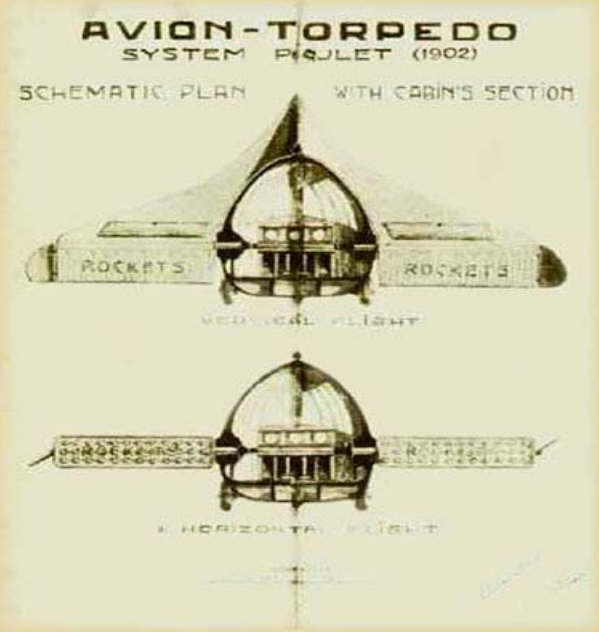
THE HUACA OF THE SUN AND THE MOON

CHIMU CULTURE

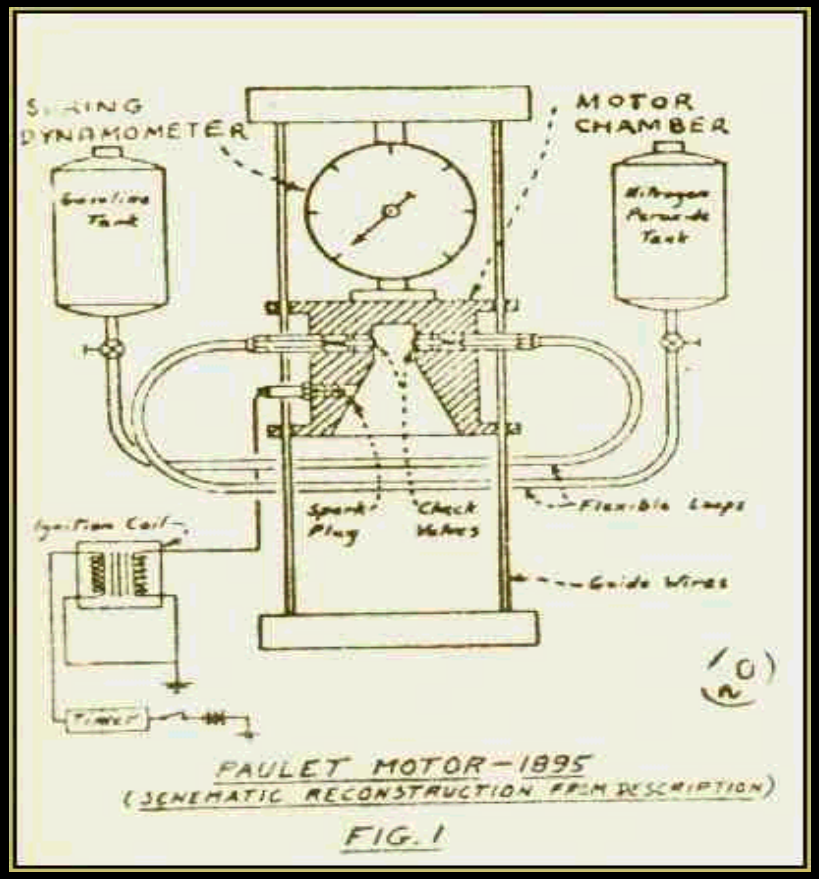

LINES OF NAZCA
ICA - PERÚ

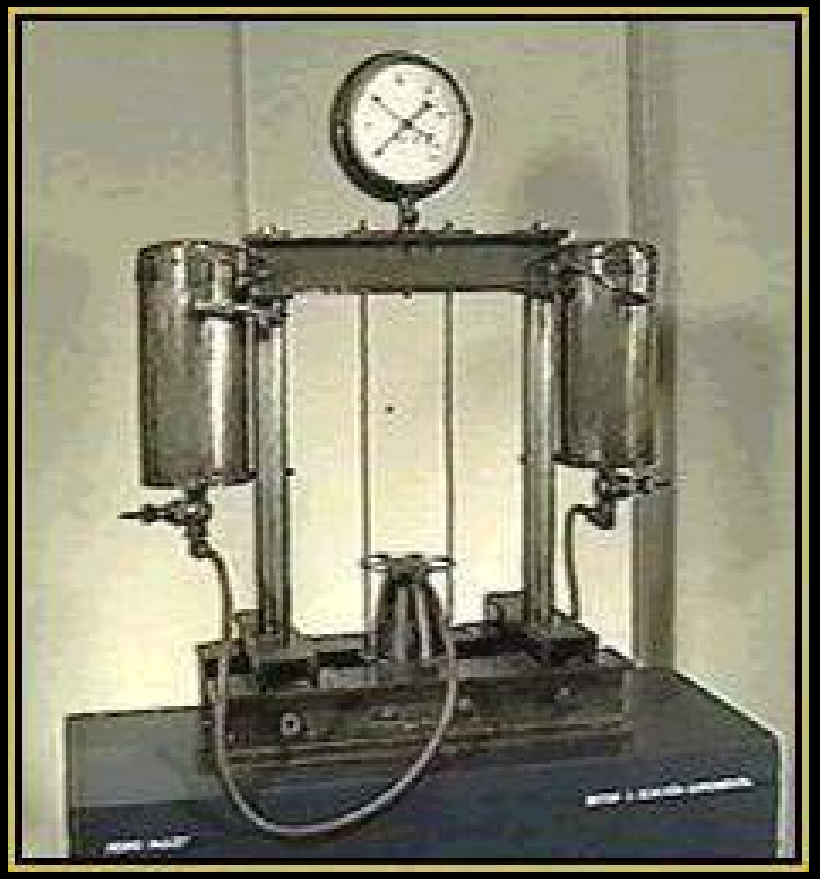
LINES OF NAZCA
ICA - PERU

PEDRO PAULET MOSTAJO
PIONEER OF THE SPACE AGE
(1874 - 1945)



THE REACTION MOTOR





AUTOBÓLIDO

FIRST TECNOLOGY 1902

PERUVIAN SPACE AUTHORITY

NATIONAL COMISION FOR INVESTIGATION, AND AIR SPACE DEVELOPMENT.

- It has as objective the promotion, control, and the celebration of national and international agreements. Also the stimulation of the exchange of technology.

- It proposes legislation, does studies, prepares specialists, absolves inquiries and develops for pacific purposes, investigations about space.

INSTITUTIONS LINKED TO THE SPACE FIELD

UNIVERSIDAD NACIONAL MAYOR DE SAN MARCOS

(Founded on the 12th of May 1551)

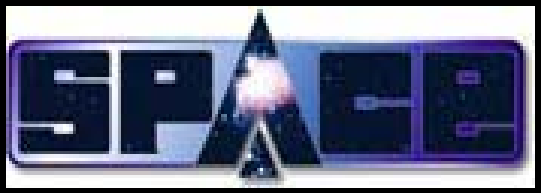
Faculty of Physics and Mathematics

Studies:

- **Giant stars with low amounts of iron.**
- **It has project in which it is searching for a site for the construction of an observatory.**
- **Cooperation in star photometric with variable conditions.**
- **It is working in the field of making more precise temperature scales.**

UNIVERSIDAD NACIONAL MAYOR DE SAN MARCOS

PERMANENT SEMINAR OF ASTRONOMY AND SPACE SCIENCE



- SPACE is a Academic Institution of investigation, development and dissemination of scientific research.
- It publishes documents, from scientists in Spanish, related to investigations related to this field.
- It offers basic classes in astronomy to school teachers and facilitates software and photographic material to institution that require them.

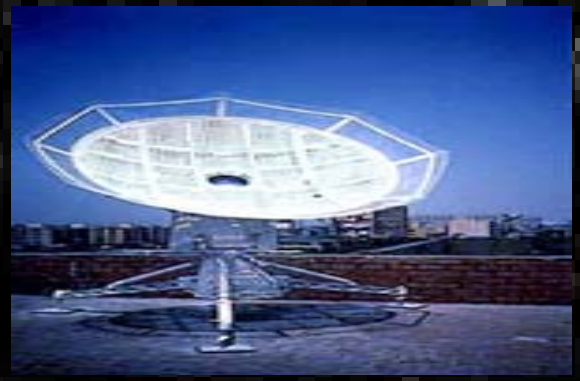
Areas of Investigation at “SPACE”

CHANGING STARS

ATMOSPHERS IN STARS

ARCHAEOLOGICAL ASTRONOMY

PHYSIC AND SOLAR RADIO ASTRONOMY



EDUCATION

- Classes are given introducing Astronomy and Astrophysics.
- Seminars for graduate students “Thesis I and II”.
- It has the first public library in Peru, on the fields of astronomy and astrophysics.

UNIVERSIDAD DE SAN MARTIN DE PORRES

Faculty of Law and Political Science
Founded the 17th of May 1962

- A special interest group is active on the subject of Space Law named Pedro Paulet.
- Its professors who are graduates specialists on Space Law participate actively in conferences and the dissemination of publications on the matter and they themselves have published several documents such as:

  - Scientific and Law aspects of the Remote Sensing of Natural Resources, by professor Alexander Carranza Reyes.
  - Elements that Create Cosmic Law, professor Ciro Manrique Moreno.
  - Space Law, Doctor Luis Hoyos Escalante.

PONTIFICIA UNIVERSIDAD CATOLICA DEL PERÚ

(Founded on the 18th of March, 1917)

INVESTIGATION GRUOP ON SPACE SCIENCE (GICE)

OBJETIVES AND POLICY

- **It has as policy the participations of the students in the decision making process related to investigations in each area of space science.**
- **They search and obtain international cooperation for the development of projects.**
- **It has received in several opportunities the collaboration of the Johnson Space Center of NASA and the Lunar and Planetary Institute.**

PONTIFICIA UNIVERSIDAD CATOLICA DEL PERÚ

WORKING AREAS

- Astronautic and Instruments Area
- Space Biomedicine Area.
- Cosmo Chemistry Area.
- Investigation on the Origins of Life Area.
- Meteorites and Small Bodies Area.

UNIVERSIDAD DE LIMA
Founded in 1962

Circle of Studies:

- Interest Group, created in 1990.
- Program of General Studies.
- Born from the course of Cosmology

UNIVERSIDAD NACIONAL AGRARIA DE LA MOLINA (Founded in 1902) Y ESCUELA SUPERIOR DE GUERRA AÉREA

Masters Degree in High Administration with mention on Defense and Air and Space Development:

Public Servants, Military officers and civilians from the private sector take part in the courses directed to the use of space technology for peaceful purposes.

This Masters Degree forms specialists that will use their knowledge of space science and technology working in the following fields:

•Extreme poverty

UNIVERSIDAD AGRARIA LA MOLINA Y ESCUELA SUPERIOR DE GUERRA AÉREA

- Space Law
- Especial Activities and Compared Space Law
- Illegal Agrarian Activities (Coca Leaves)
- Prevention mitigation of disasters produced by natural phonemes affecting the people.
- Water: Availability, Preservation and Treatment.
- Remote Space Observation and preservation of species under the danger of extinction.

Alicia Elida Presto
Chief Advisor
Centro de Investigación y Difusión Aeronáutico-Espacial, CIDA-E/DINACIA, Uruguay

Introduction

Any country, no matter how small, as is the case of Uruguay, can benefit from technological advances in order to improve its inhabitants' welfare.

The Uruguayan institutions involved in space activities develop such activities in several fields, such as: remote sensing, geographic information, meteorology and telecommunications, among others.

This report will begin with a description of the Centro de Investigación y Difusión Aeronáutico- Espacial (CIDA-E). The Centre was established 29 years ago and was described as "one of the world pioneer institutions" by a report of the European Space Agency in 1999.

I. Centro de Investigación y Difusión Aeronáutico-Espacia (CIDA-E)

The CIDA-E was created by Decree 607/75 of 5 August 1975.

The Decree 507/002 of 31 December 2002 changed the organizational structure of the National Directorate of Civil Aviation and Aeronautic Infrastructure (DINACIA) and the Centre became an Advisory of the National Directorate.

Although its functions are limited, it has a large number of researchers and collaborators who give dynamism to the organization.

The mission of CIDA-E is among others to study and investigate different problems related to aeronautic and space issue; provide advice in the field of aerospace field to the national aeronautic authorities; organize courses and seminars; maintain communications with similar foreign centres; and prepare scientific publications related to the aerospace field. By accomplishing its permanent duties in the area of scientific-technological investigation, it has supported Uruguay's ratification of many treaties and international aeronautic and space agreements. .

By accomplishing its advisory mission, and in addition to its direct advice to the National Directorate of Civil Aviation and Aeronautic Infrastructure, CIDA-E has collaborated with the Ministry of Foreign Affairs, the Uruguayan Air Force General Command, the Municipal Planetarium, and other organizations.

Through its Commissions of Investigation, and specifically in relation to space, CIDA-E studies outer space resources, applications of space technology to developing countries, space

delimitation, use of the geostationary orbit, environment protection, space transport systems, direct transmissions by satellite, extraterrestrial life, remote sensors, etc.

CIDA-E has contributed to the establishment of Uruguay's position in subjects of its specialization in international forums such as the General Assembly of the UN, the Committee on the Peaceful Uses of Outer Space, the ITU, the ICAO and the CLAC, among others.

In 1982, CIDA-E prepared the National Monograph for the second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82) and, on the occasion of UNISPACE III held in July 1999, in Vienna, Austria, it produced a document that reflected Uruguay's position regarding several topics that constituted the agenda of the Conference.

CIDA-E has organized seminars, workshops and conferences related to the field of aerospace as well as other academic activities involving the participation of national and foreign esperts.

On the occasion of the Third Space Conference of the Americas (UI CEA) celebrated in Punta del Este, Uruguay, in November 1996, CIDAE-E was in charge of the Technical Secretariat for the Conference.

CIDA-E maintains scientific relationships and has agreements with other institutions such as: the Institute of Air and Space Law of McGill University (Canada), the Instituto de Derecho Aeronautico y Espacial de la Universidad Nacional de Cordoba (Argentina), the Instituto de Derecho Aeronautico, del Espacio y de las Telecomunicaciones de Cordoba (Argentina), the lnstituto Nacional de Derecho Aeronáutico y Espacial (INDE) of the Argentinean Republic, the Asociacion Latinoamericana de Derecho Aeronautico y Espacial (ALADA), the International Space University (ISU), and has relationships with the national institutions, which will be described in this report, and with the National Aeronautics and Space Administration (NASA), the National Oceanic and Athmospheric Administration (NOAA), the European Space Agency (ESA), Office National d'Etudes et de Recherches Aerospatiales (ONERA), among others.

CIDA-E helped Uruguay become a member of the COPUOS in 1981. It has also been a member of the International Astronautical Federation (IAF), since 1985 and a member of the International Institute of Space Law (IISL), since 1999.

Within its promotional activities, CIDA-E regularly publishes its magazine for national and international circulation. It also published special issues on its area of expertise.

These special issues have been published on special academic occasions or CIDA-E’s anniversary, which has been commemorated through the organization of workshops or seminars.

With the aim of educating and informing the public, CIDA-E publishes a series of documents and diagrams, slides and audio-visual material and research papers. Moreover,
CIDA-E published a compilation of national and international rules relating to aeronautics and space, called "Digesto de la Republica Oriental del Uruguay”.

II. Servicio de Sensores Remotos aeroespaciales (SSRA)

The Remote Aerospace Sensors Service (SSRA) is part of the Uruguayan Air Force. Its origins date back to 1923 when a photographic section was created within the Military Aviation

School. In 1948, it was moved to the Aviation Group N° 3 (Bombing). It finally became independent in 1978 and was named the Photographic Group. In 1991, it was renamed SSRA.

The department is led by a director, followed by a sub-director. It is divided into four sections: Administrative, Accounting, Operative and Satellite Information Divisions.

Its mission is to direct, develop and coordinate every activity related to aerospace remote sensors. It is qualified to take vertical aerial photographs, and is also able to carry out studies in the land for topography, altimetry and forest areas. It is also qualified to receive, process and distribute satellite images, fulfilling an important social task. It supports national development by executing remote sensing, interpretation and analysis.

The CREPADUR (Centro de Recepcion, Proceso, Archivo y Distribucion de imagenes de observacion de la Tierra en Uruguay) Project, which is a project of cooperation between Spain and Uruguay, has to be recalled. This project was promoted by the Space Technology Advisory Commission (CATE) and made viable by the financial support of the Spanish Agency of International Cooperation (AECI), and the technical support of the National Institute of Aeronautic Technique (INTA) in Spain.

CREPADUR (Centre of Reception, Process, Archive and Distribution of images of Earth observation in Uruguay) is the first Governmental centre of Uruguay in the area, which receives and generates products of high added value by means of images obtained through the NOAA and Seastar satellites.

The function of the Centre is to allow the ample use of Earth observation products in Uruguay and other countries of the region, collaborate with groups of scientists in environmental programmes and management of natural resources, and to enable the investigation and development related to the use of the results of Earth observation.

CREPADUR is established within SSRA of the Uruguayan Air Force.

III. Sociedad de Especialistas Latinoamericanos en Percepcion Remota y Sistemas de Informacion Espacial (SELPER Uruguay Chapter)

In 1980, SELPER (Society of Latin-American Specialists in Remote Perception and Information Systems) began its activities in Ecuador.

SELPER is a society formed by National Chapters belonging to a number of Latin American countries and Special Chapters, which belong to technologically advanced countries in the areas of remote sensing, such as Germany, France, Spain, Canada and the United States. It has a rotating head office and an international directorate. Its activities are fundamentally related to remote sensing.

SELPER's first constitutive General Assembly, the Uruguay Chapter, took place in Montevideo, on 19 November 2003. It comprises several Commissions: Scientific Activities, Publications and Library and Organization of Events, among others. It is made up of people and institutions dealing with space activities, such as meteorologists, astronomers, professors, etc..

IV. Comision Receptora e Investigadora de Denuncias sobre Objetos Voladores no identificados (CRIDOVNI)

The Reception and Investigation Commission of Unidentified Fliyng Objects Denunciations (CRIDOVNI) was created within the Uruguayan Air Force on 7 August 1979, by the 1873 Order issued by the Air Force General Command.

It was the first government organ in South America assigned to the investigation of UFO, receiving, compiling and studying everything related to them.

It acts with complete technical independence, given the fact that the Uruguayan Air Force Command has never limited its investigations, orientations or exposure.

V. Dirección Nacional de Meteorología (DINAMEP)

The origins of the National Directorate of Meteorology date back to 1895.

Nowadays, DINAMET is a technical institution whose mission is to carry out meteorological observations, process data and distribute official information on a national level, and on a regional and international level, in accordance with current agreements.

DINAMET has a Weather Forecast Directorate (OPT) and an Aeronautic Meteorology Direction (DMA), both of which work 24 hours a day, 365 days a year.

DINAMET owns a part of satellite reception equipment (WAFS), which is the only one in the country.

VI. Servicio Geográfico Militar (SGM)

The Military Geographic Service (SGM) is part of Uruguay's National Army. Its mission is to ensure the preparation, up-date, conservation and distribution of cartographic material; maintain and expand the national net of triangulation, and also to operate a system of geographic information.

With regard to its structure, SGM is composed of five divisions, besides a Systems Division and a Secretariat. It provides services in cartography (maps, raster format, vectorial format), calculations, photographs (aerial, Landsat images).

This service is situated at the Artigas Antarctic Scientific Base (RC.A.A.) partaking in several projects and publishing aid charts for navigation and scientific investigation. It has participated in the GIANT project (Geodesic Infrastructure in Antartica) since 1995 through the observation of satellite probes each austral summer in order to establish a geodesic global net and determine the movement of continental plates.

VII. Instituto Antartico Uruguayo/B.C.A.A., Base Científica Antártica Artigas (lAU)

The Uruguayan Antarctic Institute was founded on 9 January 1968. It is part of the National Defence Ministry and its functions include carrying out investigations and scientific, technical and logistic explorations in the area of the Antarctic Treaty System; creating specific working groups; promoting and regulating the study of sciences applied to the area of the Antarctic Treaty System and coordinating the country's participation in the scientific activities

developed in the Antarctic.

The Institute is administered through a Direct Council formed by representatives of the National Defence Ministry, the Ministry of Foreign Affairs and the Ministry of Education and Culture. The president is a representative of the National Defence Ministry.

The Institute is composed of several offices (General Secretariat, Logistic, International Relations, etc), a Law Advisory Department, a Public Relations Department, Chiefs of Missions, etc.

Agreements have been signed between the Uruguayan Government and foreign Governments, in which the Uruguayan Antarctic Institute acts as the representative of Uruguay. Through Law 17.591 of 20 November 2002, an agreement between the Uruguayan Antarctic Institute and the Bulgarian Autonomous Institute was approved, in order to jointly develop scientific investigations, exchange information and scientific facts and promote scientific Antarctic issues such as atmospheric and meteorological physics, medicine, biology, etc. Moreover, by Resolution 1918 of 27 November 2002, the signing of an agreement between the Uruguayan Antarctic Institute and the Republic of Korea Ocean Research and Development Institute (KORDI) was authorized in order to develop projects and joint investigations in environmental sciences, marine sciences and in order to exchange technical information.

The Uruguayan Antarctic Institute is related to the Artigas Antarctic Scientific Base (RC.A.A), which is located on the King George Island. The mission of the Base is to support the scientific investigations and projects that take place within the scientific investigation programmeme of the Uruguayan Antarctic Institute.

Satellite information is used for meteorological forecasts and environmental information. There is an automatic Meteorological Station (DINAMET 89054) connected to world-wide vigilance programmes.

In the aforementioned Base, many activities take place, such as glaciology activities and studies of the behaviour of the meteorological systems, among others. In relation to the environment, there is a project of measurement of the thickness of the ozone layer above the Artigas Antarctic Scientific Base.

The Base has an Ozonometric Station inaugurated on 5 May 1998, having joined the World System of Ozone Observations on 31 July 1998 and becoming an important link of the national and international community for reversing the effects of the destruction of the ozone layer.

Additionally, an ionospheric station allows the measurement of the absorption of the radio cosmic noise in the 30 Mhz frequency. This study is useful to understand the physical chemical aspect of the atmosphere. .

VIII. Direccion Nacional de Mineria y Geologia (DINAMIGE)

The National Directorate of Mining and Geology (DINAMIGE) was founded in 1912. It is part of the Ministry of Industry, Energy and Mining is responsible for the control and administration of the exploitation of the mineral resources of the subsoil.

It carries out geological and geophysical investigations and provides advisory services in

the fields of geology, mining, subterranean waters and geophysics, among others. It has specialized technicians who interpret aerial photographs, satellite images and draw geological maps.

The DINAMIGE has a Memorandum of Understanding with the Companhia de Pesquisa de Recursos Minerais (CPRM) of Brazil, dated 20 December 1996.

IX. PRENADER Programme of Ministerio de Ganaderia, Agricultura y Pesca (MGAP)

Within the Ministry of Cattle-raising, Agriculture and Fisheries, PRENADER is a programme for the use of natural resources and the development of irrigation facilities. Its aim is to reconstruct the equilibrium between the environment and the needs of economic development. The programme carries out investigation and technology transfer projects on the use and conservation of soil and water.

X. Instituto Nacional de Investigación Agropecuaria (INIA)

The National Institute of Agricultural Investigation (INIA) was created in 1989 and it is composed of a Board of Directors consisting of four members. There is a national office and five regional offices: one for each experimental station.

INIA's mission is to contribute to the development of the national agricultural sector by means of adopting knowledge and technology.

XI. Administración Nacional de Telecomunicaciones (ANTEL)

The National Administration of Telecommunications, created on 25 July 1974, is a company owned by the Uruguayan State, whose legal entity is that of a decentralized public service. Its mission is to supply all the telecommunications services within the national territory.

In 1989, the first stage of the "Digital Centres" Project for Montevideo ended and on 30 September 1997 the digitation process was completed.

In 1997, the satellite Nahuel I was launched, which allowed ANTEL to secure international communications by three means: microwaves, optic fibre and communication satellites.

In 2001, an internal reorganization took place in many of the business units such as Fixed Telephony, Public Telephony, Mobile Telephony (ANCEL), Enterprise Services and data Services (Antel Data).

In 2003, Ancel was integrated into the Global System for Mobile Communication (GSM) and today the GSM net has national coverage. Rural areas use the GSMJGPRS system in order to access the Internet and data using mobile technology.

XII. Unidad Reguladora de Servicios de Comunicaciones (URSEC)

The Communication Services Regulation Unit (URSEC) was created by Article 70 of the 17.296 law in 2001 thus replacing the existing National Directorate of Communications.

Articles 71 to 94 of the aforementioned law regulate its organization and functions, which

were determined by the 212/001 decree of 4 May 2001.

URSEC practically works in the area of the Planning and Budget Commission and is technically autonomous. It can communicate directly with official decentralised services and autonomous entities as well as with other State organs.

Its function is the regulation and control of every activity related to telecommunications and those related to the admission, processing, transportation and distribution of correspondence carried out by postal operators.

URSEC is managed by a Commission composed by three members, elected by the President of the Republic, acting with his Cabinet, among people who, judging by their personal and professional background and knowledge of the subject, ensure criteria independence, efficiency, objectiveness and impartiality in their performance. The Commission is represented by its President and its members are elected for six years and liable to re-election.

URSEC's personnel is made up of all the workers from the National Direction of Communications, workers from ANTEL and from the National Postal Administration, workers from other official dependencies and skilled workers specially hired by this Unit.

URSEC's duties and powers include:

a) Giving advice to the Executive branch in the areas of formulation, instrumentation and implementation of communication politics;
b) Administrating, controlling and defending the national radio-electric spectrum;
c) Authorizing the use of frequencies of the national radio-electric spectrum, and the installation and operation of radio-electric stations;
d) Controlling the installation, function and quality, regularity and range of all services of communication, both official and private; and
e) Carrying out technical and operative supervision of all modalities of radio and TV broadcasting.

XIII. Private Institutions

In Uruguay there are also private institutions such as the lngenieros Consultores Asociados (ICA), Geosoft-Procom, Teldet, ICA being the most important. ICA offers applications to geographic information systems (GIS), Global Positioning System (GPS), image processing information systems, etc., and maintains a Trimble GPS Pathfinder Community Base Station (CBS), which provides the reference data needed to create highly accurate maps and GIS databases.

XIV. Comisión Asesora de Tecnología Espacial (CATE)

The Space Technology Advisory Commission (CATE) was created by Resolution 239/998 on 24 March 1998 to plan the country's activities in the field of space technology, elaborate a national plan on space technology and promote the scientific and educational efficient use of space technology, among other objectives.

It is composed of the sub-secretaries of the Ministries of National Defence, Foreign Affairs and Cattle-raising, Agriculture and Fisheries.

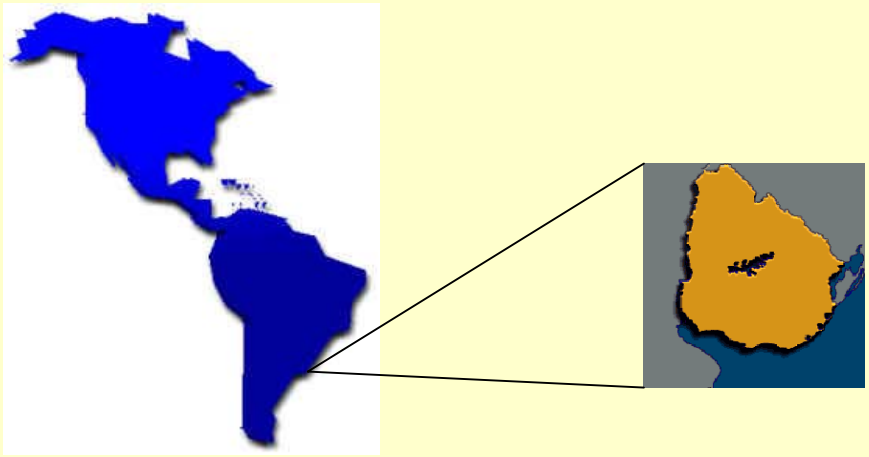
One of the projects promoted by the CATE is the aforementioned CREPADOR.

Conclusions

All nations, whether voluntarily or involuntarily, directly or indirectly, are immersed in space activity. No matter how developed the technology or space industry of a country is, all countries are actors or beneficiaries of space activities.

That is why every country, both developed and developing have an increased awareness on the fact that space activities, if undertaken in good faith and through cooperation, with healthy principles, will contribute to improve the development and understanding of human beings.

URUGUAYAN INSTITUTIONS INVOLVED IN SPACE ACTIVITIES



CIDA-E

Centre of Investigation and Aeronautic-Space Diffusion

- Created in August 1975
- Advisory of the National Director
- *Structure:* small but counts with a wide number of investigators and collaborators

CIDA-E (cont.)

- *Its mission:*
  - To study and investigate different issues of aeronautic and space problems
  - To give advice on the aerospace field to National Aeronautic Authorities
  - To organise courses and seminars
  - To maintain communications with similar foreign Centres
  - To prepare scientific publications related to aerospace field

CIDA-E (cont.)

- *It studies:*
  - the resources of extraterrestrial space
  - the applications of space technology to developing countries
  - space delimitation
  - the use of geostationary orbit
  - the environment protection
  - space transport systems
  - direct transmissions by satellite
  - extraterrestrial life
  - remote sensors, etc.

CIDA-E (cont.)

- Ratification of many Treaties and International aeronautic and space Agreements
- International forums
- Prepared the National Monograph for UNISPACE II.
- Produced a document that reflected Uruguay's position regarding several topics on occasion of the celebration of UNISPACE III
- Organises seminars, workshops and conferences

CIDA-E (cont.)

- In charge of the Technical Secretariat of the Third Space Conference of the Americas
- Keeps scientific relationships with other Institutions
- Member of COPUOS, IAF and IISL
- Publishes the CIDA-E Magazine
- Published a compilation of national and international rules of aeronautic and space interest

SSRA

Remote Aerospace Sensors Service

- Part of the Uruguayan Air Force
- *Structure:* Director and Subdirector. Four sections.
- *Its mission:*
  - To direct, develop and coordinate every activity related to aerospace Remote Sensors
- *Qualified to:*
  - take vertical aerial photographs
  - carry out studies in the land for topography, altimetry and forest areas
  - receive, process and distribute satellite images

SSRA (cont.)

- CREPADUR Project:
  - International cooperation between Spain and Uruguay
  - Images obtained through the NOAA and Seastar satellites
  - *Its functions:*
    - To allow the ample use of the products of observation of the Earth
    - To collaborate with groups of scientists in Environmental programs and management of natural resources
    - To enable the investigation and development related to the use of earth observation facts

SELPER URUGUAY CHAPTER

Society of Latin American Specialists in Remote Perception and Information Systems.

- Formed by National Chapters and Special Chapters.
- Itinerant head office
- International Directorate
- Several Commissions.

CRIDOVNI

Reception and Investigation Commission of UFO Denunciations

- Within the Uruguayan Air Force
- Investigates the UFO phenomenon
- Acts with complete technical independence

DINAMET

National Direction of Meteorology

- *Its mission:*
  - to carry out meterological observations
  - to process its data
  - to diffuse official information at a national level and at a regional and international level in accordance with current agreements
- It has a Weather Forecast Direction and an Aeronautic Meteorology Direction
- Owns a piece of satellite reception equipment

SGM

Military Geographic Service

- Part of Uruguay's National Army
- *Its mission:*
  - to ensure the preparation, up-date, conservation and distribution of cartographic material
  - to maintain and expand the national net of triangulation
  - to operate a system of geographic information
- *Structure:* Five divisions, besides a System Division and a Secretariat.
- Provides services in Cartography, Calculations, Photographs, etc.
- Participates in the GIANT project

IAU

Uruguayan Antarctic Institute

- Part of the National Defence Ministry
- *Functions:*
  - To carry out investigations and scientific, technical and logistic explorations in the area of the Antarctic Treaty System
- *Structure*: Direct Council in charge of the direction of the Institute/ Offices/ Departments.
- Acts as the representative of Uruguay in many agreements
- Related to the Artigas Antarctic Scientific Base (B.C.A.A.) located on the King George Island

IAU (cont.)

- **B.C.A.A. (Artigas Antarctic Scientific Base)**

- *Its mission*: to support the scientific investigations and projects that take place within the scientific programme of the IAU
- *Activities:* glaciology, studies of the behaviour of the meteorological systems, among others.
- It has an Ozonometric Station
- Important link for reversing the effects of the destruction of the Ozone Layer.
- Ionospheric station

DINAMIGE

National Direction of Mining and Geology

- Dependency of the Ministry of Industry, Energy and Mining
- Responsible for the control and administration of the exploitation of the mineral resources of the subsoil.
- Carries out geological and geophysical investigations
- Renders advisory services in the fields of geology, mining, subterranean waters and geophysics

MGAP-PRENADER Programme

- PRENADER Programme within the Ministry of Cattle-raising, fishing and Agriculture
- Programme for the use of natural resources and development of irrigation facilities.
- *Its aim:* to reconstruct the equilibrium between the environment and the needs of economic development

INIA

National Institute of Agricultural Investigation

- Structure: Directive Board with four members/National Office/Five regional Offices
- Its mission: to contribute to the development of the National Agricultural Sector

ANTEL

National Administration of Telecommunications

- *Structure:* decentralised public service
- *Its mission:* to supply all the telecommunications services within the national territory
- Secures international communication by: microwaves, optic fibre and communication satellites.
- Ancel is integrated to GSM

URSEC

Communication Services Regulation Unit

- *Its function*: regulation and control of every activity related to telecommunications and to correspondence.
- *Structure*: Commission (3 members)
- *Duties and powers:*
  - To give advice to the Executive Power
  - To administrate, control and defend national radio-electric spectrum
  - Technical and operative supervision of all modalities of radial and TV broadcastings.

Private Institutions

- ICA, GEOSOFT-PROCOM, TELDET, etc.

- ICA:
  - offers applications to GIS, GPS, image processing, information systems, etc.
  - maintains a Trimble GPS Pathfinder® Community Base

CATE

Space Technology Advisory Commission

- *Its mission:*
  - to plan the country's actions in the field of space technology
  - to elaborate a National Plan on Space Technology
  - to promote the scientific and educational productive use of the space technology
- *Structure:* Sub-secretaries of the Ministries of National Defence, Foreign Affairs and Cattle-raising, Agriculture and Fishing.

Jeanette Irigoin-Barrene
Professor
Director, Institute of International Studies, University of Chile

I. The Chilean Space Agency: Achievements and Functions

Chile has a long history as an advanced user of satellite technology and in space scientific research. The following are some milestones landmarks within its history, which practically begins after the establishment of the National Aeronautics and Space Administration (NASA) in the United States of America:

- Creation of the Space Training Centre of the University of Chile in 1959;
- Implementation of the first Earth Station of its class in Latin America in 1968 in Longovilo for satellite telecommunications;
- Intergovernmental Agreement of Mataveri between the USA and Chile and their respective technical agencies NASA and the Dirección General de Aeronáutica Civil (DGAC). Use of the Mataveri Airport from Easter Island as an emergency runway for space shuttles;
- The student experiment "the Chinitas", at cost of US$ 1 million with a 85% support from NASA, was onboard in the Space Shuttle Columbia on 23 July 1999. Its objective was to demonstrate the capacity of the Eriopis Connexa (Chinita), insect predator of pulgones, which attach agricultural plantations;
- Host of II Space Conference of the Americas in 1993 and the Preparatory Meeting of the Group of Experts for the fourth Conferencia Espacial de las Americas (CEA) during the International Air & Space Fair (FIDAE) 2002;
- Space programme of the Air Force of Chile and the General Directorate of Civil Aviation. Projects FASAT Alpha and Bravo satellites (1993-2001)
- Incorporation of Chile to the International Satellite System for Search and Rescue (COSPAS – SARSAT) in 1995;
- Placing into orbit of the first protein crystallization experiment called "Chagaspace" in 1996; and
- Preparatory Meeting for Latin America and the Caribbean for UNISPACE III that was held in Concepcion, Chile, in 1998

Despite the long list of projects and programmes involving space technology, the first attempt to establish an organization dedicated to space and under the authority of the Government was only carried out in 1980, in Chile. That was the creation of the Committee of Space Affairs, functioning within the Air Force of Chile, which allowed the initiation of coordination activities with national organizations interested in space and it also allowed the channelling of the

permanent efforts of the Ministry of Foreign Affairs, Directorate of Special Politics, a governmental organ that has always been in charge of receiving foreign initiatives for the benefit of Chile.

On 17 of July 2001, the President of Chile gave to an unequivocal sign of the importance of space activities for Chile when he created the Presidential Advisory Commission with a double role:

- To prepare a draft law in order to give organizational and budgetary life to the Agency, along with the proposal of a National Space Policy;

- Simultaneously, to assume as the national entity of the Government, the responsibility to immediately coordinate, at the national level, all efforts in field of satellite technology and space research and on the other hand, to act as the technical interlocutor at the international level

Following is a brief synthesis of the *considerations* behind the creation of this Commission:

1) The convenience of developing and expanding the knowledge of sciences related to outer space, and the undeniable benefit associated with the application of space technology to national activities in different areas;
2) The firm intention of the Government of Chile to grant maximum importance to the development of space policy and its applications in the economic and social development of the country;
3) The necessity to reflect the opinion of Chile in the international organs related to space matters, as well as to successfully obtain the benefits that can be derived from the international cooperation in space activities;
4) The intention to declare to the international community, the will of the Government of Chile to use outer space for peaceful purposes and to define, with that regard, united views that reflect the position of Chile;
5) The need to integrate he diverse sectors interested in the development of space, governmental, civilian, military, academic and economic matters, in the discussion and elaboration of the relevant national policies, projects, programmes and other initiatives; and
6) The urgent need to relay on a representative organization of all the mentioned sectors that, on the basis of the participation and weight of all the involved interests, collaborates with the President of the Republic in this regard and serves as an example of coordination between the diverse organs of the Administration that are interested in the matter.

The creation of the mentioned Agency was therefore decreed, having as main objective to advise the President of the Republic on everything related to the identification, formulation and execution of policies, plans, programmes, measures and other activities concerning space matters, and to serve as an example of coordination between the public organs that are involved with these matters.

In order to attain this main objective, the following basic tasks were entrusted to the Agency, among others:

a) To propose the national space policy, as well as the measures, plans and programmes t to execute or fulfil such a policy;
b) To serve as an example of coordination for the application of the national space policy of the programmes, plans and measures that are implemented within the framework of that policy;
c) To serve as an example of coordination of the diverse public organs that are involved with space development, both at the national and international level;
d) To promote international treaties, with the purpose of acceding to them as well as to channel scientific, technological and economic international cooperation, in relation to space activities;
e) To promote agreements or other instruments aimed at channelling private and public contributions to the development of the space matters;
f) To advise in the planning of national programmes aimed at the investigation, development and use of space technology in all its forms;
g) To propose actions that promote space activities and their use with peaceful aims, promoting scientific, technological and academic exchange, as well as education, research and promotion of the subjects related to space activities;
h) To identify and promote space technology as a tool and resource in the protection or preservation of the environment and the control of the international traffic of narcotics, in cooperation with the National Commission for the Control of Narcotics;
i) To study the effective national legislation applicable to space subjects and to propose the improvements or reforms that are pertinent, as much in the institutional scope as in the functional one. In particular, the Commission will have to elaborate and to propose a draft law aimed at creating an institution that assumes the development of space activities on an ongoing basis.

For the practical operation of the Chilean Space Agency, a basic, functional and effective organization was implemented.

In the three years of its operation as a President Advisory Commission, the Chilean Space Agency has produced the following important results:

- Establishment of the general coordination of the Agency as an executive and technical directorate with basic corporative image (mailing address, telephones, fax, email, website) with an optimal cost/benefit *ratio* when considering a minimum budget;
- Preparation of draft Law for the creation of a definite Agency and national space policy;
- Consolidation of the national space community through the Technical Advisory Committee with *ad-honorem* consultants (31 Organizations, more than 80 experts

in scientific, technological and legal areas).

- Integration in the international space community such as COPUOS and GEO;
- Memorandum Of Understanding (MOU) with the Russian Federation, Israel, Brazil, Ukraine, China, France and OOSA and advanced connections with the Republic of Korea, India, Italy, Argentina, Canada, Austria and ISU;
- Exposure at the FIDAE in 2002 and 2004;
- Space Campaigns of the Americas;
- Institutional support to prepare scientific projects to be sent to the International Space Station through the first Chilean Cosmonaut. Support to create space organizations in the Region (Uruguay, Venezuela and Colombia);
- Visits of official delegations from the space agencies of Canada, China, France, Ukraine, Republic of Korea and Peru;
- Activation of the Space Area in the National Museum of Aeronautics and Space;
- Creation of a new Website: www.agenciaespacial.cl;
- Sponsorship of projects with national funds;
- Preliminary proposals of projects consisting of space systems in the Chilean Earth stations, technological transfer, projects of micro-satellites and nano-satellites, participation in existing constellations, Earth observation missions. These proposals come from agencies and space organizations of France, Europe, Argentina, South Republic of Korea, Spain, the United Kingdom, South Africa, Israel, Canada, among others.

Currently, three years since its establishment, the Chilean Space Agency has also established relations with other space agencies and institutions, such as Astro Chile, Empresa National de Telecommunications (ENTEL)**,** Empresa National de Aeronautica (ENAER), Corporación Nacional del Cobre (Codelco) and Consejo Nacional para el Control de Estupefacientes. (CONACE), at the national level; and with Comisión Nacional de Actividades Espaciales (CONAE, Argentina), Centre National d'Etudes Spatiales (CNES, France), Canadian Space Agency (CSA), National Aeronautics and Space Administration (NASA, USA) and the Group on Earth Observations, at the international level.

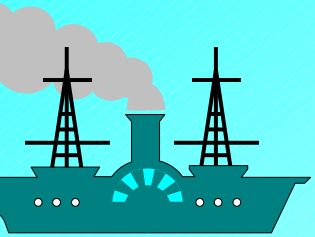
A SPACE AGENCY FOR CHILE

- HISTORICAL DEVELOPMENT
- HISTORY OF SPACIAL ACTIVITIES IN CHILE
- MOTIVATION TO CREATE A SPACE AGENCY
- BASIC TASKS OF THE SPACE AGENCY
- THE CHILEAN SPACE AGENCY
- ACHIEVED PROGRESS
- GATHERED EXPERIENCES
- BENEFITS FROM SPACE TECHNOLOGY
- INTERNATIONAL TREATIES
- FUTURE PROJECTS

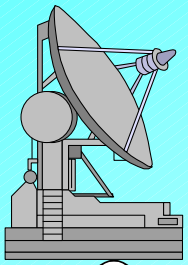
PROF. JEANNETE IRIGOIN
DIRECTOR, INSTITUTE OF INTERNATIONAL STUDIES,
UNIVERSITY OF CHILE

HISTORICAL DEVELOPMENT

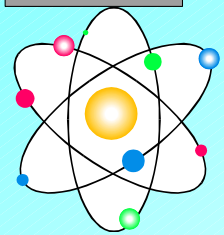
- Availability of resourses



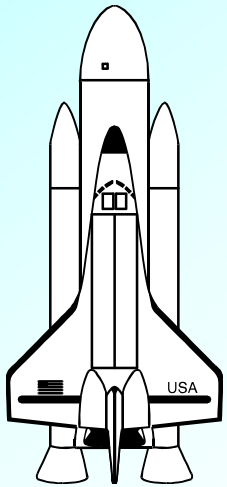
- Comunications / transport



- Information



- Knowledge



HISTORY OF SPATIAL ACTIVITIES IN CHILE

- **1959 cooperation agreement: Chile - NASA**
  - **Establishment of the Center of Spatial Studies (CEE) in the University of Chile**
  - **Installation of the first satellite tracking station in Chile**

- **1968 First Latin-American terrestrial satellite communications station in Longovilo**

- **1980 Establishment of the Commission for Spatial Issues**
  - **Advise the President of the Republic**
  - **1995 prepares a project of national spatial law**

- **1986 DGAC and NASA agree on extension of the emergency space shuttle landing track at Easter Island**

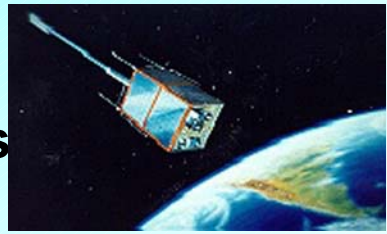
SPATIAL ACTIVITIES IN CHILE
(cont.)

- 1993 Chile is seat of the 2nd Spatial Conference of the Americas
- 1995 Santiago mission control center of COSPAS – SARSAT
- Spatial programme of the Chilean Air Force and the General Directorate of Civil Aeronautics. FASAT Alfa and Bravo projects (1993-2001)
- 1996 Protein crystallization experiment “Chagaspace”

SPATIAL ACTIVITIES IN CHILE

(Cont.)

- 1997 Chilean Diplomat is chosen Vicepresident of COPUOS



- 1998 FASAT Bravo: fotographs from 150 meters
  - 10 specialized professionals
  - Life utility until July, 2000
- 1998 Chile is seat of the Regional Preparatory Conference of UNISPACE III for the Latin-American and Caribbean Group
- 2000 Chilean Space Assosiation ACHIDE A.G.
  - Assembles professionals of the satellite field
- 2000 House of Representatives backs the project of the 1st Chilean Astronaut

SPATIAL ACTIVITIES IN CHILE

(Cont.)

- **2001 The Presidential Advisory Commission is created:**

- give life, by means of a law project, to a space agency and propose a National Space Policy
- take up the responsability of coordinating, on a national basis, all the efforts related to satellite technology and spatial research

- **2001 Establishment of the Presidential Advisory Commission Space Agency**
- **2002 IV CEA: Chile proposes the creation of regional agreement mechanisms for space issues**
- **2002 The Chilean Space Agency signs Memorándum of understanding with the space agencies of Brasil, France, China, Israel, Ucraine and on OOSA in 2003.**

- Contacts are taken up with Argentina, Canada, Holand, Spain, India, Germany, South Korea, Austria, South Africa, Japan, UK, EU, etc.

MOTIVATIONS FOR THE CREATION OF A SPACE AGENCY: GLOBALIZATION

- Location: ultra terrestrial space, no national sovereignties
- High level of knowledge integration
- Need for international cooperation to finance these projects
- Reason for the existence of the communication satellites

MOTIVATIONS FOR THE CREATION OF A SPACE AGENCY:

The use of spatial technology in other areas of national relevance entails economic and social development

Capability to affirm before the international community the need for pacific purposes in the use of ultra terrestrial space

Need to integrate all sectors involved in spatial activities development, such as government, civil society, military, academics and economics

BASIC TASKS OF THE SPACE AGENCY:

- Propose national spatial policy and coordinate its application
- Propose and promote international treaties for scientific, technological and economic cooperation
- Encourage and sponsor research and development of spatial activities
- Identify and recommend space related resources and tools for the protection of the environment

Presidential Advisory Commission
Space Agency

President of the Republic

Aviation Undersecretary, President of the Commission
Undersecretaries of For. Affairs, Telecom., Education
Gral of Presidency
DIPESP, FACH, Ex.Secr. Council of University Directors
2 designated scientists by Science Academy
2 Business Representatives + 3 Special Guests
President Conicyt, Exe. Secretay Ejecutivo of theCommission

D. S. 338
17.7.01

GENERAL COORDINATOR (Satellite Expert)
SUPPORT STAFF

Technical Assessment Committee

SCIENTIFIC & TECHNOLOGICAL

LEGAL SUBCOMITÉ

EVERYONE PARTICIPATES IN THE EFFORT

OO II ,

Forums & Conferences

Space Agencies

Foreign Private Businesses

President of the Republic

Tax Ministry

Parliament

others ministries & institutions

academics

National private sector

ACHIEVED PROGRESS

- The spatial community has assembled around the "Space Agency"

- All sectors recognize its moral and technical authority

- Need for international insertion in technical and political instances

GATHERED EXPERIENCES

- Authority with future vision
- Political will at the highest level
- Commitment of the main private, governmental and academic actors.
- Follow the correct sequence:
  - Commission conceives state spatial policy
  - Create institutions (Space Agency)
  - Assign corresponding budget

    (Projects + Workforce)

BENEFITS OF SPACE TECHNOLOGY

- **A) Knowledge of the earth and its environment**
  - Observe climate change and changes to ozone layer
  - Watch appliance of environmental agreements
- **B) Watch environment and natural resources**
  - Risk evaluation
  - Mitigation of natural disasters effects
  - Meteorological forecasts
- **C) Facilitate communication and reduce information gaps**
  - Communication, video-conferences, tele-medicine, and
  - tele-education to remote and extensive areas

BENEFITS OF SPACE TECHNOLOGY (cont.)

- **D) Utilization of navigation means improve security and human development**
  - Satellite navigation systems enhance security
  - Support of a series of economic activities

- **E) Commercial advantages and secondary benefits resulting from spatial**
  - Research and spatial development boost and include high technology innovations, such as computer programs, electronics, telecommunications and health sciences

INTERNATIONAL TREATIES (signed by Chile)

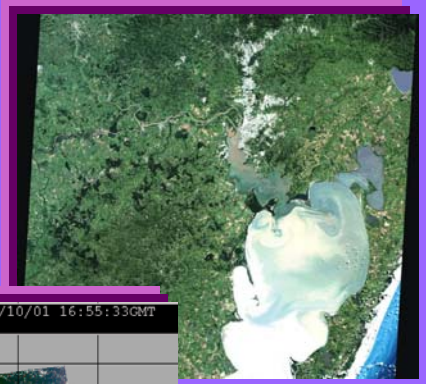
- 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies
- 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space
- 1972 Convention on International Liability for Damage Caused by Space Objects
- 1974 Convention on Registration of Objects launched into Outer Space
- 1979 Agreement Governing the Activities of the States on the Moon and other Celestial Bodies
- Principles Related to the Use by States of Artificial Satellites for International Direct Television Transmissions, adopted by the General Assembly of the UN (Res. 27/92)

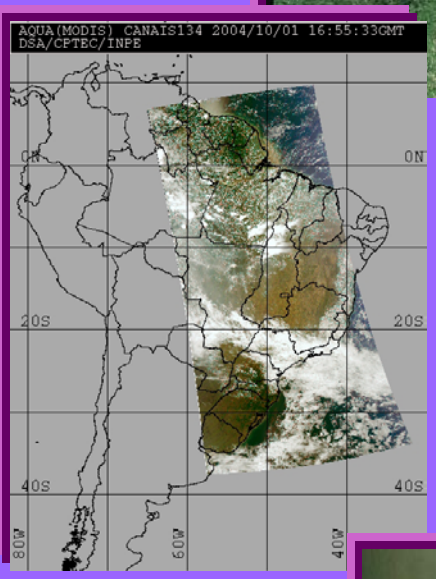
FUTURE PROJECTS

- **Organization of seminars (FIDAE 2004)**
- **Viability studies for the launch of the first telecommunications satellite**
- **Launch of 3 nano satellites for radio amateurs (AMSAT CE)**
- **Astrochile project**
  - Scientific experiments related to “balance”
  - Univ. of Santiago, Univ. of Berlin & German Space Agency
- **Studies for a National Reception Center, Treatment and Dispatch of Satellite Images**

Capacity Building and Education in Space Law in the Latin America and Caribbean Region

UN TREATIES AND PRINCIPLES ON OUTER SPACE



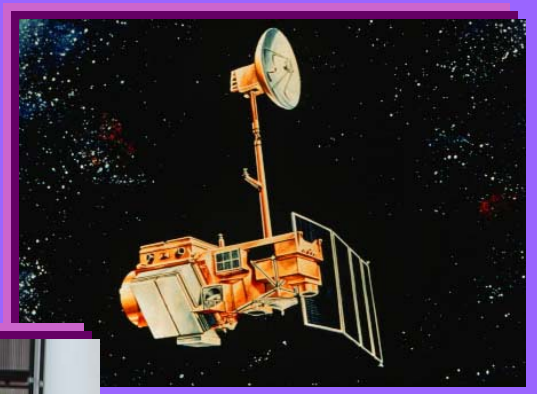


TANIA MARIA SAUSEN

INPE/CEP

CAMPUS BRASIL/CRECTEALC

tania@ltid.inpe.br



UN TREATIES AND PRINCIPLES ON OUTER SPACE

What are treaties and principles on outer space?

I am a geographer, I am just a remote sensing data user.

I am not a lawyer nor a diplomat, why I have to know about treaties and principles on outer space ?

Why do I need them? These are lawyers and diplomats business

This is not my business!!!!

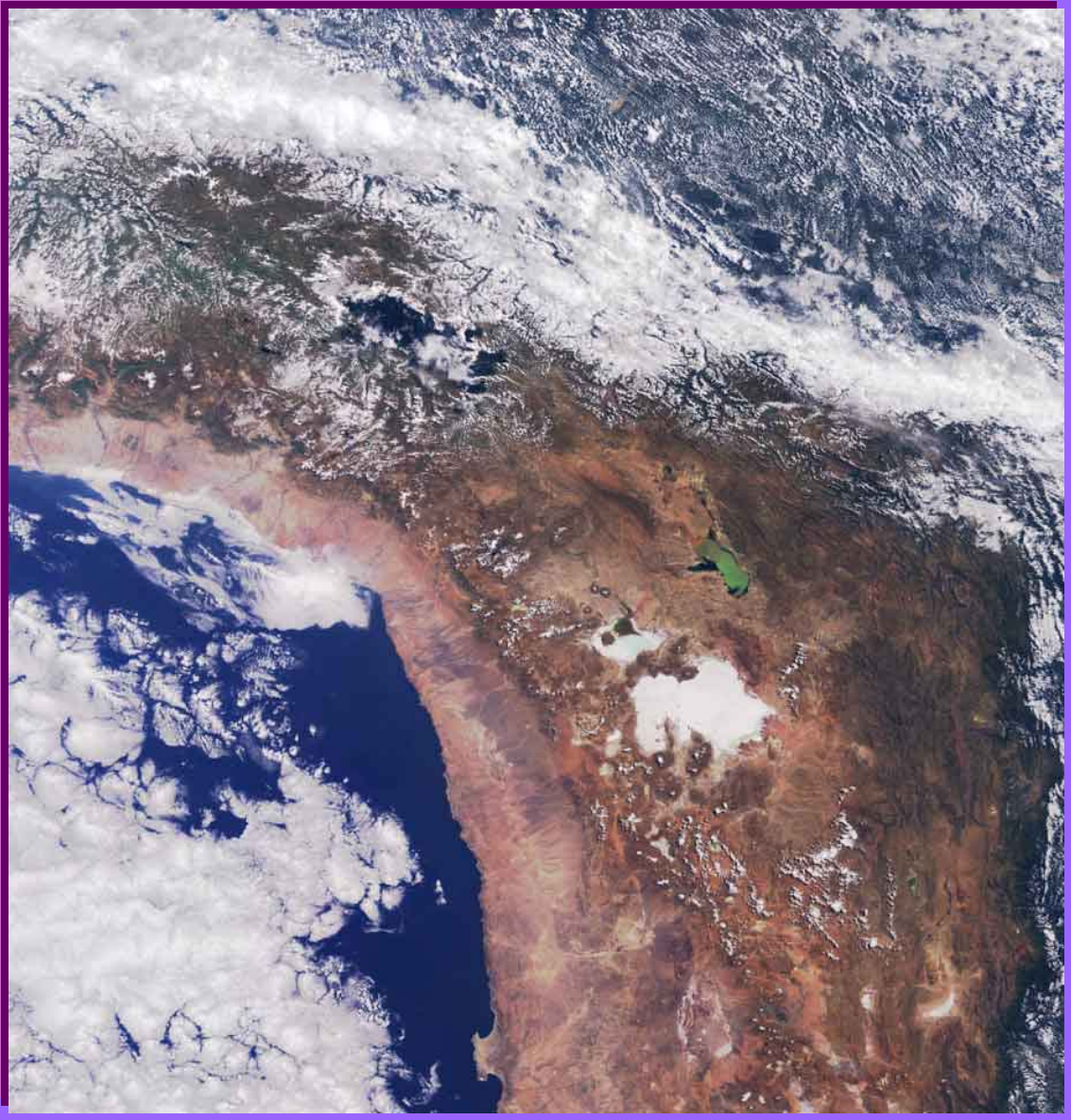
WRONG!!!!!!! THIS IS MY BUSINESS!!!!

UN TREATIES AND PRINCIPLES ON OUTER SPACE

CURRENT SITUATION (Latin America and Brasil):

- LANDSAT data are available since June 1972;
- Around additional 14 remote sensing satellites and data are available for the end users;
- Most of these remote sensing data are in high resolution like IKONOS, EROS, ORBVIEW, IRS e RESOURCESAT (from 5 m to less than 1 m);
- Besides the NOAA/AVHRR now are available the MODIS, CBERS/WFI, ORBVIEW (from 260m to 21km resolution), which only one image cover very large areas;
- Now it is possible to get satellite images, for research and apllication projects, free in internet, like CBERS and MODIS;
- It is very easy to buy satellite images by internet, all we need is a credit card and very good access to internet;

UN TREATIES AND PRINCIPLES ON OUTER SPACE



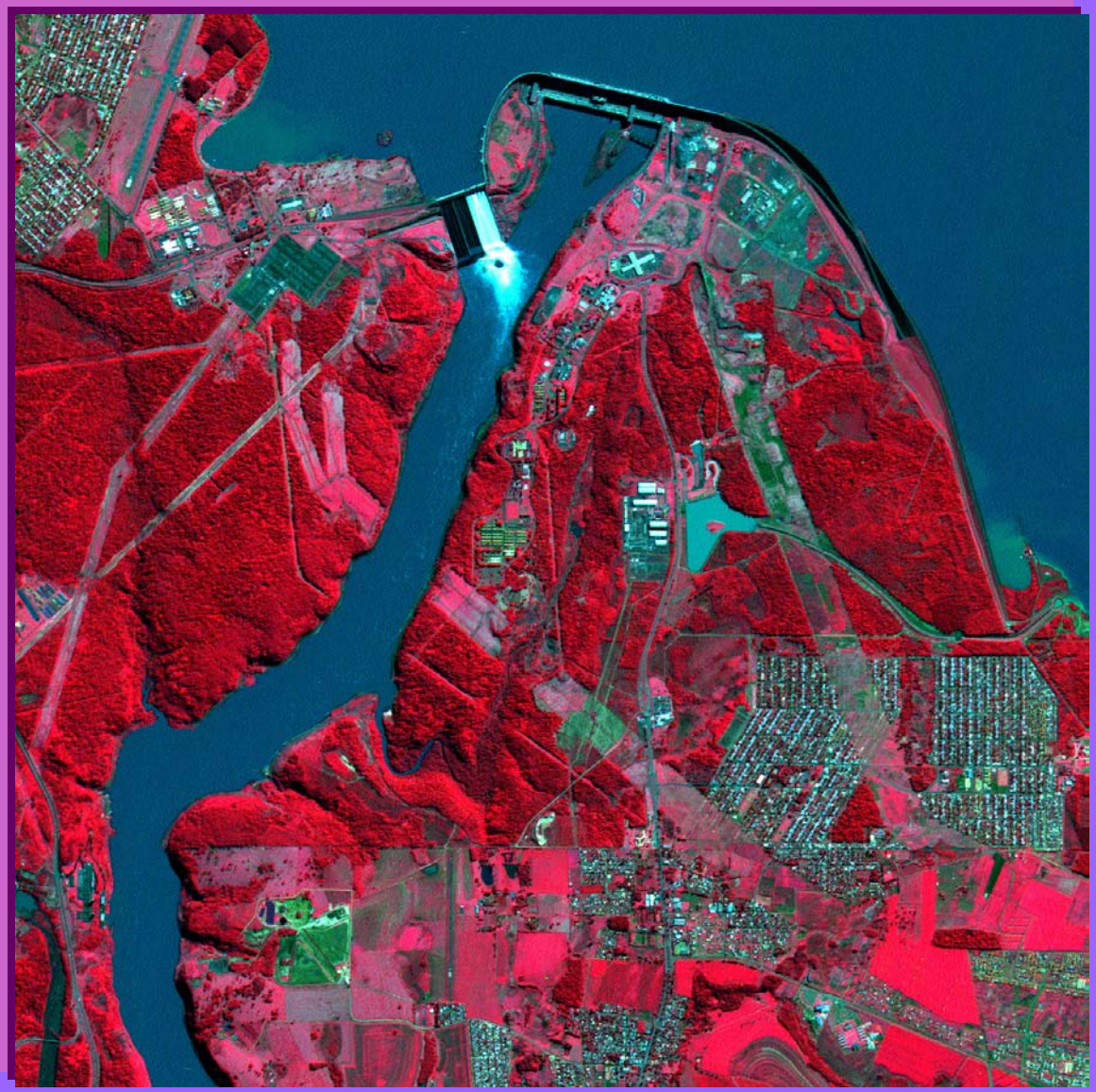
Uyuni Salar

Border among Bolivia, Peru and Brasil

ENVISAT

Meris/21km resolution

UN TREATIES AND PRINCIPLES ON OUTER SPACE



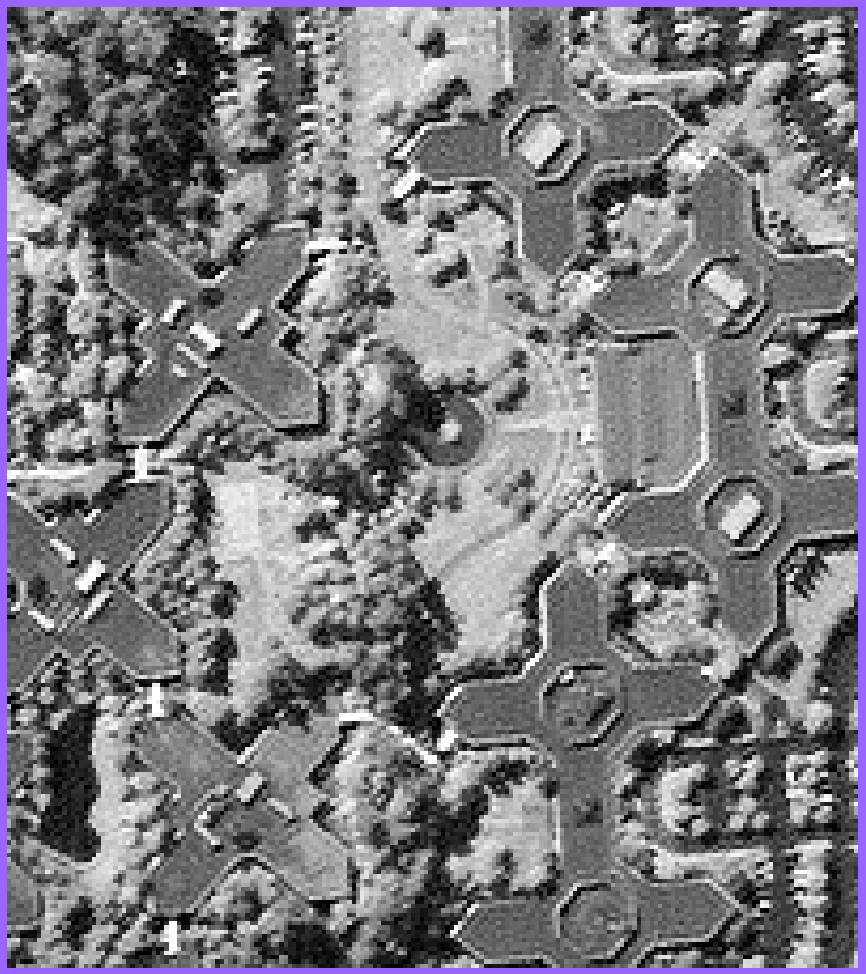
Foz do Iguaçu/Itaipu dam

RESOURCESAT-IRS6

1M Resolution

UN TREATIES AND PRINCIPLES ON OUTER SPACE

CURRENT SITUATION (all over the world):



The remote sensing datas in JPG and TIFF available, free for download, in several in homepages are good enough for a first approach or general overview about a specific area

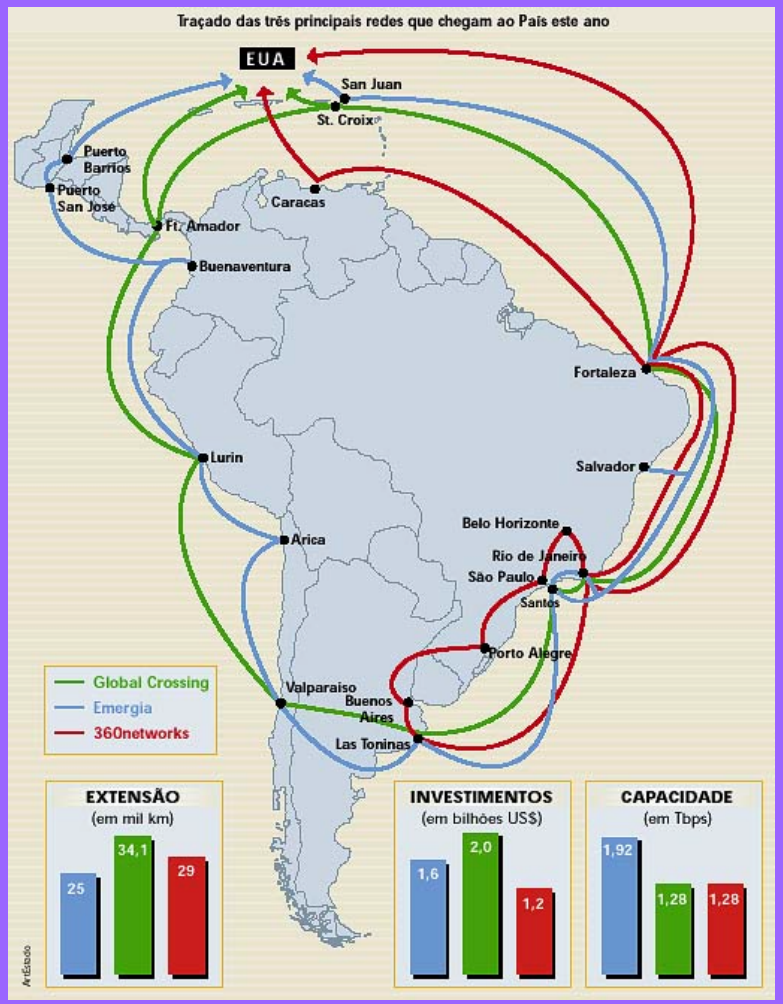
Microsoft Corporation
Headquarter, Redmond
Washington,USA

EROS Images, August18,2003

Sub-meter resolution

UN TREATIES AND PRINCIPLES ON OUTER SPACE

THE ROUTES OF INFORMATION IN SOUTH AMERICA



Through this network is possible to exchange remote sensing data and information in all Latin America, all we need are:

- very good computers,
- internet broad band,
- telephone,
- fax,
- printers and CD ROMs

UN TREATIES AND PRINCIPLES ON OUTER SPACE

CURRENT SITUATION (Latin America and Brasil):

- Remote sesing data recorded/day just in INPE tracking center:

  - 5GB raw data recorded/day
  - Two overpasses/day for each satellite (LANDSAT -5 and CBERS)
  - One hundred images recorded/day (LANDSAT 5 and CBERS);
  - LANDSAT-5 – 14.000 images/year
  - CBERS-2 – 22.000 images/sensor/year (IRMSS and CCD) and 2.750 images – WFI
  - Remote sensing raw data stock in INPE since June 1973–130TB
  - INPE is creating the Data Center which will put avialable for free download the LANDSAT archives since june 1973 + CBERS data;

UN TREATIES AND PRINCIPLES ON OUTER SPACE

CURRENT SITUATION (Latin America and Brasil):

- Just in Brasil there are more than 3000 remote sensing users
- There are around more 4000 in the other Latin American countries;
- Around 70% of these users are in government institutions or universities;
- There are hundred remote sensing data distributers in Latin America
- ***90% of these professionals NEVER heard or read anything about the remote sensing principles or principles and treaties about outer space;***
- There are no sessions or presentations dedicated to remote sensing treaties or principles in the Brazilian, Latin American or International congress, symposiuns or conferences;
- These topics are never presentated or discussed in remote sensing courses, post-graduation programs, journals or papers;

UN TREATIES AND PRINCIPLES ON OUTER SPACE

CURRENT SITUATION (all over the world):

- The remote sensing principles were established in December 9th, 1986, when just three or four remote sensing satellites were availabe and there was no available high resolution images, internet facilities or free images for download.

- Principle II-Remote sensing activities shall be carried out for the benefit and in the interest of all countries.....and ***taking into particular consideration the needs of the developing countries***;

- Principles III and IV –the remote sensing shall be conducted in accordance with.....such, such principles or treaties.... ***But the remote sensing users do not know these principles and treaties***

UN TREATIES AND PRINCIPLES ON OUTER SPACE

CURRENT SITUATION (all over the world):

- Principle XI- Remote Sensing shall promote the protection of mankind from natural disasters. To this end, States participating in remote sensing activities that have identified procesed data and analysed information in their possession that may be useful to States affected by natural disasters, or likely to be affected by impending natural disasters, shall trasmit such data and information to States concerned as promptly as possible.

- Principle XII- 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 analysed 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 developing countries.

UN TREATIES AND PRINCIPLES ON OUTER SPACE

QUESTIONARY:

Do you know, was informed or read somethnig about UN Treaties and Principles on Outer Apace Affairs, such as :

- Treaty on Principles Governing the Activities of States in Explorationand Use of Outer Sace, including theMoon and otehr Celestial Bodies;

- Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space;

- Principles related to Remote Sensing of the Earth from Space;

- Declaration of International Cooperation in the Exploration and Use of OuterSpace for the Benefit and in the Interest of States and taking into particular Consideration the needs of the Developing Countries.

UN TREATIES AND PRINCIPLES ON OUTER SPACE

• XVII International Course on Remote Sensing and GIS-Latin American Professionals, March 2004;

• IV Conference on Remote Sensing Education in Mercosul-Remote sensing educators from Latin America, August 2004;

UN TREATIES AND PRINCIPLES ON OUTER SPACE

THIS IS MY BUSINESS!!!!

THIS IS OUR BUSINESS!!!

THIS IS ALL OUTER SPACE COMMUNITY BUSINESS!!!!

UN TREATIES AND PRINCIPLES ON OUTER SPACE

Why to inform these people about the UN Treaties and Principles on Outer Space?

Because:

- They are working in space area;
- They are responsible for research and application projects in their own countries in space area;
- They coordinate or take part in the proposals for the nationals plans in space area in their own countries;
- They are developing satellites, equipments and devices in space area;
- They are dealing with space data or information;
- They are dealing with education in all levels and are preparing the futures professionals for space area.

UN TREATIES AND PRINCIPLES ON OUTER SPACE

HOW TO REACH THIS COMMUNITY:

- To disseminate these information to everyone that is involved with space activities through:
  - Internet (to dissemiante sites an homepages widely)
  - Through publications (to be distribute widely)
  - To promote and organize presentations or sessions in congress and symposiuns related to space area;
  - To promote conferences in undergraduation and graduation courses related to space area (engineering, geography, biology, meteorology,physics,etc);
  - To publish papers in magazines and journals related to space area;
  - To promote conferences or seminars for data distributers;
  - To promote conference or seminars to midia professionals;

María Eleonor Picarel
Professor
Buenos Aires, Argentina

We came here to share knowledge, information and ideas, but also to share our worries and hopes.

I have been very lucky because, having studied law at the "Universidad del Salvador", in Buenos Aires, which was the first University in the world to include space law in the curriculum of its School of Law, I fortunately have had the privilege of having an extraordinary Professor: Dr. Aldo Armando Cocca. You all know his efficiency as a creator of space law. But, perhaps you do not know him as the gentleman who made his students love space law and who always encouraged us to think by ourselves, in face of the many problems that the space era would raise, searching for innovative issues for traditional concepts, like law and justice, equity, right and wrong, lawful and unlawful or legal and illegal behaviours. We must never forget that without men and their interaction in society, law does not exist, no matter what you call it: Law, Derecho, Direito, Droit, or whatever expression you may use in your own language. Law can only be conceived for.

So, whenever we talk or think about law, we are talking and thinking about people. People who, according to their own cosmovision, cultural heritage, language, religion, traditions and background, create rules – written or not — to provide a certain stability to their interaction and thus, are able to live together in order and peace. Rules that will contribute to their growth and development, according to their needs, which may differ from the needs of other groups or communities.

In essence, law is the system of rules that exists in a certain society for the sake of life, development and welfare of its members, so that they may live in harmony with the other members of that human group.

Before the birth of space law, law was circumscribed to our planet but since the moment human activities reached outer space, law, that is, a system of protection for every man, has broken its previous limits and frontiers and, accompanying men and their goals, went beyond our planet extending its protection to outer space.

For many millennia, Earth has been the only place in the whole and vast universe to shelter humankind, therefore, there has been no other place for law; however, in the last decades of the 20th Century, following the perpetual need of mankind to always go further in the exploration of the unknown and the apparently unreachable, men conquered a new place that had till then, been forbidden for them: outer space. This was a new world to explore, a new victory for those who were never satisfied with what they already had and knew, and who endeavoured to reach what other people had not been able to reach.

For this new region, men needed new ways of protection and new rules, which had to necessarily differ from any other previously conceived, because in this unknown and strange

space, those rules could not be adequate or enough to give people what was due to them. And having agreed that the need to create those new rules for the peaceful uses of outer space was a priority, the 1967 Outer Space Treaty was adopted after many years of discussion, reflections and work.

As life evolves and things often change, the Treaty may seem to some authors something "demodé", out of time. But, is it really so? I must say I am convinced of just the contrary.

In my opinion, the Treaty is the quintessence of space law and it is impossible to understand space law without understanding the Treaty.

To develop new rules for any particular area or activity in outer space, we will always need to go back to the principles and rules of the Treaty, because outer space is not, and cannot be, a good or thing in commerce; it belongs to mankind and not to any individual or State. It is a region hostile to human beings but, at the same time, it is useful for mankind. That is why it has been recognized as "common heritage of mankind" or as I like best "*patrimonio común de la humanidad"*, a region which we have the right to explore and use without introducing any damage.

The benefits of this use, exploration and even exploitation of outer space must, therefore, be shared by all the peoples of Earth. And one of the most important principles states that the means by which the less developed countries can share those benefits is international cooperation.

Before 1969, someone said: who has the Moon, has the Earth. And this was the idea that led to the need for establishing a non-appropriation principle as a first step towards the recognition of the res communis humanitatis, principle enshrined in the Moon Agreement as common heritage of mankind.

I would also like to remind you that the *corpus iuris spatialis* was established by consensus, implying the need for an express agreement by the attendants to the General Assembly of the United Nations, under the rules that were prepared by experts in law, not allowing financial or political opinions interfere with their work.

Unfortunately, many of the good habits in the elaboration of space law seem to have been forgotten, and that worries me. It also worries me that sometimes the political and economical aspects prevail over the juridical point of view. I do not see any good in it, and I am afraid we can loose our way. I fear we can put an end, unwillingly, to space law.

Nevertheless, I still think that there is hope to preserve space law from the deleterious effects of the above-mentioned interferences. In addition, the hope is that governments understand that space law is to be preserved like the masterpiece it was at its beginning. The expectation is that those experts who can still teach it to the new generations may find some students who undertake with love and enthusiasm studies on space law.

My hope is, finally, that we may go back to the fountains and recover our steps, taking the right direction.

I make an appeal to all of you: please, go back to the principles of the Outer Space Treaty, and never forget that international cooperation is the only possibility for a better world, a world that is worth living in, the world you all surely dream of, deep in your hearts for you and the future generations. Thank you for your attention, and please do not deceive yourselves.

Regional Centre for Space Science and Technology Education for Latin America and the Caribbean CRECTEALC

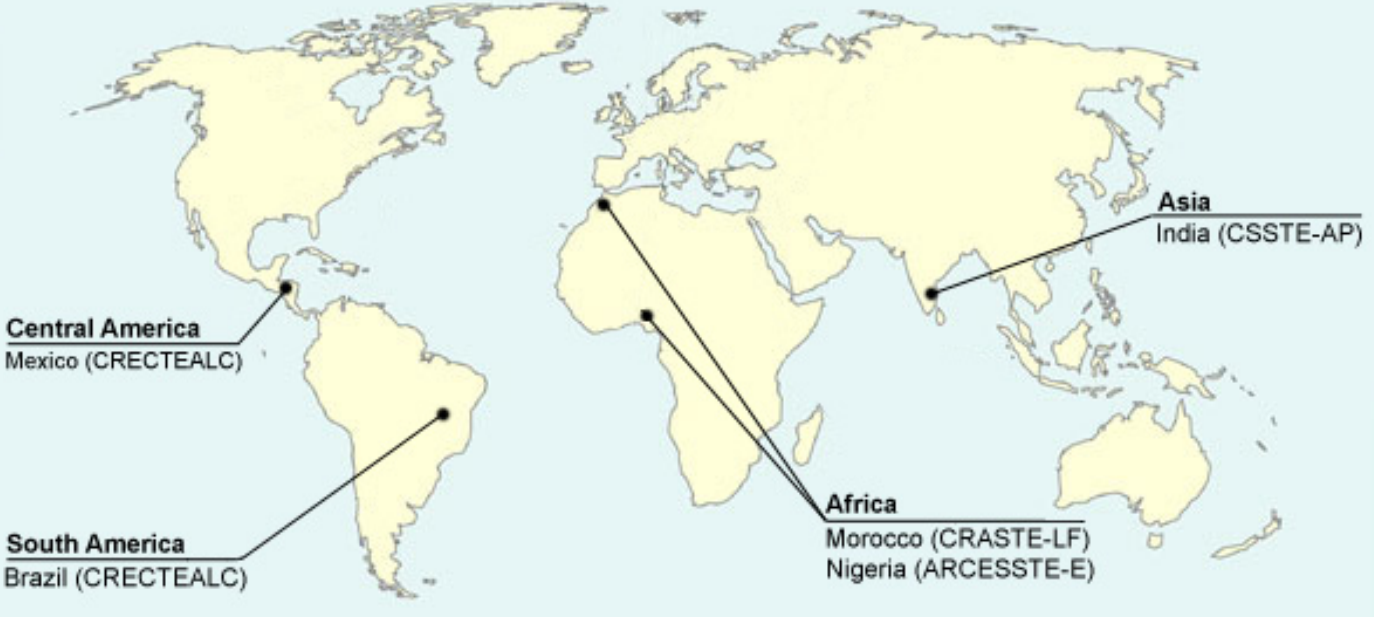
(Affiliated to the United Nations)

United Nations/Braz
Workshop on Space La

1. Regional Centres for Space Science and Technology Education

- Education is a prerequisite to manage the challenges of space science and technology.
- The United Nations is leading an effort to establish regional Centres for Space Science and Technology Education in major regions on Earth.
- The General Assembly (GA), in its resolution 45/72 (December 1990), endorsed the recommendation of the Working Group of the whole of the Scientific and Technical Subcommittee, as approved by the Committee on the Peaceful Uses of Outer Space (COPUOS), that: "...the United Nations should lead, with the active support of its specialized agencies and other international organizations, an international effort to establish regional centres for space science and technology education in existing national/regional educational institutions in the developing countries".
- The GA in its resolution 50/27 (December 1995), also endorsed the recommendation of COPUOS that "these centres be established on the basis of affiliation to the United Nations as early as possible and that such affiliation would provide the centres with the necessary recognition and would strengthen the possibilities of attracting donors and of establishing academic relationships with national and international space related institutions".

Regional Centres for Space Science and Technology Education (affiliated to the United Nations)



Map CENT-03-01 Rev.1
June 2003

Office for Outer Space Affairs (UN-OOSA)
United Nations

2. Legal status of CRECTEALC at national level & consolidation process

- The Regional Centre for Space Science and Technology Education for Latin America and the Caribbean (CRECTEALC) was established in 1997 based on UNISPACE 82 recommendations after an Agreement between the Governments of Brazil and Mexico. The two countries act as the main coordinators and alternate headquarters of the Centre.
- In September 2000 CRECTEALC signed an Agreement with Brazilian Government for the operation of Campus Brazil.
- In October 2002 CRECTEALC signed the Site Agreement with the Government of Mexico for the operation of Campus Mexico. At the same time SRE-INAOE-CONACyT signed the Coordination basis to start the Campus educational activities.
- The affiliation to the United Nations was signed on the 11th of June, 2003.

3. CRECTEALC infrastructure

- The host institution of the Centre in Mexico is shared by the Secretary of Foreign Relations - SRE, the National Council of Science and Technology - CONACYT and the National Institute of Astrophysics, Optics and Electronics – INAOE, in Tonantzintla, Puebla.
- The quality of host institution of the Centre in Brazil is the National Institute for Space Research - INPE of the Ministry of Science and Technology - MCT. Both the Secretary of CRECTEALC and its Brazilian Campus are located at INPE facilities, in São José dos Campos, São Paulo.

Secretaría de Relaciones Exteriores

INAOE

CONACYT
Consejo Nacional de Ciencia y Tecnología

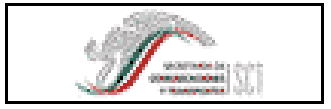
Ministério da Ciência e Tecnologia

INPE
MINISTÉRIO DA CIÊNCIA E TECNOLOGIA
INSTITUTO NACIONAL DE PESQUISAS ESPAC

4. CRECTEALC Objectives:

- Develop the skills and knowledge of university educators, environmental research scientists and project personnel in the design, development and application of remote sensing and related technologies for subsequent applications in national and regional development and environmental management programmes including biodiversity protection.
- Assist educators to develop environmental and atmospheric sciences curricula that they can use to advance the knowledge of their students in their respective institutions/countries.
- Enhance national and regional communications systems including those associated with rural development, delivery of health services, disaster mitigation, air and maritime navigation, and network/linkage of the region´s professionals and scientists, governments establishments and industries in order to facilitate the exchange of new ideas, data and experiences.
- Assist research and application scientist in preparing space-derived information for presentation to the policy and decision makers in charge of national and regional development programmes.
- Enhance regional and international cooperation in space science, technology and applications programmes.
- Assist in disseminating to the general public the value of space science and technology in improving their everyday quality of life.
- Support other relevant activities that coud enhance the scientific development of the region.

5. Campus Mexico Networking



6. Current status of Campus Mexico

Graduate courses:

- The first "Course on Remote Sensing and Geographic Information Systems of CRECTEALC", in Campus Mexico, started in September 2004 in Tonantzintla, Puebla. Besides the support from the Government of Mexico through the Secretary of Foreign Relations - SRE, and the National Institute of Astrophysics, Optics and Electronics – INAOE, the course also count with the financial support of the Organization of the American States – OAS.
- The course is focused to employees from the Federal Agency of Investigation (AFI) and the Mexican Navy (SEMAR).
- The Campus is also planning to start graduate courses between 2005 and 2006 in the following fields: Satellite communications and navigation systems; space and atmospheric sciences; satellite meteorology and global climate, and earth observation.

Seminars:

- 1st. Geographic Information Systems seminar in collaboration with the National Institute for Geography, Statistics and Systems (INEGI), in December 2004.
- 1st. Seminar on Satellite communications and Latin America & the Caribbean development, Julio 11-15, 2005.

7. Enhancing capacity building of Campus México in space science and technology education

- Last 28th September Campus Mexico signed a Framework Agreement for collaboration with the Latin American Institute of Educational Communication (ILCE), based in Mexico City. Same day an experts meeting started to explore new ways to collaborate between both regional organizations, in order to strengthen their own capacities to satisfy current and future demands of education in the region.
- The main objective: To promote **distance education** through the complex tools developed by ILCE besides the support of CRECTEALC Campi infrastructure, in order to benefit the whole region.
- The first joint programme: An **educational portal** to promote on line education. Campus Mexico and ILCE expect to launch the first part of this project on December 2004.
- Teleduc project. CRECTEALC-ILCE-UNICAMP, Sao Paulo, Brazil.

8. Enhancing capacity building of CRECTEALC in Latin America and the Caribbean

- The activities of the Centre will result in the development and growth of capacities that will enable each country to enhance its knowledge, understanding, and practical experience in those aspects of space science and technology that have the potential for a greater impact on its economic and social development, including the preservation of its environment.
- To promote the achievement of those aims the educational objectives of CRECTEALC include the promotion of graduate courses, workshops and seminars following the curricula, as suggested in the UN-OOSA document A/AC.105/649 of 1996 and COPUOS documents A/AC.105/L.238 to 241.
- The Centre is gradually implementing the courses on Remote Sensing and Geographic Information Systems, Satellite Meteorology and Global Climate, Satellite Communications and Global-Position-Systems and on Space and Atmospheric Sciences, in both Campus Brazil and Campus Mexico.
- Besides the efforts towards the implementations of courses, the Centre also has acted in the promotion of workshops and conferences on space science and technology in collaboration with national and international institutions.

- Education in space science and technology in Latin America and the Caribbean must advance at the same speed in developed countries where it has become highly interactive.
- The *distance education, internet, satellite communications,* and other information technologies have become useful tools in education programmes at all levels.
- Through CRECTEALC programs and projects it can enable all countries to take advantage of the benefits inherent in the new technologies, which, in many cases, are spin-offs from space science and technology. It can revitalize the educational system, introduce new concepts of high technology, and help to create national capacities in science and technology in general.

...

- CRECTEALC actions must be effective to join the knowledge and the practice for the realization of programs who have a positive impact in the society, through the sinergy of the Campi in the use of information and communication technologies to contribute to the improvement of the educational level in the region.

- CRECTEALC recognizes the importance of combining efforts with the aim of strengthening the infrastructure taking advantage of the **distance education** which allow to mix time and space benefits, reducing and optimizing costs in a comprehensive manner through the use of information, communication and educational technologies in its courses, workshops, seminars, etc.
- Besides this strategy CRECTEALC is promoting its activities with Latin American and Caribbean governments and operating an intensive search of international donors to finance CRECTEALC activities (FEMCIDI/OAS & UNESCO).

8. Space Law in Mexican Universities

There is no a specific bachelor, master or PhD, on Space Law in Mexican Universities however some programs and specialties in these institutions like International relations and International law include courses on space law as a part of the whole formation process. The most known institutions on this field are:

- **Universidad Nacional Autónoma de México (UNAM):**
  - **Facultad de Derecho**
  - **Facultad de Ciencias Políticas y Sociales (Centro de Relaciones Internacionales)**
  - **Instituto de Investigaciones Jurídicas (IIJ)**
- **Centro de Investigación y Docencia Económicas (CIDE)**
- **Universidad de las Américas - Puebla (UDLAP)**
- **Universidad Iberoamericana (UIA)**
- **Universidad Anahuac**
- **Centro de Estudios Internacionales (CEI) de El Colegio de México, A.C.**
- **Instituto de Estudios de la Integración Europea (IEIE) del Instituto Tecnológico Autónomo de México (ITAM)**
- **Centro de Investigación Jurídica (CIJ) del Instituto Tecnológico de Estudios Superiores de Monterrey (TEC)**
- **Instituto Tecnológico y de Estudios Superiores de Occidente (ITESO)**
- **Instituto Universitario de Investigaciones Jurídicas (IUIJ) de la Universidad de Colima**
- **Instituto de Investigaciones Jurídicas de la Universidad Veracruzana**
- **Red de Institutos de Investigación Jurídica en México**

9. Campus Mexico based at INAOE

National Institute of Astrophysics, Optics and Electronics INAOE

- Founded in 1971 by Guillermo Haro
- One of the 29 Conacyt centers. Federal government institution
- Facilities in Tonantzintla, Pue; Cananea, Son; and Sierra Negra volcano (Altitude 4600 meters).
- Basic scientific research
- High quality human resources.Postgraduated studies.
- Solve applied science and technological problems for the country
- Science divulgation

Current research projects:

- 55 projects in basic research
- 19 projects with the Mexican Navy
- 1 project with the Puebla gouverment

Graduate programs. Master and PhD in: Astrophysics; Optics; Electronics & Computer sciences.

www.inaoep.mx

INAOE Basic research

Astrophysics

- Extragalactic astrophysics and Cosmology
- Galactic astrophysics
- Stellar astrophysics
- Instrumentation
- Radio astronomy and Millimetre astronomy

Optics

- Physical Optics
- OptoElectronics
- Instrumentation and Optical metrology
- Digital imaging processing and signals
- Quantum and statistical optics
- Photonics

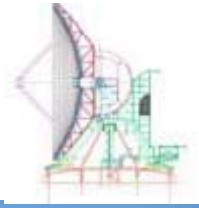
Electronics

- Design of integrated circuits
- Microelectronics
- Instrumentation
- Comunications
- Optoelectronics

Computer sciences

- Artificial inteligence
- Systems and engineering
- Scientific computations

Technological projects



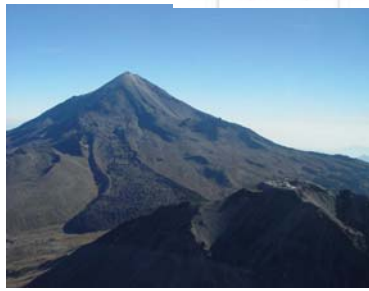
GTM / LMT (LARGE MILLIMETER TELESCOPE)

UMass/Amherst & INAOE partnership

LMT is a research facility which symbolizes the intent of both Mexico and the United States to explore at the frontiers of human knowledge.

- The biggest one on his type
- 50 meters antenna
- Wavelenght between 1 and 3 mm
- It should be operational in 2005

- Composite materials
- Intelligent antennas
- Surface measurements
- Communication equipment
- Big optical surfaces (telescopes mirrors)



Current state

Martha Gaggero
Doctor in Diplomacy
Centro de Investigación y Difusión Aeronáutico-Espacial (CIDA-E/DINACIA), Uruguay

Introduction

Since the beginning of the Space Age, Uruguay has always followed space science and technology development, considering them a fundamental tool for the development of humankind. At the same time, it has always affirmed that this process should take part within the framework of international legal regulations, guaranteeing that they will take into account universal goals.

In 1957 (the year in which the space age began), the book of Dr. Alvaro Bauza Araujo "Hacia un Derecho Astronautico" was published in Uruguay and was described as the first systematic essay about the legal problems raised by satellites, space objects and interplanetary bases. .

In reference to teaching space law, since 1954 the new rules were taught in a sequence of conferences organized at the Faculty of Law of the University of the Republic. Since 1966, a systematic course of aeronautic law, which included subjects of space law, was taught every year at the Faculty of Law. Finally, in 1975 a permanent aeronautic and space law course was established, at the same Faculty, as an extra-curricular course. Only graduates from the Faculty of Law were allowed to give the final examination. Students could indeed attend the course as auditors. Its length was one academic year and it was taught by a professor and an associate professor (afterwards, three teaching assistant).

Nowadays, the curriculum is being revised in order to adapt to the new reality and to the advances in the field of space science and technology and their legal regulation. In other subjects, such as public international law and other careers like International Relations, space law is also addressed.

Outside the university field, space law and policy are subjects included in the curricula of courses taught at the School of Command of the Air Force, the Aeronautic Military School, the National High Studies Centre, the Military Institute of High Studies, among others.

Space law teaching however, is not confined to classrooms. Thus, the activities developed by the Centro de Investigación y Difusión Aeronáutico-Espacial (CIDA-E) since its institutionalization as an official organization in 1975 must now be outlined.

Among its functions, the following should be highlighted:

- Carry out research on legal problems arising from the exploration and use of outer space, the Moon and other celestial bodies;

- Organize courses, seminars and conferences on aerospace issues;
- Prepare scientific publications; and
- Update and maintain the technical information.

In its 29 years of existence, CIDA-E has had important achievements in the field of space law both at international and national level.

I. Activities at international level

Under the auspices of CIDA-E, Uruguay ratified all five United Nations Treaties on Outer Space. CIDA-E supported also Uruguay's nomination as a permanent member of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), in 1981. It developed the national paper presented to UNISPACE II and the Uruguayan position paper to UNISPACE III.

CIDA-E has had an important role in the organization and development of the III Space Conference of the Americas in 1996. The Pro Tempore Secretariat until the IV Space Conference of the Americas in 2002, organized, in continuous collaboration with CIDA-E, many seminars and conferences about space issues.

CIDA-E, as member of the International Institute of Space Law (IISL), the International Astronautical Federation (IAF) and the International Academy of Astronautics (IAA), has participated and presented papers in annual meetings of these organizations. It has also carried out works on space matters presented to meetings convened by other international specialized institutes such as the lnstituto Ibero Americano de Derecho Aeronautico, del Espacio y de la Aviacion Comercial (ALADA) and others.

II. Activities at the domestic level

Since its establishment, CIDA-E through its multi-disciplinary research commissions has given advice to national authorities, informed them about the significance of space treaties for their ratification, and prepared papers to be presented at seminars and conferences.

CIDA-E has organized a series of conferences at the University of the Republic, and many workshops, round tables and seminars, open to all those interested in aerospace issues and has also collaborated with teaching institutes, giving lectures on the legal framework of outer space to teachers of primary schools.

The bibliographic material, whose database has more than 2,800 registers, and is at the disposal of researchers and specialists, should be also highlighted. Its annual review, which has recently edited its 28th edition in 2003, is considered to be an important means to disclose space matter.

Uruguay's position with respect to space law can be summarized as follows: education and research at the domestic level and cooperation in the elaboration and observance of its regulation at the international level.

III. Ways and means to improve capacity building in the region in the field of space law and policy

Latin-American countries have had an outstanding participation in the development of space law.

Among the most significant contributions, the Common Heritage Mankind (CHM) principle, promoted by Dr. Armando Cocca from Argentina and thoroughly supported by the space doctrine in Uruguay.

Latin-American representatives have actively participated in working groups of the Legal Subcommittee of COPUOS in the study of many issues (such as the Geostationary Orbit), promoted the development of other topics (such as space benefits) and support the inclusion of new items, such as space debris, in the agenda of the Subcommittee.

In relation to education in space law, there is no doubt that education is one of the basic pillars contemporary society is built on, and one in which, scientific and technological development will continue to advance in tandem with the development of legal regulation.

As the United Nations Office for Outer Space Affairs has pointed out: "The successful operation of space law, policies and institutions in a country relies on the presence of suitable professionals. Institutions that address the subject of space law and policy play an important role in promoting national expertise and capacity in this field".

With reference to the measures that could be taken to improve space law teaching, in addition to the recommendations that emanated from the Workshop on Capacity Building in Space Law, held in The Hague, the Netherlands, in 2002, and in accordance with them, I suggest the following:

- The idea of creating a Latin-American Centre of Aeronautic and Space Law promoted by the European Centre of Space Law (ECSL) should be kept alive. The proposal, presented to our CIDA-E in 1999 by representatives of the University of Jaen (Spain), highlighted the constitution of a thematic network that would involve European and Latin-American centres, whose goal would consist of the study of various aspects of space disciplines, so as to exchange knowledge, enrich the centres with that knowledge, and make it known to the international community.
- The possibility of having students from Latin-American countries participate in the Moot Court Competition, annually organized by IISL, should also be recognized as a way to promote the study of space law, giving it a more dynamic profile. The Director General of CIDA-E in the meeting of the Board of Directors of the IISL, in 1995, introduced the initiative, but regrettably, it has not succeeded.
- In Latin America there are various countries that offer opportunities to study space law. Appealing to the principle of cooperation, which is the cornerstone of this discipline, additional measures should be taken to facilitate the exchange of experts and students and strengthen the collaboration links that already exist. In that regard, the IV Space Conference of the Americas, among its recommendations, suggested the creation of a regional centre for education in the areas of space science and technology, incorporating the different studies on space legislation and other space matters.

One must also highlight the important work of the United Nations Office for Outer Space Affairs. Through its directory of education opportunities in space law, in which CIDA-E was included, it informs the public about the institutions that provide education in this field. The directory includes areas of specialization, educational programmes offered, facilities available, prerequisite qualifications, financial information, fellowship opportunities and opportunities for

international cooperation.

The importance given to space law teaching may be related to the scientific and technological capacity of a given country, its participation in space activities and therefore, to the possibilities of a practical application by its professionals of the acquired knowledge to the working environment.

Nevertheless, non space-faring countries must be aware that, according to Article 1 of the Outer Space Treaty *"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, and shall be the province* of *all mankind*".

In view of this, education authorities must support the teaching of these disciplines, at all levels of education, as a way to create public awareness of the rights all countries have as beneficiaries of space activities, and their related obligations.

As underlined in the Vienna Declaration on Space and Human Development, which was endorsed by UNISPACE III (Vienna, 1999), one of the strategies to address global challenges in the future is through *"enhancing education and training opportunities and ensuring public awareness of the importance of space activities.* "

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Space Law and remote sensing activities

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Introduction

The magnitude of commercial space activities today has brought about winds of change. In the field of remote sensing the shift from strict State sovereignty claims to the commercial implications of the use of outer space indicates, in turn, that national space legislation and registration questions -the latter now on the agenda of the Legal Subcommittee (LSC) of the Committee on the Peaceful Uses of Outer Space (COPUOS) become matters of high priority.

One of the most welcomed consequences of that shift to commercial space activities is the weakening of the principle of sovereign immunity. This change will no doubt ease the way for future agreements on the topic, which had been discouraged in the past decades by the risk of a State -acting de *jure imperii*- invoking a clause of sovereign immunity in the course of the implementation of the agreement thus blocking its effectiveness [1]. This is particularly so insofar as dispute settlement is concerned.

However, disagreement on certain sensitive points still stands between the industrialized and developing world, especially as regards the right of access to data by the sensed State and other related -equally sensitive- issues to be addressed later in this paper.

At this point in time, it is therefore essential to determine where we were, where we are now and, in the most realistic terms, where we really would want to be concerning the legal framework to govern remote sensing in the regional and international scenarios. In order to adjust to the changes that will inevitably flow from the present context, a brief overview of the background is necessary before evaluating the present position.

I. Background to the question

1. From strict State sovereignty to commercial uses of outer space

In the early days of remote sensing technologies the natural reference was Article I of the 1967 Outer Space Treaty under which -in those days at least- the activity was governed by a regime of complete freedom. Yet, even in those early days, a confrontation was dividing the industrialized and developing world. And it is now fair to say that, in a different international context where commercial space activities have reached unprecedented dimensions, this divergence still remains.

[1] Report of the 71st Conference of the International Law Association, Space Law Committee, Report on Remote Sensing by the present writer, 16-21August 2004, Berlin (presently being printed), www.ila-hq.org (click on "committees").

Within the United Nations (UN) the subject was brought up in 1968 at the First UN Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE I), held in Vienna, where the benefits stemming from the new technology were duly evaluated. In 1971 a Working Group was established by United Nations General Assembly Resolution 2778 (XXVI) to operate within the framework of the Legal Subcommittee of COPUOS In those initial stages two draft texts were submitted to the Working Group strongly supporting the *right of access* to the collected data by the sensed State. One of those texts was presented by Argentina and Brazil, co-sponsored by Chile, Mexico and Venezuela (Doc. A/C.1/10), and the other by France and the former Soviet Union (Doc. A/AC.105/PV133, Annex IV). In both texts the underlying idea was that the information obtained by remote sensing satellites should be disclosed to the sensed State only and its *right of access* thereto should be unlimited. Freedom of dissemination, the document underlined, might affect national interests. Conversely, the United States submitted a working paper whereby a sensing State, collecting data on the Earth environment, should make it available to all on a timely, equitable and non-discriminatory basis (Doc.A/AC.105/C.2/L.103).

Briefly, the concern of developing countries was not really focusing on the fact of taking high precision photographs of the Earth from outer space but, rather, on the use to be made by third State of the collected data which could lead to highly distorted markets.

State practice at the time was mainly confined to data collection for the protection of the environment; however, the advances of science and technology were seen by developing countries as a risk to their sovereign rights.

Be that as it may, the commercial implications of space activities were, at the time, far from the minds of the different parties involved.

2. Winds of change

Indeed the first and most important legal milestone on the international level was the adoption by consensus, in 1986, of the UN Principles on the Observation of Earth from Space[2]. This was a 15-year process that resulted in a compromise within the Legal Subcommittee of COPUOS, given the failure to conclude a binding agreement.

Nowadays it is valid to say that the Principles reflect customary international law and are therefore binding. Yet, they were drafted at a time when the commercial sides of remote sensing had not really been grasped in all their dimension. Proof of this is no doubt Principle I describing the objective of the activity as the improvement of natural resources management, land use and the protection of the environment. An updated description of remote sensing activities is today a high priority.

In spite of the many criticisms directed to these Principles, over the years they have, at least, taken unwritten rules of international law into the context of an international instrument and helped to interpret the meaning of some general principles embodied in the Outer Space Treaty, despite restricting the scope of State responsibility - as worded in Article VI of the Outer Space Treaty- to remote sensing activities alone.

Shortly after the adoption of the Principles, a general feeling began to be perceived whereby the sovereignty issues arising from remote sensing were gradually losing momentum as a result of the growing activity of private entities in space.

[2] UN General Assembly Resolution 41/65.

At that stage, developing countries -albeit careful not to give up sovereign rights in the new areas- began to access the new technology on an increasingly wider scale. The technical aspects of remote sensing and the specific clauses contained in cooperation agreements of regional and bilateral scope appeared to take priority over matters that, in the earlier days, had been highly sensitive. In many ways these agreements were filling gaps left by the 1986 Principles, therefore providing an illustrative example of progressive development of the law [3].

Ever since, winds of change began to blow. In fact, the main feature of the 1990s was a clear move towards the commercialization of space activities. By then developing countries were increasingly involved in the use of remote sensing technologies. Agreements in those days were mostly technical and embodied detailed and specific legal clauses -again, supplementing the 1986 Principles-, which enabled technology to develop and provided a more appropriate field for international cooperation to prosper. Nevertheless, the political moment in the 1990s did not appear propitious for the revision of the 1986 Principles let alone the drafting of a binding instrument.

The subject was extensively discussed throughout this decade at various international meetings dealing with outer space. First and foremost, the UNISPACE III Conference held in Vienna in July 1999, which, for the first time, assigned an important place to space industry and commercial activities. Within that major event, the Workshop *Space Law for the Twenty-first Century*[4], organized by the International Institute of Space Law and the United Nations Office for Outer Space Affairs, devoted one of its sessions to the subject. On this occasion- marked by scholarly presentations followed by stimulating debate and well thought-out proposals- the long-standing confrontation between the industrialized and developing countries was still outstanding; however, the shift from sovereignty approaches to commercial aspects was already clearly perceived.

The disagreement focused particularly on the position advocating full freedom of data collection, distribution and commercialization vis-à-vis the position supporting the rights of sensed States to access the data collected over their territories and their permanent sovereignty over natural resources which the 1986 Principles only vaguely protected. The predominant opinion at UNISPACE III was that these Principles were binding on the basis of State practice and the existing *opinio juris* on the matter.

In the meantime, agreements on remote sensing were proliferating, especially in connection with agriculture, water and other resources, as well as environmental protection, and involved actors from both developed and developing States[5]. These agreements had to cover

[3] This issue was analyzed in the Report to the International Law Association, Berlin Conference (2004), Space Law Committee, Report by the Chair.

[4] Proceedings of the Workshop on Space Law for the Twenty-first Century, UNISPACE III, Technical Forum, published by the United Nations, New York 2000 (Session 4 on Remote Sensing).

[5] See, inter alia, the SABIA 3 cooperation agreement between Argentina and Brazil (Comisión Nacional para el Ahorro de Energía, CONAE/ Agência Espacial Brasileira, AEB) signed on 9 April 1996 concerning water resources, agricultural production and related areas. Likewise, SAATCOOP, cooperation agreement involving Argentina, Brazil, Mexico and Spain. More recently, in 2002, Argentina and European Space Agency (ESA) signed an agreement on space cooperation, which envisages the protection of data collected by space technologies (Art.4), a question to be put into practice by means of bilateral agreements dealing with intellectual property issues. Also, an agreement known as SIASGE (System of Satellites for Emergency Management) was signed in 2003 between Argentina and Italy. It intends to deal with early-warning systems for natural disasters and shall be composed of nine satellites out of which two will be built by Argentina (www.conae.gov.ar).

various issues on which the 1986 Principles remained silent, thus interpreting and shaping the applicable law.

An important milestone of the 1990s in the private field was *Project 2001*, a far-reaching study on the *Legal Framework for the Commercial Uses of Outer Space*, under the direction of Professor Karl-Heinz Böckstiegel. Work began, towards the end of the 1990s, from Köln University jointly with the German Aerospace Centre (DLR), involving experts from all over the world[6]. The Working Group on Remote Sensing, operating under Project 2001, was of the view that the UN Principles allowed the commercialization of data collected by remote sensing technologies without restriction[7].

This view should therefore be read as meaning that, apart from Article VI of the Outer Space Treaty to rely upon, the only protection afforded to the sensed State was Principle IV stating that the activities should be carried out on the basis of respect for the principle of full and permanent sovereignty of all States and peoples over their own wealth and natural resources and that such activities should not be conducted in a manner detrimental to the legitimate rights and interests of the sensed State[8].

Principle IV also contemplates the possibility of participation of developing countries which, at the same time, have become sensed States, in the mutual benefits stemming from this activity.

In addition to the very valuable work carried out from Cologne by the participants in Project 2001, other national research programmes on remote sensing -of clear interdisciplinary characteristics- began to operate in different geographical locales. *Inter alia,* the University of Mississippi School of Law centred its efforts on the subject, presently under the skilful conduction of Professor Joanne Gabrynowicz, whose comments we very much look forward to hear.

The National Council for Scientific Research of Argentina, for its part, together with the University of Buenos Aires, is sponsoring a series of projects on the matter, which, as in the case of the Cologne and Mississippi Universities, have clear international implications. Among the conclusions of the latter, it was highlighted that the wide margin for interpretation left by the UN Principles was becoming a matter of concern to developing countries. Furthermore, it considered that time was ripe to give some of the most elusive Principles a more precise meaning[9].

The Space Law Committee of the International Law Association is addressing the subject since 2002, following its 70th Conference in New Delhi and has recently reported on the matter at the 2004 Conference in Berlin. The Iberoamerican Institute of Air and Space Law discussed it at its two latest Annual Meetings, and the International Institute of Space Law has repeatedly dealt with the topic in its Annual Colloquia. The general feeling to be drawn from the work of these institutions is that, in spite of the absence of a political will for change at the governmental level,

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[6] The book containing the Proceedings of the International Colloquium in Cologne (May 2001) which marked the end of the Project is entitled *'PROJECT 2001' - LEGAL FRAMEWORK FOR THE COMMERCIAL USES OF OUTER SPACE,* ed. by K.H. Böckstiegel, Carl Heymanns Verlag, 2002.

[7] See Project 2001, Working Group on Remote Sensing Issues, Toulouse, 28 October 1998.

[8] Cf. Bin Cheng, *STUDIES IN INTERNATIONAL SPACE LAW*, Clarendon Oxford 1997, particularly Chapter 22, pp. 572-597.

[9] See Projects TD018 (1998-2000) and D015 (2001-2003), conducted by the present writer, University of Buenos Aires/Conicet.

it appears wise to have a fresh discussion on the most obscure and controversial UN Principles today's world.

II. The world today: industrialized and developing countries

The new millennium marked the beginning of a somewhat more cautious approach towards the revision of the Principles: the idea of a mere discussion in new light -even without further implications- began to gain ground. This stance appeared more realistic as the political moment continued unfavourable for drastic moves such as having a binding text on the topic. At this point, the main concern of developing countries may be summarized as *ensuring the right of access to satellite data by the sensed State.*

Another emerging problem is no doubt the use of satellite data in international litigations dealing with boundary disputes, of which the recent decisions of the International Court of Justice in Qatar/Bahrain, Botswana/Namibia and Nigeria Cameroon provide glaring illustrations and show that there is more to it than just procedural questions. The practical problems in using this kind of data as evidence before national and international courts will be addressed under a separate chapter in this paper.

The general feeling in today's world is clearly reflected in the Legal Subcommittee of COPUOS. On the one side, stand the advocates of a binding agreement on remote sensing and -in a more cautious approach- those who favour the review of State practices and the discussion of the Principles in new light, along the lines suggested by the delegations of Argentina, Brazil, Chile, Colombia, Cuba, Ecuador, Greece, Mexico and Peru, at the forty-third session of the Subcommittee, in April 2004[10].

At the other end of the spectrum are the United States and Japan who, based on the fact that a good number of developing countries are using the technology and that the Principles are operating well and should therefore not be updated, stand for the principle of full freedom concerning the collection, distribution and commercialization of data obtained by those means[11].

Both positions -and most of the different shades between them- are based upon solid ground[12]. In industrialized countries, the doctrine seems inclined to avoid premature solutions, particularly in fields where claims have barely been raised. Moreover, the political will remains unfavourable. In other words, sovereign States prefer the drawing up of guidelines or codes of conduct that could be enshrined in United Nations General Assembly Resolutions but would still be non-binding. Unless, of course, they are declaring international customary law.

If we look at State practice, in recent years international agreements have frequently envisaged the use of Earth observation satellites to supervise the compliance with obligations embodied in their text. This is especially so as regards the protection of the environment. The use of Earth observation satellites is envisaged, for example, in the 1992 Convention on Climate Change and the 1997 Kyoto Protocol. Likewise, remote sensing technologies enable the detection

[10] Report of the Legal Subcommittee of COPUOS adopted on 8 April 2004 (Doc. A/AC.105/826), p.21, paragraph 125.
[11] Ibid. page 21, paragraph 129.
[12] France has always shown a more restrictive approach to the free distribution and marketing of processed data without prior consent from the sensed State. From the early days, this country drew a line between primary and processed data. France's approach to the former was definitely more liberal. See, by the present writer, *Reflections and Suggestions on Remote Sensing and International Law (in honour of Professor Karl-Heinz Böckstiegel)*, ZLW 50. Jg. 3/2001.

of alterations in the levels of the ozone layer with extreme accuracy, at different times of the year and in different points of the stratosphere.

Indeed, arguments advanced by developed and developing countries for and against the need to create new law on the matter will continue to exist. Whatever the outcome, approaches should be careful and should avoid too much detailed regulation, which is unlikely to survive the times.

Conclusion: a realistic recommendation is that some of the 1986 Principles Relating to Remote Sensing of the Earth from Outer Space be made more precise in order to be useful in current situation. To this end proposals for the Legal Subcommittee of COPUOS to discuss the UN Principles in new light with a view to establishing their consistency in today's world should be given a serious thought[13].

I shall now deal with the most controversial Principles and gaps in the law relating to remote sensing. In my comments thereon, account will be taken of the findings of the Space Law Committee of the International Law Association between the New Delhi (2002) and Berlin (2004) Conferences, as well as developments in the aftermath and the views of publicists who, in recent times, have centred their efforts on this topic[14] .

III. The doctrine

A rewarding experience prior to the preparation of the 2004 Report for the ILA Berlin Conference was the appointment of two specialists- coming from an industrialized and a developing country- to advance their present views on remote sensing in order to have a full discussion and confront their opinions at the Working Session of the Conference. To this end, the Space Law Committee entrusted Mr. Niklas Hedman (Sweden) and Prof. Monserrat Filho (Brazil) who, over and above natural differences, coincided on a number of important points.

Therefore, instead of the epic encounters expected during the analysis of the two positions, an important common denominator clearly surfaced, namely to assess the validity of some of the UN Principles in the present time. The results of this assessment showed some differences but the general conclusions were not so far apart.

In this sense, Mr. Hedman's general approach[15]-which was generally supported- is that there are five provisions in the UN Principles that ought to be enlightened, as follows:

- The definitions in Principle I and their applicability to present and future activities in the field of remote sensing;
- The implications of the phrase "legitimate rights and interests of the sensed State" in Principle IV;
- The scope of Principle XII when stating “taking into account the territoriality, the principle of non-discrimination and the cost of obtaining data”;

[13] This was, in fact, the method followed by the ILA Space Law Committee when dealing with the *Review of the Space Treaties in View of Commercial Space Activities.* The need for changes or adjustments to those Treaties, as reflected in Resolution of the New Delhi Conference, was answered mostly in the negative.
[14] It should be noted that the ILA Committee, which reflects the views of a number of experts of note from different parts of the world, is a permanent observer to COPUOS and reports annually to this body on the progress and results of its work.
[15] Report of the 71st Conference of the ILA, Space Law Committee, and discussions during the Working Session on 20 August 2004.

- Principle XIII, for the same reason; and
- The scope and implications of State responsibility as laid down in Principle XIV.

I shall pause on some of the foregoing issues leading us to four preliminary conclusions reflecting the encountered differences.

In the first place, the very topical issue of validity. According to Mr. Hedman, the set of Principles provides a balance of interests between the sovereignty of the sensed State and the interest of the sensing State in carrying out remote sensing activities without prior consent. He points out that, in earlier days, the Principles had "common utility" in mind rather than private commercial purposes. Thus, *a first preliminary conclusion would be that this balance, in the view of developing countries, is nowadays far from perfect.*

Secondly, Mr. Hedman believes that, due to their great flexibility, the Principles are still valid as an instrument for international cooperation. Indeed, as previously observed in this paper, most of them reflect customary international law, which enables them to survive the times; however, there are controversial areas as well. These include, definitions, jurisdiction, access to data and marketing thereof and international responsibility. Let us elucidate further.

According to Mr. Hedman, Principle I, when defining the objective of remote sensing as the improvement of natural resources management, land use and the protection of the environment, is clearly outdated. Remote sensing applications go nowadays far beyond these initial purposes. For example, the use to be made of the analyzed data remains unresolved. *A second conclusion would therefore be that Principle I, should be redefined in the interest of consistency with the present reality.*

Thirdly, it is clear that the foregoing issues are related in turn to Principle XIV on State responsibility, which refers expressly to Article VI of the Outer Space Treaty. Pursuant to that Principle, States operating remote sensing satellites are made internationally responsible for their "activities". It would appear doubtful whether this term applies to remote sensing activities in the sense of the Principles or, rather, to space activities *lato sensu* as established in Article VI of the Outer Space Treaty. Moreover, as Mr. Hedman observes[16], the use of remote sensing data by third parties seems to be excluded.

This brings to mind Bin Cheng's position on the question that, in practice, simplifies the interpretation procedure. Bin Cheng considers that the sensed State would be more effectively protected by relying on Article VI of the Outer Space Treaty- which makes States internationally responsible for national activities in outer space on the whole- than by Principle XIV which limits the scope of that Article to “States operating remote sensing activities”.

Interesting for its implications is the discussion recalled by Mr. Hedman, which took place in the Legal Subcommittee of COPUOS in 2003, concerning a Working Paper submitted by Brazil [17] and from which it would result that developing countries are not so worried by the collection, storage, processing and distribution of the processed data but by the *use made of the analyzed data.* This indicates that Principle XIV should be read together with Principle IV, which declares that remote sensing activities should not be conducted in a manner detrimental to the legitimate rights and interests of the sensed State. Mr. Hedman finds an acceptable balance in Principle IV as it recognizes the freedom of exploration and use of outer space on the one hand

[16] See note 14 supra. This was thoroughly discussed at the Working Session of the Berlin Conference, to be published shortly in the Conference Report (in book format).
[17] A/AC.105/C.2/L.244, Working Paper by Brazil cited by Mr. Hedman.

and, on the other, it provides that remote sensing activities shall be conducted on the basis of respect for the principle of full and permanent sovereignty of all States and peoples over their own wealth and natural resources, with due regard to the rights and interests, in accordance with international law, of other States and entities under their jurisdiction. Yet, in the present writer's view, the reading of Principle IV appears too vague to be effective.

Closely linked to the above observations are Principles XII and XIII. The former concerns access to data on the part of the sensed State and, at first sight, does not recognize any special treatment for the sensed State in connection with the distribution of data [18]. It is supplemented by Principle XIII envisaging consultations between the sensing State and the sensed State, at the request of the latter, and making a call for international cooperation with special reference to the needs of developing countries. *A third conclusion would be that more precision is needed, having in mind that the main concern of developing countries today is the right of access to the collected data on the part of the sensed State.*

The interpretation of the term "territory under its jurisdiction", with regard to the access to data in Principle XII, and "territory" in Principle XIII, which limits the consultation possibility to the territory of the sensed State, has caused some initial trouble. In fact, as later observed by Mr. Hedman, they should be taken as synonyms on the basis of the drafting history of the Principles, which reveals a compromise between States advocating territoriality and States interpreting "national jurisdiction" in a broader sense.

Fourthly, and this recommendation is shared by all, it is essential to be aware of the importance of remote sensing in the implementation of the recommendations of UNISPACE III and the value of the work of the action teams set up by COPUOS to this end. In this sense, Mr. Hedman refers the Committee to the Note by the Secretariat entitled "Input from the action teams for the report of the Committee on the Peaceful Uses of Outer Space to the General Assembly at its fifty-ninth session for its review of the implementation of the recommendations of UNISPACE III"[19]. *In this light, a fourth- and non-controversial conclusion- points to the need for a proper space to be given to remote sensing activities in the implementation of the recommendations of UNISPACE III, as well as the importance of supporting the task of the action teams.*

Now for Prof. Monserrat´s proposals to the ILA Berlin Conference.

Prof. Monserrat has provided a complete outlook of the topic, clearly reflecting his position on the need to move towards the adoption of a binding instrument on remote sensing, a goal for which he has struggled for years both on the private and intergovernmental level[20]. Nevertheless, an analysis of the compatibility of the validity of the UN Principles in today's context appears a sensible step forward at this time.

Underlying Prof. Monserrat's position on the need of a convention on the subject are two basic reasons:

(a) The increasing commercialization of remote sensing services; and

[18] See Williams, *REFLECTIONS AND SUGGESTIONS ON REMOTE SENSING AND INTERNATIONAL LAW*, ZLW 50.Jg.3/2001, pp.409-418, at p. 415.
[19] Doc. A/AC.105/L.247 of 23 May 2003.
[20] In addition to Dr. Monserrat's study for the ILA, reflected in the Berlin Conference Report, the reader is referred to other contributions by this author in the various Proceedings of the IISL Colloquia (AIAA) and the Revista de Direito Aeroespacial, SBDA (Brazil), particularly in connection with the X Seminario Brasileiro de Sensoriamento Remoto held at Foz do Iguaçu on 21-26 April 2001.

(b) The preservation of the *right of the sensed State to access data* without discrimination.

Prof. Monserrat's point of departure is the confrontation of traditional principles which, quoting the present writer[21], he sums up as, on the one hand, freedom of exploration and use of outer space (Article I, Outer Space Treaty) and, on the other, the principle of sovereignty. When applied to the collected data, this would mean a clash between freedom of information and the need for the prior consent of the sensed State (resulting from the principle of State sovereignty over natural resources).

As Prof. Monserrat rightly observes, nothing is said about the role of the private sector in carrying out the Principles. In simple terms, whereas remote sensing technology has rapidly evolved, law making has come to a halt. Commercial remote sensing companies operate today in the global market in a legal vacuum. This, in his view, is a matter of great concern.

Hereunder are some of the shortcomings of the UN Principles underlined by Montserrat. A number of points in common with Mr. Hedman's stances may be easily identified:

- Principle I: the definition of remote sensing is very limited and does not include observation, reconnaissance and monitoring activities of productive areas (agricultural, industrial, etc.), transportation (railways, motorways, ports and airports) and services (meteorological services and tourism, for example), nor does it include the verification of compliance with international treaties. There is an unwanted vacuum here.
- Principles II and III: they highlight the importance of the availability of remote sensing to all countries. Hence, these activities should also be considered "the province of all mankind" and should have a legal system to match such an objective.
- Principle IV: on the protection of the rights and interests of the sensed State. It is essential to outline those rights and duties, undefined in the Principles.
- Principle V: international cooperation and participation of the sensed State in remote sensing activities. The Principle is restricted by the words "such participation shall be based in each case on equitable and mutually accepted terms". This implies that cooperation will be usually dependent on the will of the countries carrying out the activity.
- Principle XII: access to data on a non-discriminatory basis and on reasonable cost terms should equally include access to the available analyzed information on the territory of the sensed State. The drafting of this Principle is obscure and flexible, especially when speaking of a "non-discriminatory basis and on reasonable cost terms", a formula open to wide interpretation.
- Principle XIV: it limits the application of Article IV of the Outer Space Treaty and creates confusion (responsibility for remote sensing activities vis-à-vis responsibility for outer space activities).

All in all, Prof. Monserrat Filho's main conclusion is the need for a fair and equitable convention to ensure an equilibrium between the technological and economic power of sensing

[21] Williams, Maureen, *Observing the Earth from Space in Light of the Principle of Sovereignty,* Revista Brasileira de Direito Aeroespacial, N° 82, April 2001, and from the same author *Reflections and Suggestions on Remote Sensing and International Law,* ZLW 50, Jg. 3/2001.

States and the legitimate rights and interests of sensed States which are the weaker side in this relationship.

With this in mind, the following steps are recommended:

1. Satellite remote sensing activities must be regulated by a special and comprehensive convention elaborated by the Legal Subcommittee of COPUOS on the basis of the UN Principles.
2. The convention should clarify, detail and develop the existing Principles and elaborate new ones, if necessary, in order to create a contemporary and effective legal instrument regulating the international use of the most advanced remote sensing technology for the benefit of all nations and, thereby, harmonizing the legitimate rights and interests of the sensing and sensed States.
3. The convention should encourage effective and sound cooperation between public and commercial interests in remote sensing activities, which should be organized as a public service.
4. The freedom of remote sensing by satellites must be preserved, and the right of access by sensed States to data concerning their territory and natural resources must be guaranteed in clear terms. This means defining the term "access to data on a non-discriminatory basis and on reasonable costs", *inter alia*.

To sum up, the common denominator stemming from the two analyzed positions (Mr. Hedman and Prof. Monserrat) is to ease the way for a further evaluation of the Principles, particularly those they have chosen to underline.

I shall now refer to the views of other experts of great renown who have made valuable contributions to this topic providing sensible ideas. What follows is a summary of the thoughts of Professors Christol (USA), Kerrest (France), Venturini (Italy) and Dr Rajan (India)[22].

Professor Christol considers that, generally, the UN Principles may today be seen as part of international custom. This author puts forward a few suggestions concerning Principle 1, namely that the definitions should be revised and the term "remote sensing" enlarged to cover commercial space activities. Likewise, Prof. Christol remarks that the issue of the right of the sensing State to engage in this activity without the prior consent of the sensed State remains unresolved by the Principles; however, he feels it is perhaps too late now to impose treaty restraints on those practices. As to Prof. Monserrat´s concern on the issue of access to data by developing countries and the principle of non-discrimination, Christol suggests extending the meaning of the word "data" in Principle I both to primary and processed data.

At a later stage, Prof. Christol mentions the US Commercial Space Act of 1998 (H.R. 1702), which specifies that space science data shall be considered a commercial item and that the focus of US statutes dealing with remote sensing is on commercial subjects. As to the possibility of updating the UN Principles, either with the objective of drawing up a binding international instrument or a set of guidelines, this writer asks himself whether all remote sensing issues should be addressed or would it be more realistic to identify specific issues on which consensus would be more easily achieved? I leave this question open for discussion.

Professor Kerrest, when referring to the provisions laid down in the Principles, uses the word "obligation". This is no doubt an interesting feature when addressing the validity thereof.

[22] See op.cit.in note 14. Until the ILA Conference Report book becomes available this may be seen in www.ila-hq.org (click on "committees", then click on "Space Law Committee").

He observes, *inter alia*, that the obligation of international cooperation in Principles V and VII is not easy to define and that, in practice, it amounts to an obligation to negotiate but not necessarily to reach agreement. This, naturally, weakens the strength of that commitment. The obligation "to inform" (Principle X) is, in Prof. Kerrest's view, not a very hard one for the sensing State to implement. Another outstanding question is the access to data on the part of the sensed State and the meaning of the term "reasonable costs" (Principle XII). Both are left to interpretation with the ensuing uncertainties involved in this procedure. For example, does the reasonable cost requirement refer to the market value? Should the term "reasonable" be applied having in mind the possibilities of developing countries? If not, the advantages recognized by sensing States to developing countries would be meaningless. The expression "taking due account of the needs and interests of developing countries" in that same Principle would be useful -albeit rather vague- to argue in favour of the developing world.

As an illustration of the weakness of the 1986 Principles, Kerrest quotes an Article in *Space News* (14 April 2003) where Menashe Broder, Imagesat Chief Executive Officer, observes that "*the customer tasks the satellite to image what it wants and downloads the image without anybody -including this company- knowing what it is doing"*. Indeed, *this* observation is a source of worry where the use of satellite imagery as evidence in court is concerned.

The option of drafting an international convention on this subject is, in Kerrest's view, somewhat of a "mission impossible" in the present political scenario. As to Principle XIV, he considers it should be read together with the obligation of State supervision stemming from Article VI of the Outer Space Treaty.

Dr. Rajan draws from his experience at COPUOS during the negotiation of the 1986 Principles, referring to the many difficulties involved in reaching consensus on the text and observing that, unlike contended by many publicists, the main purpose of the Principles was to enable commercial remote sensing satellites to come into being. He observes, *en passant,* that traditional rights like intellectual property have been substantially damaged as a result of the technological progress.

Concerning Prof. Monserrat's well-known contention that remote sensing should be a public service, Rajan coincides in principle provided due care is taken to balance the commercial and public services in order to facilitate funds from the private sector for innovation purposes. Commerce, he recalls, is basically competitive and requires a certain degree of secrecy.

Professor Venturini coincides on the importance of having a definition on remote sensing activities consistent with the present time. After recalling the many obstacles to be sorted out on the way to consensus within the Legal Subcommittee of COPUOS, this author pauses on Prof. Monserrat's suggestion that the use of "analyzed data" be included in that definition. In her view, this idea appears extremely difficult to put into practice as, once the sensed data has been purchased and distributed in accordance with the 1986 Principles, it is doubtful whether its use would need special regulation. Instead, this writer suggests filling the gap with national legislation and specific regional or international agreements. Regarding intellectual property questions and patents for satellite sensed data, the rules within the system of the World Intellectual Property Organization (WIPO) may provide useful guidelines.

A concern for privacy as an individual human right stems from Venturini's comments. This question, she holds, should not be overlooked in any international instrument regulating remote sensing. Principle XIV is considered quite realistic as it confines responsibility to the operation of remote sensing satellites and not to the use of data obtained thereby. A conclusion to

the contrary would only be acceptable when the use of the data was a wrongful act under international law.

Interesting information is added by Prof. Venturini, as regards the situation in Italy where no comprehensive legislation on space activities was ever enacted or, in fact, drafted. The Italian Space Agency (ASI) is devoted to research programmes and devoid of commercial purposes.

IV. An outstanding issue of the times: the use of satellite data as evidence before national and international courts.

One cannot escape the fact that this question is a matter of concern in the legal world, particularly in certain instances in court proceedings. Hence, a few words should be said about the problem without, at this point, advancing concrete proposals.

Earth observation satellites are being widely used for a number of purposes in the fields of meteorology, ecology, prevention of natural disasters, detection of underground water, flood and draught areas, the proximity of volcanic eruptions and others. Technology has been operating well and hardly any claims have arisen. Earth observation satellites, for example, are most helpful detecting alterations of the ozone at different times of the year and points of the stratosphere. As observed earlier, they became particularly important for monitoring the compliance with international treaties, such as those relating to the protection of the ozone layer, climate change, the Kyoto Protocol and so forth.

Yet, it is in the case of boundary disputes where the new technology brings about not a few problems. On this point I shall address some of the major issues involved.

In the first place let us recall the different stages in the collection of satellite data:

1. Earth observation satellites collect the raw data that they send to ground stations. In this primary State, the data has no real value and must be processed.
2. The first step -known as pre-processing- rectifies radiometric and geometric distortions.
3. Next, the raw data becomes available in digital form and certain aspects of the picture may be enhanced, at the user's request, by means of computers.
4. The user may then ask for the classification of the information gathered, bringing together, for instance, similarities and differences.
5. Ancillary information, such as maps, may de added to prove the results of the satellite image [23].

An important initial landmark was the Frontier Dispute case[24], way back in 1986, between Burkina Faso and Mali, where the International Court of Justice (ICJ) considered that maps could not constitute a binding document or a territorial title by themselves, whatever their accuracy and their technical value, unless the parties concerned had expressed their acceptance.

[23] See *inter alia,* Harald Ginzky*, Satellite Images as Evidence in Legal Proceedings relating to the Environment - A US Perspective*, Air and Space Law, Vol. XXV, Kluwer 2000, at p. 115. The problem is addressed by the author from an almost exclusively US perspective and frequently linked to the Fourth Amendment and the right of privacy to establish compatibilities with the use of remote sensing technologies.

[24] ICJ Reports 1986, paragraphs 54-56.

The question came to the limelight on the threshold of the new millennium following a number of cases submitted to the International Court of Justice (ICJ) and some arbitration procedures where maps based on data collected by Earth observation satellites were produced as evidence and experts called upon for their interpretation.

Far from being merely a procedural matter- which at first sight could be seen as such- the problem has prompted serious studies around the nature of this type of evidence in recent times. It appears on the agenda of a number of international private institutions and national research programmes.

As Professor Kerrest acutely points out, the difficulties concern the very nature of satellite imagery, which mainly consist of data and not photographs proper. This point is essential where evidence is concerned. An aerial photograph cannot be modified unless an expert, at a later stage, can prove a falsification. This is not the case when dealing with numbered images that are no more than a list of data that can be modified without a possibility of detection. On this assumption, and taking into account the presently available techniques, it is imperative to supervise the process of obtaining the image from the moment it is collected right up to the time it is used in court[25].

At the root of the question is the fact that, even though digital mapping allows little margin for human error in the production of a satellite image, there is plenty of space for error in the interpretation of the image. Which, in practice, as observed in the British Institute of International and Comparative Law (BIICL) Report[26], means *that it is the opinion of the expert and not the Earth observation data that is used in court.*

Professor Venturini voiced her opinion clearly at the Berlin Conference when stating that internationally recognized standards should be developed in order to validate data and its interpretation. This idea is in line with Professor Christol's, who has in mind a model statute containing provisions to preserve the integrity of the end product of remote sensing[27]. Venturini further added that State practice both in the USA and in European judicial and administrative procedures revealed the crucial aspects and key needs in this area. An interesting precedent in the domestic field -despite its failure to become a law- is a bill on the certification of satellite data submitted to the Italian Parliament in 2001 [28].

In support of Prof. Venturini´s contention, Mr. Hedman adds that the use of satellite data as evidence in court proceedings calls for caution on the part of the court. In fact, the remote sensing image submitted is the result of a long chain of measures open to different interpretations[29]. Dr. Rajan, for his part, foresees that the use of satellite data in international litigation will become a matter of routine in a not distant future so that some kind of basic rules ought to be developed to smoothen the transition to the new technology [30].

[25] See Kerrest's comments in op.cit. in note 14.
[26] The 2001 BIICL Report entrusted section 8. 5 of its Report (entitled "Using Satellite Imagery in International Litigation - practical experience") on *EO Data in the Legal Sector,* to Chris Hackford (DJ Freeman), an expert of wide experience in the interpretation of satellite data before the ICJ.
[27] Christol's remarks sent to the present writer and included in the Berlin Report on Remote Sensing.
[28] Venturini, in her comments to the Space Law Committee Report to the Berlin Conference.
[29] Chapters 5 and 6 of the Hedman Introductory Report, circulated to the Space Law Committee members in the second half of 2003.
[30] See op.cit. in note 14, chapter C on "The Use of Remote Sensing Data in International Litigation"

In South America, practice is still scarce. To mention one of the few examples, the Supreme Court of Argentina recently used satellite data in a case concerning flooded areas, in spite of its Procedural Code not envisaging the production of this kind of evidence. This led to a decision of the Supreme Court in the case *Terrero v. Province of Buenos Aires*[31], on 26 February 2002. It concerned damages to a farm owned by Mr. Terrero, the plaintiff, due to the flooding of his property as a result of works carried out in the area by the Province of Buenos Aires. However so, due to the lack of clarity in the law, difficulties are inevitable when assessing the value as evidence of satellite data and digital maps. Therefore, in the event of having to apply the existing legislation to new technologies the process is carried out with extreme care[32]. Naturally, in the above-mentioned case the Court was not dealing with boundary disputes.

Eighteen years after the Burkina Faso/Mali case and ensuing ICJ pronouncement, the situation is still unclear. The advances of science and technology have led to a completely new international context, which indicates the need for further studies on the topic along the lines of the Earth Observation Data Policy and Europe (EOPOLE) and APERTURE[33] projects in Europe and of other research groups of the kind in different parts of the world[34]. In general, practitioners acting as agents for States involved in boundary disputes before the ICJ or other international tribunals appear reluctant to accept the validity of any such data as evidence in court proceedings[35].

As described by the BIICL Working Group[36] the problem was, *inter alia,* illustrated in the boundary disputes decided by the ICJ in recent years between Cameroon/Nigeria (judgment of 10 October 2002), Botswana/Namibia (13 December 1999) and Qatar/Bahrain (23 March 2001), as well as in the Yemen/Eritrea arbitration (award of 17 December 1999). In Cameroon/Nigeria, for instance, Nigeria was using satellite imagery in its written pleadings to show the ICJ the location of a certain area. The interpretation of the image made by the parties was conflicting and, instead of having a clarifying effect for the Court, it increased confusion. Hence, what Nigeria saw as a very clear way to prove a straightforward point to the Court had the contrary effect [37].

In Botswana/Namibia, only one satellite image was produced by the latter during the oral presentations after which one of the ICJ judges[38] requested the parties to submit more photographs of the area, which they did by providing aerial and satellite images. Another judge[39] openly relied on the aerial photography and satellite imagery evidence to determine the main channel of the river Chobar. A third judge[40], in no uncertain terms, discarded the value of this evidence. None of them, however, drew a line between aerial and satellite images along the lines

[31] This judgment was published in *EL DERECHO,* Buenos Aires, Argentina*,* Vol. 198, pp.528-530.
[32] See Rodríguez, A., *Valor como prueba de los mapas digitales obtenidos por satélites de observación de la Tierra*, paper submitted to the XXXIII Meeting of the Iberoamerican Institute of Air and Space Law, Lima (Perú), October 2004.
[33] APERTURE: "Environmental typological space mapper facilitating the implementation of European legislation", European Project on Earth Observation, http://directory.eoportal.org/res_p1_Project.html
[34] The University of Buenos Aires and the Conicet are sponsoring research of the kind, which is presently underway.
[35] This was expressed by Sir Francis Vallat, drawing from his rich experience as agent for Qatar in the Qatar/Bahrain case, in a meeting with the present writer in Midhurst, UK, on 17 September 2004.
[36] See the BIICL Final Report, *EO Data in the Legal Sector,* 10 May 2001, at p. 73 et seq.
[37] See note 24 supra.
[38] Request made by Judge Ranjeva.
[39] The UK Judge, Rosalyn Higgins, used this data to determine that the north channel of the Chobe river was, in fact, the main channel.
[40] Judge Parra Aranguren from Venezuela.

of Professor Kerrest's concern in his comments to the 2004 ILA Conference, referred to earlier in this chapter[41].

From the foregoing, it follows that the BIICL Study Group, the ILA Space Law Committee, and the views of the publicists today appear to coincide on the need to elaborate international standards on the methods of production of satellite imagery at court. The pillars upon which these standards should be built could be inspired, *inter alia,* on the three-tier criterion advanced in the BIILC Report, as follows:

- Accuracy of the image or any other end product provided by Earth observation data;
- Verification of the method by which the satellite data was interpreted so as to confirm the accuracy of the end product; and
- The possibility of satellite imagery interpreters to act as expert witnesses in a court of law [42].

Indeed, the above-listed requirements would have to be coupled with a list of renown international experts from where the parties and the court would be able to draw.

Unless these requirements are met it appears unsafe for courts and tribunals to accept remote sensing data as evidence in contentious court proceedings, especially in cases of boundary delimitations.

V. Conclusions and recommendations

During the 2004 Berlin Working Session of the ILA Space Law Committee, a number of points were listed by the Chair THAT reflected the general thinking, at the moment, on the 1986 Principles. These points were taken as basis for further discussion in the forthcoming months.

The list has been reviewed and slightly adjusted for this Rio Workshop. When summarizing, on general lines, the views of the industrialized and developing worlds, it intends to reflect what could be considered as some common denominators on remote sensing today. What follows is the series of conclusions and recommendations drawn from this discussion paper to be seen in the context of each chapter to which they relate.

I. The UN 1986 Principles on Remote Sensing are generally considered as declarative of customary international law, and are therefore binding.
II. Remote sensing activities are nowadays of a predominantly commercial nature.
III. Having in mind that the participation of private entities in space activities is constantly growing, it seems opportune to have a fresh discussion on the Principles with a view to identifying gaps and providing interpretation criteria.
IV. Principle I defines the objective of remote sensing in a way inconsistent with today's world scenario.
V. Principles II, IV, XII, XIII and XIV are too vague to be effective in the present international context.
VI. The Principles are silent on a number of important aspects of remote sensing today, *inter alia*, the distribution, dissemination and commercialization of data collected by Earth

[41] The difference relates to the possibility of faking satellite imagery.
[42] Ibid, p. 75.

observation satellites and subsequently processed. Furthermore, the right of access to data on the part of the sensed State is not clearly defined.

VII. The doctrine remains divided on the need to proceed towards the drafting of a binding international instrument on remote sensing.

VIII. At the inter-governmental level, the general feeling is that premature solutions should be avoided as no serious claims have arisen so far. Hence, the political arena is not favourable for drawing up binding rules.

IX. A realistic course of action at this time would be the enactment of domestic law addressing issues relating to the protection and distribution of data and licensing procedures. This would give greater transparency to remote sensing activities.

X. National laws, in accordance with Article VI of the Outer Space Treaty, should deal with questions relating to the authorization and supervision of private activities in space, particularly for the protection of the collected data.

XI. Both industrialized and developing countries provide today examples of national space legislation and regional agreements on remote sensing, thus filling in gaps within the UN Principles.

XII. International cooperation, in this context, should play a major role, especially in ironing out differences between the industrialized and developing world.

UN/BRAZIL WORKSHOP

SPACE LAW AND REMOTE SENSING ACTIVITIES

Discussion Paper by
Professor Dr. Maureen Williams

Section I: The Background

1. From strict sovereignty to commercial space activities
2. The winds of change

Section II: The world of today; Industrialised and Developing Countries

Section III: The Doctrine

Section IV: Remote Sensing Data in International Litigation

Section V: Conclusions and recommendations

Conclusions and Recommendations

I. The UN 1986 Principles on Remote Sensing are generally considered as declarative of customary international law, and are therefore binding.

II. Remote sensing activities are nowadays of a predominantly commercial nature.

III. Having in mind that the participation of private entities in space activities is constantly growing, it seems opportune to have a fresh discussion on the UN Principles with a view to identifying gaps and suggesting interpretation criteria.

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V. Principles II, IV, XII, XIII and XIV are too vague to be effective in the present international context.

VI. The Principles are silent on a number of important aspects of remote sensing today*, inter alia*, the distribution, dissemination and commercialisation of data collected by earth observation satellites and subsequently processed. Furthermore, the right of access to data on the part of the sensed state is not, in practice, clearly defined.

VII. The doctrine remains divided on the need to proceed towards the drafting of a binding international instrument on remote sensing.

VIII. At the inter-governmental level the general feeling is that premature solutions should be avoided as no serious claims have arisen so far. Hence, the political arena is not favourable for drawing up binding rules.

IX. A realistic course of action at this time would be the enactment of domestic law addressing issues relating to the protection and distribution of data and licensing procedures. This would give greater transparency to remote sensing activities.

X. National laws, in accordance with Article VI of the 1967 Space Treaty, should deal with questions relating to the authorisation and supervision of private activities in space, particularly for the protection of the collected data.

XI. State practice, both in industrialised and developing countries, is clearly indicating that, in the application of the UN Principles, gaps are being covered by regional agreements and national space legislation.

XII. International cooperation, in this context, should play a major role, especially in ironing out differences between the industrialised and developing world.

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It is an outstanding paper, as always are the papers written by Professor Maureen Williams. It gives us a comprehensive and precise picture on the evolution and the present situation of the United Nations Principles Relating to Remote Sensing of the Earth from Outer Space, adopted by United Nations General Assembly by consensus, in 1986.

In this picture, we clearly see the most important details in the discussions held in last years on remote sensing legal issues:

1) At the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), in 1999, mainly in its Workshop on Space Law for the Twenty-first Century;
2) In the Project 2001 study on "Legal Framework for the Commercial Uses of Outer Space," under the direction of Professor Karl-Heinz Böckstiegel, and now Project 2001 Plus, directed by Professor Stephan Hobe;
3) In the reports and other papers discussed by the Space Law Committee of the International Law Association, mainly in its 2004 Conference in Berlin.

Professor Williams also refers to the research undertaken on the topic at the universities of Buenos Aires, Cologne and Mississippi, as well as to the papers presented in the latest meetings of the Iberoamerican Institute of Air and Space Law, and in the Annual Colloquia of International Institute of Space Law.

Special attention is given by Professor Williams to the proposals on space remote sensing regulation registered in last years in the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS).

Extremely relevant is the part of the paper by Professor Williams devoted to the use of satellite data presented as evidence before national and international courts. It is indeed a new application of remote sensing data, which is not yet legally regulated. Professor Williams presents us studies on this very contemporary issue, as well as her own ideas on this subject and points out the requirements that need to be met in order to make remote sensing data acceptable evidence in contentious court proceedings, particularly in boundary delimitations.

On the basis of the quite clear scenarios drawn in Professor Williams' paper, it is possible to discuss practically all political and legal questions on space remote sensing activities that concern many countries and researchers today.

Let me summarize and make some of my own comments on the key observations and conclusions of Professor Williams on the present-day situation and tendencies of the legal framework governing or, at least, guiding remote sensing activities.

1) The divergence between industrialized and developing countries on the matter still remains.

I suppose this divergence will be hardly overcome if the necessary discussion on updating and modernization of the 1986 Principles remains closed in the Legal Subcommittee of COPUOS. The central point is that, after very dynamic 18 years, the Principles are out of date, considering the great changes that we have witnessed in this area. Therefore, the argument that the Principles still work well, does not stand– in my opinion– a simple exam, specially if we look at their real application.

2) The disagreement between industrialized and developing countries focuses particularly on the position advocating full freedom of data collection, distribution and commercialization vis-à-vis the position supporting the rights of sensed States to access the data collected over their territories.

It seems that the full freedom of data collection, distribution and commercialization is efficiently supported by the technological predominance of sensing States, while there is not yet any effective guarantee for the sensed States to have access to data collected over their territories.

Nevertheless, the UN Principles were thought to establish a compromise, a balance of interests. As observed Prof. Ram Jakhu, "it can be said that undoubtedly, the sensed State has been accorded a right under international law (including Principle XII of the 1986 UN Principles Relating to Remote Sensing of the Earth from Outer Space) to seek or demand from the sensing State the satellite imagery of its own territory. It is expected of the sensing State(s) to positively respond to the request by the sensed State for satellite imagery of their respective territory… Unfortunately, contrary to the provision of these Principles, recently several States have started making non-discriminatory access arbitrarily restrictive by subjecting such access to their exclusive national policies and laws. Ironically, the United States, which has always and ardently advocated the freedom of acquisition and non-discriminatory dissemination of satellite imagery, has started imposing the most detailed, complex and extensive national legal prohibition on the collection and distribution of such imagery."[1]

3) The only protection afforded to the sensed State is Principle IV stating that the activities should not be conducted in a manner detrimental to the legitimate rights and interests of the sensed State.

Here, it is irresistible to raise some questions: What is meant by "conducting space remote sensing activities in a manner detrimental to the legitimate rights and interests of the sensed State"? What are the legitimate rights and interests not only of the sensed State but also of the sensing State? How does one comply with the Principles as they are today if they do not answer such basic questions?

4) The wide margin for interpretation left by the UN Principles became a matter of concern to developing countries. The time is ripe to give some of the most elusive Principles a more precise meaning.

For instance, Principle XII, which establishes the sensed State's access to primary, processed and analyzed data concerning the territory under its jurisdiction on a non-

[1] Jakhu, Ram, Current Legal Issues Relating to Access to Space, 2004 Space Law Conference, Paper Assemble, Beijing, China, 25-27 April 2004

discriminatory basis and on reasonable cost terms. How does one prevent an arbitrary approach of a sensing State without a legal definition of the terms "non-discriminatory basis" and "reasonable cost"?

5) An updated description of remote sensing activities is today a high priority.

The purposes of these activities actually go far beyond the improvement of natural resources management, land use and the protection of the environment, as Principle I States. They intrinsically involve the political and economic strategic interests of all countries. My question is: "What does the international community gain by ignoring the technologically complex reality of the current practice of remote sensing its in very fast State of evolution?"

Surely not, by chance, the US Commercial Remote Sensing Policy of 23 April 2003, States that remote sensing space systems are developed "for national security purposes, to satisfy civil mission needs, and to provide important public services", as well as to provide "a near real-time capability for regularly monitoring events around the world", and "to enable such activities as research on local, regional, and global change, and support services and data products for weather, climate, and hazard response, and agricultural, transportation, and infrastructure planning." This Statement shows how extremely distant from the definition of remote sensing given in Principle I of the 1986 UN Principles.

6) In spite of the absence of a political will at the governmental level to change the UN Principles (as well as the other space law instruments), it appears wise to have a fresh discussion on the most obscure and controversial of them in the world of today.

The absence of a governmental political will is not general, of course. As we have been seeing in the session of the Legal Subcommittee of COPUOS, many countries support the idea of discussing the evolution and the application of the UN Principles. The challenging point here seems to convince some industrialized countries of the need for all the international community to engage in a fresh discussion.

7) Conclusion: a realistic recommendation is that some of the 1986 Principles should be made more precise to be useful in the present situation. To this end it is submitted that proposals for the Legal Subcommittee of COPUOS to discuss the UN Principles in a new light, with a view to establishing their consistency in today's world, should be given a serious thought.

It would be a great advance if at the next session of the COPUOS Subcommittee, this discussion could begin with the support of all member States.

Concerning the applicability of the Principles, it is noteworthy that there are conflicting dispositions in regard to international cooperation in remote sensing activities, as the following example shows.

Principle V says: "States carrying out remote sensing activities shall promote international cooperation in these activities. To this end, they shall make available to other States opportunities for participation therein. Such participation shall be based in each case on equitable and mutually acceptable terms."

Meanwhile, the new US Commercial Remote Sensing Policy says that "in general, the US Government should not pursue such [foreign] partnerships if they would compete with the private sector, unless there is a compelling national security or foreign reason for doing so."

How can one reconcile these two contradictory positions?

Now let me make some remarks on the commercialization of remote sensing data. The 1986 Principles, as we know, do not mention these kind of activities, which are in intensive development today. It means that commercial remote sensing companies are currently operating in a global market place devoid of specific regulation.

The market alone, without special regulation, tends to ignore the right of access to data on a non-discriminatory basis and on reasonable cost terms (Principle XII). From the market point of view reasonable cost terms are the terms fixed by the market place itself.

The national security policy of some countries also restricts today the right of access to remote sensing data. For instance, the US Commercial Remote Sensing Policy, of 23 April 2003, "the US Government may restrict operations of the commercial systems in order to limit collections and/or dissemination of certain data and products, e. g., best resolution, most timely delivery, to the US Government, or US Government approved recipients."

For this and many other reasons, it seems evident that we should update, clarify, detail and develop the 1986 Remote Sensing Principles and elaborate new ones, if necessary, in order to create a contemporary and effective legal instrument, regulating the international use of the most advanced remote sensing technology, for the benefit of all nations and, in this way, seek to harmonize the legitimate rights and interests of the sensing and sensed States.

Professor Williams is absolutely correct when she writes that "the magnitude of commercial space activities today has brought about winds of change." At the same time, we can speak on certain necessary change of winds, as much as we need to open a fresh discussion on the 1986 UN Principles and, in particular, assure by the most legally effective means, the right of sensed States to access remote sensing data concerning their territory.

That is the reason for my submission to the participants of this Third UN Workshop on Space Law the following declaration for consideration, which was elaborated with the contribution of Doctors Maureen Williams, Sylvia Ospina, Ram Jakhu and Álvaro Fabrício dos Santos:

"Draft of Rio de Janeiro Declaration on the Right of Sensed States to Access Remote Sensing Data concerning their territory

1. Space remote sensing activities are essential in the world of today as an indispensable source of strategic data for the social, cultural and economic development of all countries. Developing countries, in particular, need this advanced technology to improve the management of their national wealth and resources, as well as to achieve a higher quality of life for their populations. The good governance of our planet increasingly requires a global, qualified, timely and permanent system of information, easily accessible by each country.

2. The commercialization of space remote sensing data should facilitate, and not hinder, the access to data by all users on a non-discriminatory basis. It is therefore appropriate to adopt international rules on access to commercial remote sensing data, in order to ensure and consolidate this technology in a normal and productive interaction.

3. The right of sensed States to access space remote sensing data about their territories is based, primarily, on Article I of the 1967 Outer Space Treaty. It is reaffirmed and enlarged in the

Principles Relating to Remote Sensing of the Earth from Outer Space, adopted unanimously by United Nations General Assembly in 1986, particularly in Principle II, which provides that remote sensing activities shall be carried out for the benefit and in the interests of all countries taking into particular consideration the needs of developing countries.

4. The right of access to data finds further support in Articles II and IX of the 1967 Outer Space Treaty. This is confirmed by Principle IV of the 1986 UN Principles whereby remote sensing activities shall not be conducted in a manner detrimental to the legitimate rights and interests of the sensed State.

5. The 1986 UN Principles proclaim the right of sensing all places of the Earth at any time, and of distributing and selling the collected data, pursuant to the principle of full freedom established in Article I (2) of the 1967 Outer Space Treaty.

6. A clear expression of the right of a sensed State is incorporated in Principle XII, which reads as follows

> "As soon as 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".

It must be kept in mind that agreement on Principle XII resulted in creating a fair balance between the freedom of sensing and the right to sensed data; however, experience shows that until now, while the full freedom of sensing States is being exercised, the right of access by sensed States is clearly being overlooked. This imbalance should be corrected.

7. To this end, a clarification of the meaning of the terms "non-discrimination" and "reasonable cost", as well as an updating of many related provisions of the 1986 UN Principles, is necessary today.

8. The discussion of such a topical issue at the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) should be a step in the right direction. It would open a dynamic new phase in remote sensing activities promoting their growth and transparency. Moreover, it would encourage the active participation of many more developing countries in the use of these technologies.

To conclude, I remember the words of Judge Manfred Lachs, which remain significant today: "If all activities connected with outer space are to be concluded for the benefit of all and to the detriment of none, international cooperation is essential, and 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."[2]

[2] The Law of Outer Space: An Experience of Contemporary Law Making, Leiden: Martinus Nijhoff, 1989, pp-6-7).

Rio de Janeiro Declaration on the Right of Sensed States to Access Remote Sensing Data concerning their territory

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Introduction

I would like to thank the organizers and participants of this workshop for the opportunity and honour to comment on Prof. Williams' excellent discussion paper, *Space Law and Remote Sensing Activities*.[1] Also to be thanked and congratulated is the International Law Association Space Law Committee and its Special Rapporteurs. They produced the excellent *Report on the Legal Aspects of the Privatization and Commercialisation of Space Activities at the 2004 Berlin Conference*,[2] from which Prof. Williams' paper is drawn.

The central point of the discussion paper is that it is "essential to determine…where we are now and, in the most realistic terms, where we really want to be…"[3] This is critical and it is within this context that these comments are written. As the discussion paper recognizes, the "political moment in the nineties" was one in which new agreements and attempts at new agreements were unlikely to be met with success.[4] As to the current moment, the success of new agreements is still highly unlikely. Some of the most respected members of the space law community have expressed this view stating that the situation is "impossible."[5] This author joins the view that seeking a binding international agreement is unrealistic at this time. Whether or not some kind of proposal ought to be brought to the Legal Subcommittee would depend on what the proposal contained, its scope and the strategy for moving it forward.

The question then becomes, what, if anything, ought to be done or considered now? As to this question, a dialogue has progressed to where a "common denominator"[6] has been identified by some specialists. It is "to ease the way for further evaluation of the *Principles*."[7] It is at this point that another highly respected member of the space law community has asked whether "all remote sensing issues should be addressed or would it be more realistic to identify specific issues on which consensus would be more easily achieved?"[8] This author agrees that it would be more realistic to identify specific issues on which consensus could be achieved.

[1] Maureen Williams, "Space Law and Remote Sensing Activities: A Discussion Paper" (hereinafter Discussion Paper).
[2] "Report on the Legal Aspects of The Privatisation and Commercialisation of Space Activities", International Law Association Berlin Conference (2004) Space Law Committee, *available at* www.ila-hq.org. (hereinafter Berlin Report).
[3] Discussion Paper, *supra* note 1, pg. 1.
[4] "the political moment in the nineties did not appear propitious for the revision of the 1986 Principles let alone the drafting of a binding instrument." *Id.*, pg. 2.
[5] Berlin Report, *supra* note 2, pg. 10.
[6] Discussion Paper, *supra* note 1, pg.11.
[7] *Id.* at pg. 11.
[8] Berlin Report, *supra* note 2, pg. 10.

In order to address views and items contained in the discussion paper, these comments consider the status of commercial remote sensing and two accompanying trends: the emergence of developing nations as sensing States and the emerging global monitoring activities. Then, these comments offer two new suggestions for consideration. First, in order to reach "equilibrium"[9] between sensing and sensed States, sensed States should identify and establish evidence of State practice to be taken by them that will serve to enhance and protect their right to access data for territory under their jurisdiction under international law. Second, a scholarly study ought be undertaken by the appropriate experts on the principles of equity at international law that may be applicable to remote sensing activities.

Finally, it is a basic premise of these comments that there have been dynamic and dramatic changes in remote sensing activities in recent years. It is important to stress that some of the most significant changes are very recent and occurred after the Space Law Committee produced its *Berlin Report* earlier this year. These events will be raised as appropriate in relevant sections of the comments.

I. Identifying Specific Points Upon Which Consensus Can Be Reached

The author agrees with the view that *United Nations Principles Relating to Remote Sensing of the Earth from Space (Principles)*[10] are "generally considered as declarative of customary international law, and are therefore binding."[11] The discussion paper identifies a useful "common denominator stemming from the two analyzed position[s] of (Mr. Hedman and Prof. Monserrat)"[12] which is to "ease the way for further evaluation of the *Principles*."[13] The common denominator is followed by a list of twelve "conclusions and recommendations" that serve as a "basis for further discussion"[14] and which "could be considered as some common denominators on remote sensing today."[15] Many of them are quite broad or multifaceted and could benefit from further clarification. Of all of the various sets of space-related principles promulgated in the United Nations, the remote sensing *Principles*[16] have one of the longest histories[17] and have achieved among the highest levels of acceptance.[18] "Further evaluation of the *Principles*" ought to be done with both their substantive achievements and inadequacies in mind. Keeping in mind what can be lost as well as what can be gained will serve in identifying specific points upon which consensus can be reached.

The author agrees with the view that the *Principles* "are still valid as an instrument for international cooperation…"[19] The author also agrees "there are controversial areas as well."[20]

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[9] Discussion Paper, *supra* note 1, pg. 10.
[10] United Nations Principles Relating to Remote Sensing of the Earth from Space, G.A. Res. 41/65, 42 UN GAOR Annex (95th plenary meeting) at 2 UN Doc A/RES/41/65 (1987) (hereinafter Principles).
[11] Discussion Paper, *supra* note 1, pg. 16.
[12] *Id*. at pg.11.
[13] *Id*.
[14] *Id*. at pg. 16.
[15] *Id*.
[16] Principles, *supra* note 10.
[17] Joanne Irene Gabrynowicz, "Discussion Paper – Expanding Global Remote Sensing Services: Three Fundamental Considerations," Proceedings of the Workshop on Space Law in the twenty-First Century Organized by the International Institute of Space Law with the UN Office of Outer Space Affairs, July 1999.pp. 103-104. (Hereinafter Proceedings).
[18] Since 1958, there have been approximately 72 space resolutions and declarations. *Principles Adopted by the U.N. General Assembly*, presented by Joanne Irene Gabrynowicz to United Nations/Republic of Republic of Korea, Workshop on Space Law, 3 November 2003.
[19] Discussion Paper, *supra* note 1, pg. 7

Recent opinion indicates that there is a hierarchy of strength among the *Principles'* provisions.[21] Thought ought to be given to which provisions are the strongest and which may be less so. Among the strongest still in need of precision is the provision that sensed States have the right to access primary and processed data.[22] It has been the most widely accepted custom and has been adopted as part of the national law and policy of important remote sensing nations[23] and included in important bilateral[24] and multilateral agreements.[25] Before deciding whether or not to proceed to the Legal Subcommittee, specific points of consensus ought to be extracted from these broader items.

II. Comments

1. Discussion paper "conclusion and recommendations" II and III

Commercial remote sensing: growing?

"*Remote sensing activities are nowadays of a predominately commercial nature*."[26]

"*Having in mind that the participation of private entities in space activities is constantly growing, it seems opportune to have a fresh discussion on the Principles with a view to identifying gaps and providing interpretation criteria*."[27]

Commercial and privatized remote sensing activities have existed since 1984.[28] They increased rapidly after 1992, when the United States,[29] followed by other nations, authorized the commercialization of high-resolution satellite technology. However, in the last year remote sensing activities have included the failure and impending failure of significant commercial remote sensing companies and the long-term return of the *Landsat* programme to a non-

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[20] *Id.*
[21] "Most of them reflect customary international law which enables them to survive the times…" *Id.*; International Law Association New Delhi Conference (2002) Space Law Committee, Final Report on the Review of Space Law Treaties. In View of Commercial Space Activities – Concrete Proposals, "Among the conclusions, reached by consensus, was the fact that most of the 1986 UN Principles Relating to Remote Sensing of the Earth from Outer Space were today part of customary international law.", pg. 14. Referring to *Proceedings of the Workshop on Legal Remote Sensing Issues– Project 2001*, 28 October 1998, Toulouse. "Most of these Principles reflect customary international law". Berlin Report, *supra* note 2, pg. 4.
[22] Principle XII, *Principles*, *supra* note 10.
[23] National Landsat Policy Act of 1992, H.R. Rep. 102-539, 102d Cong., 2d Sess., 52, (1992).
[24] RADARSAT Data Policy, Document Number: RSCA-PR0004, Sec. 10.1 b. July 13, 1994, pg. 11. "Data distribution shall be consistent with the United Nations Resolution 41/65 of December 3, 1986 on the Principles Relating to Remote Sensing of the Earth from Space."
[25] *Principles of the Provision of ERS Data to Users*, ESA/PB-EO (90) 57, rev. 6, Paris, 9 May 1994, (European Space Agency, Earth Observation Programme Board), Sec. 2 General Principles, 2.1 Legal Principles, para. 2, at 2. and *ESA Envisat Data Policy*, ESA/PB-EO (97) rev. 3, Paris, (European Space Agency), 19 Feb. 98 at 8-9 (1998).
[26] Discussion paper, *supra* note 1, pg. 16.
[27] *Id.*
[28] The terms "commercialized" and "privatized" refer to very different types of public – private relationships. The differences between them give rise to different forms of property interests and are, therefore, important to data acquisition and access issues. Addressing this would cause these comments to take a less focused approach. The difference between "commercialized" and "privatized" is simply noted here for now. However, the author is of the view that these differences are important and must be understood on a case-by-case basis for each system when assessing data policies that apply to it.
[29] Get cite.

commercial, public good status.[30] Recent activities have also included historic progress on long-term global monitoring activities[31] and developing nations becoming *sensing* nations.[32] In other words, there are now multiple significant trends at play. A discussion about the applicability of the *Principles* to commercial systems must also take into account these accompanying trends to "avoid too much detailed regulation which is unlikely to survive the times."[33] More detail concerning these trends and some implications for the current discussion follows.

In 2004, three major events occurred that invites into question the characterization of commercial remote sensing as "unrelentingly growing."[34] In March, Resource21, a company established in 1995 and whose largest investor was the Boeing Company, failed when it did not win a government contract for the *Landsat* Data Continuity Mission.[35] In August, the United States Executive Office of the President Office of Science and Technology Policy informed the President's Cabinet that "the lack of viable commercial markets for Landsat data led to the cancellation of plans to pursue Landsat data continuity as a public-private partnership…"[36]

Finally, on 30 September the first United States company to operate a commercial satellite, Space Imaging, lost a government contract, placing its future in serious jeopardy.[37] In only three years, it went from a monopoly position[38] to what is increasingly regarded as a potentially failed company.

In a similar vein, ImageSat International,[39] an Israeli company, and Spot Image[40] a French company, both reported that the market could not support their businesses. Both redesigned their business models to serve only government and military customers. "Insufficient business from individual and corporate customers…prompted ImageSat…to limit public access to

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[30]Memorandum for the Secretaries of State, Defense, the Interior, Agriculture, Commerce Health and Human Services, Transportation, Homeland Security; Administrators of EPA, NASA; Directors of OMB, Central Intelligence, National Science Foundation; and Assistant to the President for National Security Affairs from the Director of the Office of Science and Technology Policy, Washington, D.C., August 13, 2004 (hereinafter Memorandum).

[31] For example, the Group on Earth Observations, the Global Monitoring and for Environment and Security, the Vienna Declaration, the Disaster Charter (*see infra* note 60).

[32] Nigeria's *Nigeriasat 1* and Algeria's *ALSAT-1*. These missions, and the participation of developing nations in global monitoring activities, are extremely important to the current discussion and will be set out more fully below.

[33] Discussion Paper, *supra* note 1, pg. 6.

[34] Berlin Report, *supra* note 2, pg. 14.

[35] "Failure To Capture Landsat Contract Dooms Resource21" Jason Bates and Brian Berger, *Space News*, posted: 11:52 am ET, 15 March 2004, *available at* http://www.space.com/spacenews/archive04/landsatarch_031504.html.

[36] Memorandum, *supra* note 29.

[37]"Orbimage Wins NextView Contract; Space Imaging's Future in Question", Jason Bates, *Space News*, October 4, 2004, pg. 1.

[38] The Remote Sensing Industry: A CEO Forum, John Graham and Joanne Irene Gabrynowicz, eds., publisher The National Remote Sensing and Space Law Center, University, MS, USA (2002), ISBN 0-9720432-2-5, pg. ii.

[39] "ImageSat to Focus on National Security, Government Customers," by Barbara Opall-Rome, Space News, Tel Aviv, posted: 11:43 am ET, 21 June 2004, *available at,* http://www.space.com/spacenews/archive04/imagesatarch_062104.html (hereinafter ImageSat to Focus on National Security).

[40] "Spot Image Focuses on Serving Its Government, Military Customer Base" by Peter B. de Selding, *Space News*, Paris, November 18, 2003, *available at* http://www.space.com/spacenews/archive03/spotarch_111803.html (hereinafter Spot Image Focuses).

imagery collected by its Eros-A satellite."[41] At an Earth observation conference in the French Senate, Spot Image Chairman Jean-Marc Nasr said,

> "The private commercial market is an allusion [sic]. When we say commercial market now, we mean the market from civil and military customers in governments beyond the nation whose taxpayers paid for the observation satellite system. For us, it's clear. The commercial private sector demand will remain marginal for the foreseeable future.[42]"

Finally, after many difficult years of attempting to commercialize the *Landsat* programme, the U.S. Government recently acknowledged and formalized its value as a public service. In a recent memorandum, the Office of Science and Technology Policy Stated,

> "…Landsat images are the principal source of global, medium resolution, spectral data used by…government agencies, academia and the private sector in land use/land cover change research, economic forecasting, disaster recovery and relief, and the scientific study of human impacts on the global environment. Additionally, Landsat data are utilized by over 70 countries and are an important part of a global, integrated Earth observation system...[T]he lack of viable commercial markets for Landsat data led to the cancellation of plans to pursue Landsat data continuity as a public-private partnership…[T]o maintain Landsat's legacy of continual, comprehensive coverage of the Earth's surface, the United States Government will transition the Landsat programme from a series of independently planned missions to a sustained operational programme and establish a long-term plan for the continuity of Landsat data observations.[43]"

It appears that rather than "constantly growing",[44] a more accurate characterization of commercial remote sensing is that it is consolidating, both in size and function. Commercial remote sensing is becoming a virtual auxiliary of national/national security/military institutions. However, even that status is uncertain. In the United States it is reported that "military use of commercial satellite capacity will continue at a substantial pace for the next five years…[although]…four planned military-owned and operated satellite systems will reduce the military's demand for commercial satellite capacity from the current 80-percent level to roughly 50 percent by 2010 or 2011."[45]

In short, commercial systems either are already, or are becoming, dependent on government customers. The question arises: for what purposes are the governments hiring their services? The discussion paper's objective is that it is "essential to determine…the most realistic"[46] situation. Therefore, the probability that these services are being hired for national security and/or military purposes must be raised.

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[41] ImageSat to Focus on National Security, *supra* note 39.
[42] Spot Image Focuses, *supra* note 40.
[43] Memorandum, *supra* note 36.
[44] Discussion paper, *supra* note 1, pg. 16.
[45] "Military Spending on Commercial Satellite Capacity to Remain Constant," Satellite Today, October 26, 2004, Vol. 3 Issue 206, *available at* http://www.telecomweb.com/satellite/.
[46] Discussion Paper, *supra* note 1, pg. 1.

The discussion paper correctly notes a "purpose of the *Principles* was to enable commercial remote sensing satellites to come into being."[47] Therefore, attempts to further define the *Principles* in terms of commercial systems are supported by custom. However, the probable fact that the commercial systems are being used as auxiliary national security and/or military systems for hire raises important legal and practical political questions.

Legally, being hired for national security and/or military purposes makes the commercial satellites hybrid systems with both civilian and military characteristics. This may place them beyond the scope of the *Principles.*[48] Given the companies' own assessment of the commercial remote sensing market, it is also probable that the systems are exclusively, or almost exclusively, hired for national security and/or military purposes.[49] Therefore, to the degree they are hired for national security and/or military purposes, their status could be brought into question. If, for example, they are used 85% of the time for national security and/or military purposes,[50] are they *de facto* "national security" or "military" satellites? If so, military satellites were intended to be excluded from the *Principles* by the leading remote sensing nations.[51] Undoubtedly, good legal arguments based on changed circumstances could be made to address this position. Then the discussion paper's call for "realistic terms"[52] becomes once again relevant and the question must be raised as to whether or not the current political moment is one in which these arguments can succeed. As noted by important space law scholars, "Great caution is required in the sale of restricted data and information. Failure to conform to technical and security-oriented governmental regulations has produced sanctions".[53]

However to date, the political will necessary to enable that group's recommendation for nations to take "parallel courses of action" so companies are "encouraged to acquire data and information that can be marketed at home and abroad" while "governmental institutions" should be used to gather data for "lawful military activities"[54] is not forthcoming and the economic realities of commercial remote sensing may make it impossible to afford for parallel action.[55] A parallel approach ought to continue to be recommended. At the same time, additional possibilities must also be considered. Such possibilities are set becoming available due to two new important trends in remote sensing activities.

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[47] Discussion Paper, *supra* note 1, pg. 12; See also, The UN Principles Relating to Remote Sensing of the Earth from Space: A Legislative History –Interviews of Members of the United States Delegation, ed. Joanne Irene Gabrynowicz; publisher, The National Remote sensing and Space Law Center, University, MS, USA, pp. 106 –107 (hereinafter Legislative History).
[48] Proceedings, *supra* note 17, pg. 114.
[49] ImageSat to Focus on National Security, *supra* note 39. Spot Image Focuses, *supra* note 40.
[50] This raises the interesting question of how it could be determined who is hiring the satellites. There has always been a distinction between the collected data and the customers who have them collected. Even under laws that require commercial imagery to be made available to a sensed state, clients' lists have been considered proprietary and not subject to disclosure.
[51] Legislative History, *supra* note 47, pp. 17 –19, 102-103.
[52] Discussion Paper, *supra* note 1, pg. 1.
[53] Report of the Space Law Committee, Proceedings of the American Branch of the International Law Association, 2003 – 2004, pp. 246 – 7.
[54] Id. at 246 – 7.
[55] For example, in the U.S. civil agencies were directed by the President to consider civil requirements for imagery and geospatial information that can be effectively provided by commercial remote sensing space capabilities and the allocation of resources to meet those requirements. To date, funds are still unavailable and future actions are unclear. U.S. Commercial Remote Sensing Space Policy, April 25, 2003.

Two important accompanying trends

Developing nations as sensing States

Among the most important recent trends in remote sensing activities is the emergence of developing nations as sensing States.[56] The successful launch and operation of Nigeria's *Nigeriasat-1,*[57] Algeria's *Alsat-1*[58]*,* Brazil and China's partnership on the CBERS satellite series,[59] and the participation of India and Argentina as satellite providers in the *Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (Disaster Charter)*[60] means that a growing number[61] of developing nations are sensing States as well as sensed States. The previous stark dichotomy that always coupled "sensing State" with "developed nation" and "sensed State" with "developing nation" has shifted. This is an important new, and growing,[62] trend. The implications of this will be discussed below.

Growth of global monitoring activities

The science and space communities have envisioned a coordinated, integrated, long-term, global system of satellites to observe the Earth since the 1970s.[63] Starting in 1999, the political will emerged for the first time to make such a system reality and historic progress has been made. In 1999, the States participating in the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) adopted a resolution titled, *The Space Millennium: Vienna Declaration on Space and Human Development* (Vienna Declaration). It recommended the development of a comprehensive, worldwide environmental monitoring strategy.[64] During the same time that this concept was being developed, other global monitoring initiatives also evolved. In 2001, the European Space Agency and the European Union Councils adopted the Global Monitoring for Environment and Security (GMES) initiative.[65] In the same time frame, the Ad Hoc Group on Earth Observations (GEO) was also established following a

[56] There is an entire body of scholarship that addresses how to determine whether a nation is "developed" or "less developed." Criteria include economic, political, technological, and military, among others. Additionally, the globalization of trade has given rise to new categories such as "newly industrialized." The author makes no attempt at a formal categorization. For purposes of this paper, the terms "developed" and "developing" will have the meaning traditionally used in space law: those nations that have indigenous space capabilities and those that do not.

[57] *Nigeriasat-1* is owned by Nigeria and is the product of cooperation among Algeria, China, Nigeria, Thailand, Turkey, the United Kingdom and Vietnam. http://www.skyrocket.de/space/index_frame.htm?http://www.skyrocket.de/space/doc_sdat/nigeriasat-1.htm.

[58] *Alsat-1* is owned/sponsored by Algeria and is the result of international cooperation between Algeria, China, Nigeria, Thailand, Turkey, and Vietnam. http://www.spaceandtech.com/spacedata/logs/2002/2002-054a_dmc-alsat-1_sumpub.shtml.

[59] " China to Launch Trio of Satellites with Brazil", China Daily, July 23, 2003, *available at* http://www.china.org.cn/english/scitech/70633.htm.

[60] Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters, *available at* http://www.disasterscharter.org/charter_e.html (hereinafter Disaster Charter).

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[61] Missions in progress and planned for launch in the near future include the *China-DMC+4*.

[62] http://www.sstl.co.uk/

[63] SPACE STUDIES BOARD, NATIONAL RESEARCH COUNCIL, EARTH OBSERVATIONS, PAST PRESENT AND FUTURE: HISTORY, PROMISE AND REALITY 14 – 17 (1995).

[64] UNISPACE III plus 5 Report is based on this work.

[65] http://www.gmes.info/

2003 G-8 agreement[66] and subsequent Earth Summits.[67] The Summits' purpose was to promote the development of one or more comprehensive, coordinated, and sustained Earth observation systems.[68] On February 16, 2005, at the Third Earth Observations Summit in Brussels, ministers from around the world are expected to endorse a 10-year Implementation Plan for the creation of a comprehensive Global Earth Observation System of Systems[69].

Many of these activities are related to, or based upon, the *Disaster Charter*.[70] The *Disaster Charter* has created a virtual global remote sensing network.[71] It is providing developed and developing nations access to remote sensing technology in a timely and critical manner. The virtual network is reminiscent of the early days of Intelsat. Intelsat was established in the 1960s when most nations were unable to provide satellite telecommunications individually so they established a shared global communications network. The institutional design supporting the Disaster Charter is still evolving and is not yet as developed as the first years of Intelsat. However, the fundamental element of shared access to existing assets is there. Charter members include developed and developing nations.[72] The *Disaster Charter* has been activated 56 times since November 2000.[73] Nations for whom it has been activated include developed and developing nations.[74] Approximately 63% of the activations have been for the benefit of developing nations.[75] Finally, and significantly, 25% of the satellites to which members have access are from developing nations.[76] This adds to the growing presence of developing nations as sensing States.

Implications of these trends when considered together

The emerging trends of global monitoring systems and developing nations as sensing States are integrating developing nations into coordinated international space-based activities and endowing them with a new authoritative status that can provide strategic leverage. Participation in these activities enables developing nations to take action that can establish evidence of State practice to enhance and protect the right to access data for territory under a sensed State's jurisdiction at international law.

As sensed States, making formal, consistent claims for data pursuant to the *Principles* can further develop custom. Details of this possibility are set forth below. As sensing States, developing nations can use this status to influence and establish evidence of State practice. They

[66] http://Earthobservations.org/declaration.asp
[67] Earth Observation Summits were held in the U.S. in 2003 and in Tokyo in 2004.
[68] The evolution and interplay of these events is an important and complex topic. It is well beyond the scope of this paper. They are raised here simply to note their relevance to current remote sensing activities.
[69] http://europa.eu.int/comm/space/esw/summit/Article_1514_en.htm
[70] Disaster Charter, *supra* note *51.*
[71] Facilities available through the Charter include space systems for observation, meteorology, positioning, telecommunications and TV broadcasting or on-board elements such as instruments, terminals, beacons, receivers, VSATs and archives. *Id.*
[72] European Space Agency (ESA), Centre national d'études spatiales (CNES), Canadian Space Agency (CSA), Indian Space Research Organisation (ISRO), National Oceanic and Atmospheric Administration (NOAA), and Argentina's Comisión Nacional de Actividades Espaciales (CONAE).
[73] Disaster Charter, *supra* note 51.
[74] Afghanistan, Algeria, Argentina, Austria, Bolivia, Canada, Canary Islands, Columbia, Congo (DRC), Czech Republic, Dominican Republic, El Salvador, France, Galapagos, Germany, Grenada Island, Haiti, India, Indonesia, Italy, Lebanon, Mexico, Montserrat, Morocco, Nepal, North Republic of Korea, Sudan, Tenerife, Turkey, Iran, Philippines, Portugal, Russia, Siberia, Slovenia, Spain, Znojmo (South Moravia).
[75] Disaster Charter, *supra* note 60.
[76] ERS, ENVISAT, SPOT, RADARSAT, IRS, POES, GOES, and SAC –C.

can 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. Details of this option are also set out below.

2. Discussion paper "conclusion and recommendations" IX, X and XI

National remote sensing laws available as models

The discussion paper States, "commercial remote sensing companies operate today in the global market in a legal vacuum."[77] This point requires clarification. At the national level, there a number of important remote sensing nations that have, or are developing, significant remote sensing law. In 2000, the United States issued detailed regulations for commercial remote sensing systems.[78] These were issued pursuant to the *Land Remote Sensing Policy Act of 1992*.[79] In 1999, Canada began developing national regulations that are still in the law-making process.[80] France has a remote sensing legal framework.[81] Japan also has various "provisions of existing relevant national law[s]" and data policies.[82] India, while not having formal national legislation, does have an extensive policy framework that has some provisions that are analogous to laws in other nations.[83] All of these regimes accept or incorporate some provisions of the *Principles*.[84] As this author has fully detailed elsewhere,[85] U.S. law explicitly endorsed aspects of the *Principles* twice in its Federal statutes governing remote sensing activities.[86]

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[77] Discussion Paper, *supra* note 1, pg. 9.
[78] 15 C.F.R. Part 960 Licensing of Private Land Remote-Sensing Space Systems, *also available* http://www.licensing.noaa.gov/reference.html.
[79] Land Remote Sensing Policy Act of 1992, 15 U.S.C. 5601, *et. seq., also available at* http://www.licensing.noaa.gov/reference.html (hereinafter Policy Act).
[80] Philip J. Baines, *Balancing Interests: Toward Further Progress in the development of a Regulatory Regime for Commercial Remote Sensing Space Systems in Canada*, Proceedings, The First International Conference on the State of Remote Sensing Law, ed. Joanne Irene Gabrynowicz, Joanne; publisher, The National Remote Sensing and Space Law Center, University, MS., USA, ISBN 0-9720432-3-3, pgs 21 - 31. (hereinafter, Proceedings.). The pending Canadian regulations are available at http://webapps.dfait-maeci.gc.ca/minpub/Publication.asp?publication_id=375907&Language=E.
[81] Phillipe Clerc, *The State of Remote Sensing Law: French Regulations and Practice*, Proceedings, *supra* note 80, pp. 2 – 10.
[82] Masami Onoda, *Japanese Earth Observation Program and Data Policy*, Proceedings, *supra* note 80, pp. 11 – 20.
[83] Mukand Rao, *Issues for a Remote Sensing Policy and Perspective of the Indian Remote Sensing Data Pro*, Proceedings, *supra* note 80, pp. 47 – 61.
[84] Proceedings, *supra* note 80, pg. 6 (France); pg. 11 (Japan); pg. 25 (Canada), pg. 48-49 (India).
[85] Joanne Irene Gabrynowicz, *Defining Data Availability for Commercial Remote Sensing Systems Under United States Federal Law*, 23 Annals of Air and Space L., 93 (1998).
[86] Regarding the Land Remote Sensing Commercialization Act of 1984:

It (non-discriminatory access) is in conformity with the international obligations of the United States. For example, Article I of the Outer Space Treaty states, 'the...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.' Similarly, at the conclusion of the 1983 Williamsburg economic summit, the United States as a member of this summit agreed to a statement which said that 'economic summit members support the need to assure timely public non-discriminatory data dissemination and to seek continued availability of satellite data.'

H.R. Rep. 98-647, 98th Cong., 2d Sess. (1984) at 11.

Regarding The National Land Remote Sensing Policy Act of 1992:

There are many aspects of these individual national laws. France's remote sensing law includes, among others, provisions for copyright as well as data access and distribution.[87] While Canada's regulatory regime for commercial systems operations is pending, the *Radarsat* private sector partner is "contractually obligated to comply with national policy pending legislative enactment."[88] The pending legislation encompasses, among other things, liability, rights and freedoms, privacy, the tasking records of a satellite; notification regarding substantial foreign agreements; changes in operational characteristics; and permission to transfer ownership.[89] Some of the individual provisions within these national laws address some of the questions raised in the discussion paper. They are available for consideration as models for the domestic laws of other nations and at the international level. For purposes of illustrating how such a model could be approached, some specific issues or questions raised in the discussion paper will be compared with elements of the United States law.[90]

The discussion paper notes a number of issues that require more precise responses to be useful. They include "ensuring the right of access to satellite data by the sensed State"[91]; whether or not State responsibility required by Article VI of the Outer Space Treaty is applicable to "remote sensing activities in the sense of the Principles"[92]; whether or not the Principles XII and XIII "recognize any special treatment for the sensed State in connection with the distribution of data."[93]; "more precision…[in exercising] the right of access to collected data on the part of the sensed State"[94]; lack of reference "about the role of the private sector in carrying out the Principles"[95]; concern that "the definition of 'remote sensing' is very limited" [96]; outlining the "rights and duties [for] protection of the rights and interests of the sensed State"[97]; "defining the term 'access to data on a non-discriminatory basis and on reasonable costs' "[98]; enlarging "the term 'remote sensing' to cover commercial space activities"[99]; whether or not "reasonable cost…refer[s] to market value?"[100]; "Should the term 'reasonable' be applied having in mind the

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In its legislative report accompanying the 1984 Landsat Act (sic) the Committee provided a detailed explanation and defence of the bill's requirement that data 'shall be made available to users on a nondiscriminatory access basis.'...In reviewing these arguments, the Committee finds the justification for nondiscriminatory access as compelling today as it did then...
National Landsat Policy Act of 1992, *supra* note 23, at 51.

[87] Clerc, supra note 81, pp. 2 – 10.

[88] Proceedings, *supra* note 80, pg. 27.

[89] *Id.* pp. 23 – 29.

[90] The author has chosen United States law for purposes of illustration for three reasons. First, it is the law about which she has the most knowledge. Second, U.S. law is one of, if not the, most developed body of national remote sensing law and it addresses, from one national perspective, a number of issues raised in the discussion paper. Third, and most importantly, the relevant U.S. law is easily accessible at a number of Internet websites. This enables the reader to access the cited material and make his or her own comparisons. Relevant websites will be noted as applicable. In addition to those, the reader is also directed to the Library of Congress website at http://thomas.loc.gov/ for United States law in general.

[91] Discussion Paper, *supra* note 1, pg. 5.

[92] *Id*. at pg. 8.

[93] *Id*.

[94] *Id*.

[95] *Id*. at pg. 9.

[96] *Id*. at pg. 10.

[97] *Id*.

[98] *Id*.

[99] *Id*. at pg. 11.

[100] *Id*.

possibilities of developing countries?"[101]; and concern that a commercial customer can download satellite imagery "without anybody-including the company-knowing what it is doing."[102]

These issues have been addressed in the United States regulations as follows[103]:

"Ensuring the right of access to satellite data by the sensed State"[104]:

> "When Congress removed the blanket non-discriminatory data access requirement, it was careful to ensure that access to the un-enhanced data would remain consistent with the United Nations' Principles on Remote Sensing, that the government of a sensed State should have timely access to all such data concerning its own territory."[105]

"…Whether or not State responsibility required by Article VI of the Outer Space Treaty is applicable to 'remote sensing activities in the sense of the Principles' "[106]:

> "In particular, it is important to note that the license requirement imposed on the licensee that it maintain 'operational control,'…[it]…is an implementation of U.S. obligations under the United Nations Outer Space Treaty of 1967. That treaty provides that the U.S. Government, as a State party, will be held strictly liable for any U.S. private or governmental entity's actions in outer space. Consequently, NOAA requires that [commercial remote sensing] licensees under this part maintain ultimate control of their systems, in order to minimize the risk of such liability and assure that the national security concerns, foreign policy and international obligations of the United States are protected."[107]

"Whether or not the Principles XII and XIII "recognize any special treatment for the sensed State in connection with the distribution of data."[108]:

"Should the term 'reasonable' be applied having in mind the possibilities of developing countries?"[109]:

> "The price of these data, if measured in terms of their value to a particular commercial customer, may be prohibitive to a small government…In any event, the sensed State has the opportunity to demonstrate that the terms [data price] result in an undue hardship."[110]

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[101] *Id*.
[102] *Id*. at pg. 12.
[103] The Federal Register quotes used in this section are from the explanatory notes that precede the actual regulation. The author chose this material because it sets out the various rationales that were used to determine particular segments of the regulations. This is thought to be particularly relevant in a discussion about regulatory models.
[104] Discussion Paper, *supra* note 1, pg. 5.
[105] Licensing of Private Land Remote-Sensing Space Systems, Federal Register, Vol. 65, No. 147, pg. 46826, Monday, July 31, 2000 (hereinafter Licensing).
[106] Discussion Paper, *supra* note 1, pg. 8.
[107] Licensing, *supra* note 105, pg. 46825.
[108] Discussion Paper, *supra* note 1, pg. 8.
[109] *Id*. at pg. 11.
[110] Licensing, *supra* note 105, pg. 46826.

"…More precision…[in exercising] the right of access to collected data on the part of the sensed State"[111]:

> "In those instances where the sensed State has not been able to satisfy its desire to acquire un-enhanced data directly from the licensee, the sensed State shall make a formal written request to the Assistant Administrator[112] including the specific information (i.e., geographic location, date) on the un-enhanced data it desires to acquire."[113]

"Lack of reference "about the role of the private sector in carrying out the Principles"[114]:

> "…Congress…was careful to ensure that access to the un-enhanced data would remain consistent with the United Nations' Principles…the 1992 Act requires that all [commercial satellite operating] licenses include the condition that the licensee [i.e. satellite operator] shall make available upon request to the government of any country, including the United States, un-enhanced data collected by the system concerning the territory under the jurisdiction of such government on reasonable commercial terms and conditions as soon as such data are available…"[115]

"The definition of 'remote sensing' is very limited"[116]:

> "[Commercial data is to be available, for example, to]…a small government that simply wishes to monitor its own natural resources or to use the data, for example, for purposes of land use planning or to mitigate the effects of a recent natural disaster.[117]

"…Outlining the "rights and duties [for] protection of the rights and interests of the sensed State"[118]:

"…Defining the term "access to data on a non-discriminatory basis and on reasonable costs"[119]:

> "…Access to…un-enhanced data would remain consistent with the United Nations' Principles on Remote Sensing, that the government of a sensed State should have timely access to all such data concerning its own territory. …all [commercial satellite operating]…shall make available upon request to the government of any country…un-enhanced data collected by the system concerning the territory under the jurisdiction of such government on reasonable commercial terms and conditions as soon as such data are available; consistent

[111] Discussion Paper, *supra* note 1, pg. 8.
[112] Licensing, *supra* note 105. As of 17 November 2004, Gregory W. Withee is the Assistant Administrator for Satellite and Information Services, NOAA, National Environmental Satellite, Data and Information Service, 1335 East-West Highway, Room 7311, Silver Spring, MD, USA, 20910.
[113] Licensing, *supra* note 105, pg. 46826.
[114] Discussion Paper, *supra* note 1, pg. 9.
[115] Licensing, *supra* note 105, pg. 46826.
[116] Discussion Paper, *supra* note 1, pg. 10.
[117] Licensing, *supra* note 105, pg. 46826.
[118] Discussion Paper, *supra* note 1, pg. 10.
[119] *Id*.

with the national security concerns, foreign policy and international obligations of the U.S…If a licensee intends to provide its un-enhanced data on a restricted or exclusive basis, it becomes more difficult to determine what is ''reasonable'' vis-à-vis a sensed State. The price of these data, if measured in terms of their value to a particular commercial customer, may be prohibitive to a small government that simply wishes to monitor its own natural resources or to use the data, for example, for purposes of land use planning or to mitigate the effects of a recent natural disaster. On the other hand, the same price may be reasonable if the sensed State intends to use the data for competitive purposes. The reasonable commercial terms and conditions will have to be considered on a case-by-case basis. In any event, the sensed State has the opportunity to demonstrate that the terms result in an undue hardship."[120]

"Whether or not "reasonable cost…refer[s] to market value?"[121]:

"NOAA fully expects that a licensee's obligation to make un-enhanced data available to the sensed State will in almost all instances be satisfied as a normal commercial transaction where the government of a sensed State is a regular customer. In those instances where the sensed State has not been able to satisfy its desire to acquire un-enhanced data directly from the licensee, the sensed State shall make a formal written request to the Assistant Administrator including the specific information (i.e., geographic location, date) on the un-enhanced data it desires to acquire."[122]

"Enlarging "the term 'remote sensing' to cover commercial space activities"[123]:

"[The Land Remote Sensing Policy] Act,[124]…authorizes the Secretary of Commerce…to issue licenses for operation of private remote sensing space systems."[125]

"Concern that a commercial customer can download satellite imagery "without anybody-including the company-knowing what it is doing."[126]:

"Foreign entities may be involved in the operations of the system with approval based on a review conducted by NOAA in consultation with other U.S. Government (USG) agencies."[127]
"Review of Foreign Agreements: These regulations contain a revised definition of significant and substantial foreign agreement to reflect the tighter focus on issues of control."[128]

[120] Licensing, *supra* note 105, pg. 46826.
[121] Discussion Paper, *supra* note 1, pg. 11.
[122] Licensing, *supra* note 105, pg. 46826.
[123] Discussion Paper, *supra* note 1, pg. 11.
[124] Policy Act, *supra* note 79.
[125] Licensing, *supra* note 105, pg. 46822.
[126] Discussion Paper, *supra* note 1, pg. 12.
[127] Licensing, *supra* note 105, pg. 46822.
[128] Licensing, *supra* note 105, pg. 46823.

It is to be expected that individual States would address these and other issues from the perspective of their own national interests and that any given approach may differ from that of the United States and other remote sensing nations. However, there is value in considering the approaches taken by States actively and successfully regulating commercial remote sensing.

III. Establishing evidence of State practice to be taken by sensed States that will serve to enhance and protect their right to access data for territory under their jurisdiction under international law.

1. As sensed States

Respected members of the space law community are of the view that the *Principles* have achieved a balance of interests.[129] As the discussion paper correctly notes, however, that balance is "far from perfect"[130] and an "equilibrium between the technological and economic power of sensing States and the legitimate rights and interests of the sensed States" still needs to be ensured.[131] "At this point the main concern of developing countries may be summarized as ensuring the right of access to satellite data by the sensed State."[132] To address this concern, correct the imbalance, and insert "more precision...[regarding]...the right of access"[133] sensed States can establish evidence of State practice that enhances and protects their right to access data. Just as continued satellite flight strengthens the custom that nations have the freedom to use space, continued, regular claims to data gathered from space can establish a countervailing custom that strengthens the right to access it.

Possible approaches include presenting regular, consistent, formal claims to the appropriate officials of sensing States and companies.[134] A letter from a head of the sensed State's Foreign Ministry, State Department, or other appropriate official could invoke the *Principles* and claim any imagery/data collected regarding the territory under the sensed State's jurisdiction. Official inquiries made two or three times a year, or whatever interval is deemed appropriate, would begin to establish evidence of a State practice of transparency and required responses.[135]

The discussion paper States, "[t]he general feeling, particularly at the inter-governmental level, is that premature solutions should be avoided, especially as no serious claims have been raised so far."[136] This view is consistent with information obtained in response to an inquiry made recently by a graduate school researcher to NOAA, the agency that issues commercial remote sensing licenses in the United States. Her *inquiry and the response* follows:

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[129] Discussion paper, Hedman, pp. 7-8.; International Space Law Panel, 2004 NASA Legal Team Conference April 26-29, 2004 New Orleans, Prof. Sergio Marchisio, University of Rome La Sapienza. "(t)he Principles Relating to Remote Sensing of the Earth from Outer Space were adopted by consensus through resolution 41/65 on 1986; they seemed to be a successful achievement in which a fair compromise was found between the interests of the sensing States and the needs of the sensed States." (Presentation on file with the author.)
[130] Discussion Paper, *supra* note 1, pg. 7.
[131] *Id*. at pg. 10.
[132] *Id.* at pg. 5.
[133] *Id*. at pg. 8.
[134] *See supra* note 112. *See also* http://www.nesdis.noaa.gov/About/gw-ch-bio.html.
[135] Interview with Joanne Irene Gabrynowicz, *Geospatial Today*, March – April 2004, *available at* http://www.geospatialtoday.com/journal/contents2_6.htm.
[136] Berlin Report, *supra* note 2, pg. 14.

> *Q*: "Have any 'sensed States' actually requested commercial data or imagery pursuant to the UN Principles, the Land Remote Sensing Act, [sic] or the licensing provisions of the commercial operator? If so, did they make the request to the government or to the companies? How many requests? Over what period of time?
>
> *A*: "Licensees are instructed to let NOAA know if they have received any requests for data under this provision of their license. To the best of our knowledge, neither NOAA nor any company have received any such request."
>
> *Q*: Have any 'sensed States' been denied access to commercial data and imagery? If so, how many, for what reasons, and how were these conflicts resolved?
>
> *A*: Per the answer to [the] question [above] [], this question is not applicable.[137]

Customary law is based on State practice. State practice requires action. Specific, transparent requests by sensed States and responses from sensing States are the actions necessary to more precisely define and strengthen the right of data access. Publication of the requests and responses over time would then provide a basis for future action, if any.

2. A new possibility: State practice as sensing States

Since 1999, a number of developing nations have become sensing States. This presents an historic opportunity in the development of space law: developing nations are now in a position to establish evidence of State practice *as sensing States*. From this position, developing nations can engage in domestic, bilateral, multilateral and regional agreements that detail data request and release practices that will enhance and protect the right of a sensed State to access data for territory under its jurisdiction. These agreements can follow some precedents set by previous agreements between a sensed State on one side and a sensing State on the other. They can also add to prior practice and specifically cite the *Principles* as authority in domestic, bilateral and multilateral legal documents and in international fora.[138]

IV. Formal Study of Principles of Equity and Remote Sensing Activities

The discussion paper's view that fairness and equity[139] are needed between sensed and sensing States is correct. It has been noted that a fundamental component of space law are equitable principles.[140] This point has also been made specifically as it relates to commercial

[137] E-mail from Katy Vincent, International Relations Specialist, NOAA/NESDIS International and Interagency affairs (27 Oct 2004, 11:36:56 – 0400) (on file with author).
[138] Commercialization Act, 15 U.S.C. § 4201 - 4292 (1984), Now repealed and replaced with Policy Act, 15 U.S.C. § 5601 - 5642 (1992).; RADARSAT Data Policy, Document Number: RSCA-PR0004, Sec. 10.1 b., (Canadian Space Agency), July 13, 1994, at 11.; ESA Envisat Data Policy, ESA/PB-EO (97) rev. 3, Paris, (European Space Agency), 19 Feb. 98.; Principles of the Provision of ERS Data to Users, ESA/PB EO (90) 57, rev. 6, Paris, 9 May 1994, (European Space Agency, Earth Observation Programme Board), Sec. 2 General Principles, 2.1 Legal Principles, para. 2, at 2.; International Space University, Toward an Integrated International Data Policy Framework for Earth Observations Workshop Report, ISU/REP/97/1, 1996, at. 8.
[139] *Id*. at pg. 10.
[140] Carl Q. Christol, *Equity and International Space Law*, 33 Proceedings of the Thirty Third Colloquium on the Law of Outer Space 270, at 272 (1990).

remote sensing[141] and using space-based Earth observation systems for implementing multilateral environmental agreements.[142] As the space law community is so well aware, the late Justice Manfred Lachs "profoundly influenced the post-war development of international law".[143] In 1992, this author had the opportunity and honour of having Justice Lachs review one of my papers. In his written note to me, he said, "I feel the real criterion is equity. I said in several judgments, "Equity is a bridge between man and the law. You may apply it to land and sea (as I have done) but to outer space, too!"[144]

This paper proposes that the International Institute of Space Law direct that a formal and exhaustive study on the rules of equity at international law and their potential applicability to remote sensing activities be undertaken.

V. Satellite Data as Evidence Before National and International Courts

The use of satellite imagery as evidence before national and international courts is a timely and important topic. The core of the question lies in the fact that the entire world of photography has migrated from film to digital media. Dramatic evidence of this fact was demonstrated by the Kodak Corporation's announcement that it is phasing out its film production in favour of digital media.[145] It is natural to see the same progression being made regarding imagery used for evidentiary purposes in courts of law. As the discussion paper points out, the international community has already begun to address how the transition should be made and the issues made by the transition to ensure the integrity of evidentiary rules. In some cases, new rules to specifically address digital media are being considered. This is an important and large topic that the author looks forward to addressing more fully elsewhere. At this juncture, it is sufficient to note that "[d]igital imaging is a useful and attractive technology that is here to stay. The legal community should not condemn the use of digital cameras or digital images for fear of legal issues surrounding the technology. Instead, the legal community should recognize the evidentiary dangers posed by digital images and should recognize that current methods of authentication are insufficient to extinguish the concerns presented by digital images. The legal community should adopt new authentication standards tailored to compensate for the susceptibilities inherent in digital imaging technology."[146]

Conclusions

It is unclear that commercial satellite remote sensing is growing. In fact, current indications are that it is consolidating and the long-term viability of the commercial *industry* is in doubt although it is certain that remote sensing *activities* will continue well into the future. Commercial systems in Israel, France and the United States are becoming, or already are, totally

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[141] Gabrynowicz, *supra* note 85, pp. 105 – 106.

[142] "There is a strong foundation in law supporting the use of data and information from (Earth observation) systems in (Multilateral Environmental Agreements). The basis for this international legal status includes international space law as well as national laws, customary law, and the application of equity principles." Addressing Challenges of the New Millennium, 6th International Space Cooperation Workshop Report, American Institute of Aeronautics and Astronautics, pg. 39, *available at* www.aiaa.org.

[143] Encyclopedia Britannica On-Line, *at* http://www.britannica.com/eb/Article?tocId=9046752&query=Manfred

[144] Handwritten note on file with the author.

[145] "Kodak Announces an End to RnD on Consumer Films", http://www.photo.net/bboard/q-and-a-fetch-msg?msg_id=0064zh

[146] Jill Witkowski, *Can Juries Really Believe What They See? New Foundational Requirements for the Authentication of Digital Images*, 10 Wash. U. J.L. & Pol'y 267, 293-294 (2002).

dependent upon governments as customers. It can be expected that raising their status at international law will be met with significant political barriers. Therefore, if and how to discuss commercial systems as they relate the *Principles,* ought to be carefully considered so as not to weaken them. At the same time, the new trends of global monitoring systems and developing nations as sensing States are providing new options to further develop remote sensing law. These include institutionalizing formal data claim procedures and developing agreements to establish State practice to enhance and protect data access. It is suggested that these actions can, and will, accomplish a "high priority" identified in the discussion paper which is to provide "[a]n updated description of remote sensing activities."[147]

[147] Discussion Paper, *supra* note 1, pg2.

20 Years of the Moon Agreement: Space Law Challenges for Returning to the Moon

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Introduction

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (hereinafter referred to as the Moon Agreement),[1] was drafted by the Legal Subcommittee of the United Nations Committee on Peaceful Uses of Outer Space (COPUOS) and was adopted by the U.N. General Assembly on 5 December 1979. Since 1979, this Agreement has been the last treaty to be drafted by the Legal Subcommittee and so far it could attract only 11 ratifications and 5 signatures.[2]. None of the States Parties to this Agreement is a major space power. A question arises: what are the main reasons for such a low number of ratifications of the Moon Agreement? In other words, whether the 1979 Moon Agreement could be considered good enough to serve as an appropriate legal regime to govern the activities by space faring nations, particularly by their respective private entities?

It is generally believed that the Moon Agreement is not conducive to the particular interests of private commercial enterprises, and thus major space powers, like the U.S., have not been keen in ratifying this international space treaty. Therefore, the Moon Agreement can not serve as an appropriate legal regime to govern the Moon activities. I will assess this point below in detail. However, in my view, the low number of ratifications has in fact been primarily due to two other factors; i.e. firstly, the exploration of the Moon had almost stopped for about the last thirty years, and secondly, there is a general lack of knowledge and of interest in international space law in developing countries, while developed countries are not willing to further develop international space law. These two factors are also briefly addressed below with a view to showing that a change in them could be expected to enhance an international interest in the legal regime governing the Moon, and consequently more States might be ratifying the Moon Agreement in the near future.

In this paper I will address only those provisions of the Moon Agreement that are different from, or are an improvement upon, the 1967 Outer Space Treaty.[3]

[1] Adopted by the United Nations General Assembly under Resolution no. 34/68. 18 ILM 1434; 1363 UNTS 3. The Agreement was opened for signature on 18 December 1979, and has entered into force on 11 July 1984. Depositary for the Agreement is the UN Secretary-General.

[2] As of 1 January 2004, while Chile, Kazakhstan, Mexico, Morocco, The Netherlands, Pakistan, Philippines, and Uruguay have ratified the Agreement, the signatory States include France, Guatemala, India, Peru, and Romania. See: "Status of international agreements relating to activities in outer space as at 1 January 2004", UN Document, Addendum, ST/SPACE/11/Add.1/Rev.1. Belgium has recently ratified the Moon Agreement: see http://www.cordis.lu/belgium/highlight1.htm (date accessed: 16-Nov-04)

[3] The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, adopted by the General Assembly in its resolution 2222 (XXI)), opened for signature on 27 January 1967, entered into force on 10 October 1967. As of 1 January

I. General Lack of Interest in International Space Law:

The COPUOS and its Subcommittees make decisions on the basis of an informal rule of consensus. This rule was adopted in 1962 in order to satisfy the concerns of certain States (particularly, the Soviet bloc of countries), which feared that their views might be ignored when important decisions would be made with respect to the exploration and use of outer space.[4] The consensus rule worked relatively well in the past as five treaties and three resolutions on major space law issues have been successfully drafted and adopted, with the only exception of the 1982 Resolution on the Direct Television Broadcasting via Satellite.[5] However, the rule has become a very controversial law-making process in the COPUOS. As noted above, since the adoption of the Moon Agreement in 1979, no international space law treaty has been drafted by the Legal Subcommittee. Several important items have often been proposed to be placed on its agenda. These items included: (a) commercial aspects of space activities (intellectual property, insurance and liability etc.), (b) legal aspects of space debris, (c) comparative review of international space law and international environmental law, (d) improvements in the Registration Convention, (e) militarization and weaponization of outer space, (f) drafting of a comprehensive space treaty, (g) discussion on the development of an international convention on remote sensing, etc.[6]

It is interesting to note that all these issues are important to all States (both space and non-space powers) but have not been accepted for discussion in the Legal Subcommittee,[7] because a very small minority of powerful States is monopolizing the decision-making process in the COPUOS and has been using the requirement of consensus as a veto power. These States see no need to elaborate further the legal regime of outer space, including the one for the Moon.

On the other hand, there is a general lack of knowledge and of interest in international space law, particularly in developing countries. This issue was considered to be a "pressing concern" by the 1999 UNISPACE III Conference, which concluded that "*many States have not yet become parties to the [UN] outer space treaties…. the apparent decline in the willingness of States to bind themselves to the terms of successive treaties tends to undermine the normative authority of the later international agreements*"[8]. In order to rectify this "less than optimal" situation, the Conference recommended immediate actions to be taken by the United Nations. In order to implement this recommendation, the Legal Subcommittee and the U.N. Office of Outer

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2004, there are 98 ratifications and 27 signatures to the Treaty (hereinafter referred to as the '1967 Outer Space Treaty').

[4] After serious and lengthy discussions amongst the COPUOS member States, with respect to the procedure for decision making in the COPUOS, on 19th March 1962 the Chairman of the COPUOS announced that "The Committee and its subcommittees (would) conduct the Committee's work in such a way that the Committee will be able to reach agreement on its work without need for voting."

[5] "Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting", General Assembly Resolution 37/92, adopted by 107 votes to 13, with 13 abstentions, on 10 December 1982; U.N. Document A/37/PV.100 of 17 December 1982.

[6] Report of the Legal Subcommittee on the work of its forty-third session, held in Vienna from 29 March to 8 April 2004, UN Document no. A/AC.105/826 of 16 April 2004, page 20;and Report of the Legal Subcommittee on the work of its forty-second session, held in Vienna from 24 March to 4 April 2003, UN Document no. A/AC.105/805 of 10 April 2003, page 21.

[7] The only exception has been the addition in 2001 of an item on the Legal Sub-Committee's agenda relating to "Consideration of the draft convention of the International Institute for the Unification of Private Law (UNIDROIT) on international interests in mobile equipment and the preliminary draft protocol thereto on matters specific to space property": UN Doc. A/AC.105/763 (24 April 2001).

[8] Report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 19-30 July 1999, UN Document no. A/Conf.184/6, para 372.

Space Affairs have started actively promoting capacity building in space law, particularly in developing countries. They have sponsored the organization of several international workshops on space law,[9] including the current one in Brazil. The Office for Outer Space Affairs has recently started regularly publishing information relating to space law, which is "aimed at a broad audience including policy and decision makers, educators and students of space law, as well as space law enthusiasts"[10]. In addition, the International Institute of Space Law organizes every year not only its Colloquia on the Law of Outer Space but also regional workshops on specific themes of space law[11]. These activities and efforts will hopefully enhance awareness and importance of space law at the international level and consequently more States could be expected to ratify the U.N. space treaties, including the Moon Agreement. Recent decision by Belgium to ratify the Moon Agreement is an important development that indicates the start of a new trend of accepting this last Agreement was adopted by the U.N. in 1979.

II. Renewed Global Interest in Missions to the Moon

The U.S. and the Russian Federation are no longer the only two States that are interested in sending missions to the Moon. There seems to be a renewed interest in the Moon explorations by these two States and also by the European States, the Peoples' Republic of China, India and others.

1. The United States of America

On 15 January 2004, the U.S. President George W. Bush declared the resumption of the exploration of the Moon and the use of its resources for missions to Mars.[12]. More than two-thirds (68%) of Americans support Bush's new plan for going back to the Moon.[13] NASA's Exploration Mission Directorate has already started implementing the President's vision of space exploration, with the goal to: "define the characteristics of the first new piloted spaceship since the space shuttle, and establish the initial steps and stages by which these new craft will attempt a series of moon landings"[14]. It has issued a request for proposals for the design of the crew exploration vehicle (CEV) and has planned to send two teams in 2008. The CEV systems are to be such that they could also be used for deep space missions, such as trips to asteroids or Mars. The NASA's

[9] For example, see: Report on the United Nations/Republic of Republic of Korea Workshop on Space Law on the theme "United Nations treaties on outer space: actions at the national level" (Daejeon, 3-6 November 2003), UN Document no. A/AC.105/814; Report on the United Nations/International Institute of Air and Space Law Workshop on Capacity-Building in Space Law (The Hague, 18-21 November 2002), UN Document no. A/AC.105/802; and the IV Conferencia Espacial de las Americas, Cartagena de Indias, Colombia, 14-17 May 2002.

[10] http://www.oosa.unvienna.org/SpaceLaw/spacelawupdate/index.html (date accessed: 06-Nov-04)

[11] For example: Space Law Conference 2004 - Asia: a Regional Force in Space, 25-27 April 2004, Beijing, Peoples Republic of China; Space Law Conference 2001: Legal Challenges and Commercial Opportunities for Asia, 11-13 March 2001, Regent Hotel, Singapore. A third similar Conference is being planned and it will take place on 26-28 June 2005 in Bangalore, India.

[12] "Bush proposal to send man to Mars" (9 January, 2004), http://news.bbc.co.uk/2/hi/science/nature/3381531.stm#text (date accessed: 09-Jan-04); "Bush unveils vision for moon and beyond: President seeks $1 billion more in NASA funding (January 14, 2004), http://www.cnn.com/2004/TECH/space/01/14/bush.space/index.html (date accessed: 14-Jan-04).

[13] "Gallup Survey Shows Americans Support New Plan For Space Exploration," (Cape Canaveral FL, Jul 20, 2004), http://www.spacedaily.com/news/spacetravel-04zm.html (date accessed: 11-Sep-04).

[14] Frank Sietzen, "UPI Exclusive: NASA Begins Moon Return Effort", (Washington, Jul 29, 2004), http://www.spacedaily.com/news/spacetravel-04zq.html (date accessed: 11-Sep-04). Frank Sietzen, "Analysis: Bush Stands By His Space Plan", (Washington, July 26, 2004), http://www.spacedaily.com/news/spacetravel-04zp.html (date accessed: 11-Sep-04).

plan is to develop technical capabilities in a series of spirals with the goal of having one lunar landing per year, starting not later than 2020. The final spiral vehicles "would be the most capable ships, which could extend human presence on the moon up to three months, basically establishing an initial lunar base."[15]

2. The Russian Federation

In the context of the American decision to return to the Moon, Russia could be expected to rethink its own efforts to join in the renewed 'rush' to the Moon. Russian space policy makers have expressed that the country already possesses the technology and know-how to re-launch its Moon exploration missions. According to Nikolai Moiseyev, a deputy director of the Russian Rosaviakosmos Space Agency, *"Before the end of the year [2004], we intend to develop a federal space programme until 2015 and it is possible that such projects [missions to the Moon and Mars] would be included."*[16] *Similarly, Roald Kremnyev, deputy director of the Lavochkin Institute, said that "If Russia decides to revive its lunar programme, we would need a year to create a prototype of a new Lunokhod and two to three years to construct the apparatus*."[17]

3. The European Union

Europe's first mission to the Moon (SMART-1) started on 28 September 2003, in order to "begin detailed mapping of the moon's surface, including the far side, which is never seen from Earth… [and also to] look for evidence of water on the moon and gather data on its chemical make up"[18]. SMART-1 has successfully reached the Moon on 17 November 2004 and is carrying out its mission by orbiting around this planet.[19] Currently, there seems to be a strong interest within the European governmental institutions, [20] associations of business enterprises and the general public bodies that "Europe must play a leading role on the international stage and be in a position to independently engage in space activities and develop corresponding technologies."[21]

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[15] Ibid.
[16] "After Bush speech, Russia mulls missions to Moon and Mars" (Moscow, Jan 15, 2004), http://www.spacedaily.com/2004/040115162118.8ffpi9bk.html (date accessed: 12-Sep-04).
[17] Ibid.
[18] "Europe's moon mission blasts off" (September 28, 2003), http://www.cnn.com/2003/TECH/space/09/28/moon.launch/index.html (date accessed: 29-Sep-03); "Europe's lunar adventure begins" (Sunday, September 28, 2003), http://news.bbc.co.uk/2/hi/science/nature/3136004.stm (date accessed: 29/09/2003). For an historical perspective, see "Europe counts down for first moon mission", (Friday, September 26, 2003), http://www.cnn.com/2003/TECH/space/09/26/europe.moon.ap/index.html (date accessed: 26-Sep-03); Jonathan Amos, "Europe targets the Moon", (4 March 2003), http://news.bbc.co.uk/2/hi/science/nature/2818551.stm (date accessed: 05-Apr-03).
[19] "Europe Reaches the Moon", (Paris, Nov 17, 2004), http://www.spacedaily.com/news/lunar-04zw.html (date accessed: 17-Nov-04).
[20] "European MPs Favours Ambitious Space Program", (Paris, Oct 21, 2003), http://www.spacedaily.com/news/esa-general-03r.html (date accessed: 30-May-04): The European Parliament's Committee on Industry, External Trade, Research and Energy reaffirmed "the need for Europe to play a leading role in this highly strategic international arena." For details of European Space Policy and priorities, see, The European Commission's WHITE PAPER, "Space: a new European frontier for an expanding Union An action plan for implementing the European Space policy" Brussels, 11 November 2003, COM(2003) 673.
[21] "Europe must Play a Leading Role in Space, EISC Stresses", Brussels, 15 November 2003, at http://www.spacedaily.com/news/esa-general-03t.html (accessed on: 04-May-04); "EU Competitiveness Council Debates Space Policy", Brussels, 26 March 2004, at http://www.spacedaily.com/news/disaster-management-04b.html (accessed on: 24-May-04).

Given such a political vigour in Europe, the European States can be expected to continue their collective efforts in the exploration of the Moon.

4. The People's Republic of China

On 15 October 2003, the People's Republic of China became the third nation in the world to send a man into Earth's orbit, after the United States and the Russian Federation (former Soviet Union)[22]. Due to its expanding geo-political position the world, China has embarked upon an ambitious space programme of its own.[23]. In addition, to continuing developing of its manned space programme, China would eventually build its permanent space laboratory and space station.[24] Unlike the 15th century overseas expeditions, which China left to the Europeans to control the newly discovered territories, in the new era of space explorations, China does not want to miss out.[25] According to Brian Harvey, the Dublin-based author of a book on China's Space Programme, "By 2050, you could see a Chinese base on the moon, or even on Mars."[26] Expectedly, China has planned the launch of an unmanned mission to the Moon and could eventually establish a Moon base. China's Moon mission- Chang'e I- would be undertaken in a phased manner. During the third phase, China would "launch a space shuttle capable of collecting samples on the moon and returning to Earth."[27] According to Luan Enjie, China's chief space official (the Director of the National Aerospace Bureau), China would launch a probe to orbit the Moon by 2007, an unmanned lunar landing by 2010, and land a human on the Moon by 2020.[28] For China, money has so far not been a problem, and with an unprecedented expanding economy and given the new political will to conquer space, China can be expected to make progress in space exploration and exploitation, and possibly making territorial claims in space.

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[22] "China Successfully Completes First Manned Space Flight" (Beijing, Oct 16, 2003), http://www.spacedaily.com/news/china-03zo.html (date accessed: 30-May-04).

[23] "China's vision for new space age", (8 July, 2004), http://news.bbc.co.uk/2/hi/science/nature/3876373.stm (date accessed: 08-Jul-04). For a rundown of key events in China's space program, see "Timeline: China's space quest" (October 6, 2003), http://www.cnn.com/2003/TECH/space/10/03/china.space.timeline/index.html (date accessed: 29-Nov-03). For details of Chinese Space Policies and Activities, http://www.cnsa.gov.cn/fg_e.htm (date accessed: 09-Sep-02);

[24] "China's vision for new space age", (8 July, 2004), http://news.bbc.co.uk/2/hi/science/nature/3876373.stm (date accessed: 08-Jul-04); "China Makes Strides In Space Technology" (Beijing, Oct 06, 2004), http://www.spacedaily.com/news/china-04zzo.html (date accessed: 11-Oct-04).

[25] "On eve of space age, China is keen not to miss out on new era of exploration" (Beijing, Oct 20, 2003), http://www.spacedaily.com/2003/031020055022.skthblf2.html (date accessed: 30-May-04): "If we miss out on the space age, it will be similar to 500 years ago, when we missed out on maritime technology and missed a chance for development of society," the Beijing Evening News Editorial.

[26] "Space could be Chinese by the year 2050, experts say" (Beijing, Oct 16, 2003), http://www.spacedaily.com/2003/031016024357.yvvtcqwo.html (date accessed: 28-May-04).

[27] "China Outlines 4 Scientific Goals For Moon Project" (Beijing, Nov 10, 2003), http://www.spacedaily.com/news/china-03zy.html (date accessed: 05-May-04); "China may launch unmanned moon mission in 2005: report" (Beijing, Mar 03, 2003), http://www.spacedaily.com/2003/030303030843.54odg9c7.html (date accessed: 08-Apr-03).

[28] "Report: China manned moon trip by 2020", (November 29, 2003), http://www.cnn.com/2003/TECH/space/11/29/china.moon.ap/index.html (date accessed: 29-Nov-03). See also, David Whitehouse, "China sets its sights on the Moon", (3 December, 2003), http://news.bbc.co.uk/2/hi/science/nature/3288043.stm (date accessed: 03-Dec-03); "China's vision for new space age", (8 July, 2004), http://news.bbc.co.uk/2/hi/science/nature/3876373.stm (date accessed: 08-Jul-04); "China Makes Strides In Space Technology" (Beijing, Oct 06, 2004), http://www.spacedaily.com/news/china-04zzo.html (date accessed: 11-Oct-04).

In their report, a group of Chinese space scientists have recently urged their Government to accelerate the development of space infrastructure and to regard outer space as "space territory". According to the report, "opening up of outer space would require infrastructure in space; much like development of land, sea and air which require ground facilities such as railroads, sea ports, power stations and airports."[29] The Chinese space scientists also argued that by virtue of having "vehicles that take up positions in space and the ability to possess part of the space resources", the country would effectively extend its three territorial claims- land, sea and air- into space; thus the claim of the "fourth territory".[30] We should keep in mind, though, that this is not the policy of the Chinese Government, but only a recommendation of a very influential group of scientist and they could possibly and eventually persuade the formulation in the future of an official policy of space territorial claims.

5. India

India has become a fairly advanced country in the development, use and management of space technology. It has undertaken complex space missions, indigenously developed launch vehicles and spacecraft capabilities, launched several payloads for foreign entities, and entered into international space cooperative projects with the United States, Canada, the European Union., Brazil, Mongolia, etc.[31] About a year ago, India decided to send, by 2008, an unmanned mission called Chandrayan-I in order to put a satellite into the Moon's orbit.[32] According to the head of the Indian Space Research Organization, India's unmanned Moon mission "is progressing

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[29] Wei Long "China Eyes Territorial Claim Of Outer Space" (Beijing - Jan 21, 2002), http://www.spacedaily.com/news/china-02f.html (date accessed: 21- Jan-02).

[30] Ibid.

[31] For details, see: "ISRO to Launch Israel's Scientific Instrument", (Bangalore - Dec 30, 2003), http://www.spacedaily.com/news/india-03h.html (11-Sep-04); "India To Launch Indonesian Satellite", (New Delhi, Sep 17, 2004), http://www.spacedaily.com/news/microsat-04m.html (date accessed: 20-Sep-04); "India's space agency wins 10 mln dollar EU contract to launch satellite" (Bangalore - Jun 05, 2004), http://www.spacedaily.com/2004/040605104435.cyq2twy4.html (date accessed: 12-Sep-04); "U.S., India discuss space cooperation", (Monday, June 21, 2004), http://www.cnn.com/2004/TECH/space/06/21/india.space.ap/index.html (date accessed: 21-Jun-04); "Bush unveils deeper US-India space, nuclear cooperation", (Monterrey, Mexico- Jan 12, 2004), http://www.spacedaily.com/2004/040112222734.c2g2d9wp.html (date accessed: 22-Jan-04); "Canada And India Sign Space Cooperation Agreement", (Bangalore - Apr 01, 2003), http://www.spacedaily.com/news/india-03b.html (date accessed: 04-Apr-03); "India and Brazil Sign Agreement for Cooperation in Space" (Bangalore - Jan 27, 2004), http://www.spacedaily.com/news/india-04d.html (date accessed: 12-Sep-04); "ISRO and Brazilian Space Agency to Cooperate in Space Activities", (Washington, March 27, 2000), http://www.spacedaily.com/spacecast/news/india-00e.html; "India Signs Space Cooperation Agreement With Mongolia", (Bangalore - Jan 27, 2004), http://www.spacedaily.com/news/india-04b.html (date accessed: 12-Sep-04); "Italy, India sign technology pact", New Delhi, Nov 28, 2003), http://www.spacedaily.com/2003/031128164925.dnaimfl3.html (date accessed: 01-Dec-03); "India, China turn traditional rivalry into space race" (Bangalore, Oct 12, 2003), http://www.spacedaily.com/2003/031012013635.6p1w7a9u.html (date accessed: 07-May-04).

[32] "Indian cabinet approves proposal for unmanned moon mission", (New Delhi, Sep 11, 2003), http://www.spacedaily.com/2003/030911164033.fm12qa0c.html (date accessed: 15-Jan-04); "Indian Prime Minister Announces Mission to Moon", (Bangalore,Aug 20, 2003), http://www.spacedaily.com/news/india-03f.html (date accessed: 12-Mar-04); "Unmanned moon mission could catapult India to global league: space chief" (Bangalore, Apr 29, 2003), http://www.spacedaily.com/2003/030429012615.mjvka2bc.html (date accessed: 29/04/2003); Pratap Chakravarty, "India Craves The Moon To Crown Its Space Odyssey", (Space Daily, 12 March 2001), http://www.spacedaily.com/spacecast/news/india-00c.html (date accessed: 15-Mar-01); "Russia to join India's moon programme: space official", (Moscow, Nov 13, 2003), http://www.spacedaily.com/2003/031113153537.5car1dyo.html (date accessed: 14-Nov-03);

smoothly."[33] Given its successes in the IT sector, its fast developing economy, and aspirations to be a major player in global politics (including its attempts to seek a permanent seat on the United Nations Security Council), India is poised to actively pursue its missions to the Moon.[34]

6. Others

The Canadian Space Agency, which is already working on a Moon mission with India, believes that a Canadian mission to the Moon or Mars is technically possible and can be undertaken, if additional funding from the Canadian government is provided for such a mission.[35]

This renewed global interest in the Moon exploration, and its use for deeper space missions, are expected to dramatically change the geo-political perception of the Moon, and a global interest can be expected to arise in the legal regime governing the Moon and other celestial bodies. Because of their various requirements of natural resources and 'landing' sites on the Moon, sometimes conflicting interests and possible territorial claims, the space-faring nations would feel the need of some sort of international regal regime to govern their Moon-related activities. On the other hand, non-space faring nations might feel that a rush for utilization and possible territorial claims on the resources of the Moon would jeopardise their interests and thus they too could feel the need for such a regime. In addition, one must not ignore the activities of several private entities, which are "selling" pieces of land on the Moon.[36] Irrespective of the fact that such "selling" has no legal basis,[37] public interest would demand that clear rules must be established primarily at the global level due to the international nature of the Moon. The Moon Agreement could possibly provide a ready-made answer to meet such a need.

III. Exploration and Exploitation by Private Enterprises

Contrary to the views of certain individuals, the Moon Agreement is not against the interests of private entities. In my opinion, it actually provides what the 1967 Outer Space Treaty lacks, a good legal basis for undertaking Moon explorations and the use of the natural resources

[33] "India's Unmanned Moon Mission Going Smoothly: Official" (New Delhi, Sep 27, 2004), http://www.spacedaily.com/news/india-04p.html (date accessed: 28-Sep-04); "India 'on course' for the Moon", http://news.bbc.co.uk/2/hi/south_asia/2917271.stm (date accessed: 05-Apr-03).

[34] For details, see "India to be fastest growing tech market in the world: Gartner", (Bangalore, Jan 20, 2003), http://www.spacedaily.com/2003/030120104434.v64vmi18.html (date accessed: 28-Apr-03); "Blair backs India's quest for permanent seat on UN Security Council", (London, Sep 20, 2004), http://www.spacedaily.com/2004/040920163432.gxs2s3xj.html (date accessed: 21-Sep-04); "Unmanned moon mission could catapult India to global league: space chief", (Bangalore, Apr 29, 2003), http://www.spacedaily.com/2003/030429012615.mjvka2bc.html (date accessed: 29-Apr-03);

[35] "Canada could fly to Mars too: space agency" (13 Jan 2004), http://www.cbc.ca/stories/2004/01/13/canada_mars040113 (date accessed: 13-Jan-04).

[36] Richard Stenger, "Prime lunar real estate for sale -- but hurry" November 20, 2000, http://www.cnn.com/2000/TECH/space/11/20/lunar.land/index.html (date accessed: 14-Jan-04).

[37] See Statement by the Board of Directors Of the International Institute of Space Law (IISL) On Claims to Property Rights Regarding The Moon and Other Celestial Bodies (2004): "according to international law, and pursuant to Article VI (of the Outer Space Treaty), the activities of non-governmental entities (private parties) are national activities. The prohibition of national appropriation by Article II thus includes appropriation by non-governmental entities (i.e. private entities whether individuals or corporations) since that would be a national activity. The prohibition of national appropriation also precludes the application of any national legislation on a territorial basis to validate a 'private claim'. Hence, it is not sufficient for sellers of lunar deeds to point to national law, or the silence of national authorities, to justify their ostensible claims. The sellers of such deeds are unable to acquire legal title to their claims. Accordingly, the deeds they sell have no legal value or significance, and convey no recognized rights whatsoever." http://www.iafastro-iisl.com/additional%20pages/ Statement_Moon.htm (date accessed: 02-Oct-04).

of the Moon by non-governmental enterprises. I will now address some of the issues that are directly related to this aspect.

1. The Common Heritage of Mankind

The most important and innovative provision of the Moon Agreement is the one that attempts to effect an equitable sharing of the benefits of the exploitation of the natural resources of the Moon and other celestial bodies. This was achieved by declaring, under Article 11 of the Moon Agreement that the Moon, other celestial bodies, and their natural resources, are the 'Common Heritage of Mankind' (CHM). The CHM concept was first proposed by Prof. Aldo Armando Cocca, the then Ambassador of Argentina, during the discussions in 1967 in the Legal Subcommittee of the COPUOS. This concept was later taken up by the Ambassador of Malta in the discussion on the equitable sharing of the resources of the high seas and was finally included in the 1982 Convention on the Law of the Sea.[38] In 1970, Argentina presented to the Legal Subcommittee the first set of draft legal principles to govern the use of the natural resources of the Moon.[39] Article 1 of these principles Stated that "The natural resources of the Moon and other celestial bodies shall be the common heritage of all mankind." The negotiating history of the Moon Agreement shows that the Argentinean proposal became the basis for the formulation of the Moon Agreement, though significant input was provided by several States through their respective proposals. Article 1 of the Argentinean proposal, as slightly modified, became the current paragraph 1 of Article 11 of the Moon Agreement and thus for the first time, the concept of CHM was transformed into a legal principle in 1979 when it was included in the Moon Agreement.

There seems to be a considerable misinformation about the meaning of 'common heritage of mankind', even in some official circles. For example, the U. S. Army Space Reference Text on Space Policy and Law mentions that under the Moon Agreement,

> "…the moon is a common heritage for all mankind which implies that all nations would share *equally* in any benefits derived from moon exploration. If the U.S. signed this treaty it would be hard to get private firms to invest in future moon projects if they had to divide the profits."[40]

Such assertion is wrong and misleading since the wording of Article 11 of the Moon Agreement is such that it does not require "equal" sharing but an "equitable" sharing. More importantly, such equitable sharing shall be effected only through an international regime, which needs to be established (as discussed below) at a later date. In other words, private entities engaged in the exploration of the Moon's natural resources would not be required to share the

[38] United Nations Convention on the Law of the Sea (and the Agreement relating to the implementation of Part XI of the Convention), signed at Montego Bay, Jamaica, 10 December 1982, Entered into force: 16 November 1994 (there are 145 ratifications as of 1 January 2004; the 145th State to ratify the Convention was Lithuania, while the 144th was Canada which deposited its instrument of ratification on 7 November 2003).

[39] Report of the Legal Sub-Committee on the Work of the Eleventh Session, April 10 to May 5, 1972, U.N. Document: A/AC.105/101. May 11, 1972, Annex I, pp.6-7.

[40] Chapter 3, SPACE POLICY AND LAW, (US) ARMY SPACE REFERENCE TEXT, (http://www.fas.org/spp/military/docops/army/ref_text/index.html#APPA, date accessed: 20-Jan-01), emphasis added. This document was prepared by Space Division, HQ TRADOC. The purpose of this Reference Text is to provide information on space systems and their use as they relate to U.S. Army operations. The intended users are U.S. Army commanders, staff officers and Non-commissioned Officers, students attending Army courses of instruction and their instructors.

benefits of such explorations unless and until the envisioned international regime is established, and that too, only in accordance with the provisions of that regime.

While developing countries introduced the concept of CHM in the draft Moon Agreement, the United States supported it,[41] but the Soviet Union was adamantly opposed to any inclusion of this concept in the Moon Agreement. From 1972, the Soviet Union maintained its opposition because, in its view, the CHM concept appeared more philosophical than legal and that world could not inherit what was not owned by any entity. It was only during the last session of Legal Subcommittee in 1979 that the Soviet Union withdrew its opposition when the Brazilian proposal tied the meaning of the CHM to the provisions of the Moon Agreement itself. Thus, the final wording of Article 11, para. 1 States that:

> "The moon and its natural resources are the common heritage of mankind, which finds its expression in the provisions of this Agreement and in particular in paragraph 5 of this Article [i.e. Article 11]."

Article 11, Para 5, in turn, specifies that "States Parties to this Agreement hereby 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."

Therefore, for a proper interpretation of the CHM principle, no reference to principles and rules under any other treaty, including the 1982 Law of the Sea Convention should be made. Moreover, its meaning would be elaborated when the envisioned international regime is established. Thus, the CHM is an evolving principle and not one frozen in time.

2. International Regime to Govern the Exploitation of Natural Resources of the Moon

Under the Treaty, an international regime needs to be established when the exploitation of the natural resources of the Moon "is about to become feasible." Here the term 'exploitation' should be understood to mean regular extraction and refinement of natural resources for commercial purposes. It is not research, scientific investigation and exploration, as such activities are only precursors of exploitation.

The envisioned international regime must also include provisions with respect to:

(a) The orderly and safe development of the natural resources of the Moon;
(b) The rational management of those resources;
(c) The expansion of opportunities in the use of those resources;

[41] The text of the U.S. Working Paper 12/Revision 1, introduced on April 12, 1972, proposed, *inter alia*, that "1. The natural resources of the Moon and other celestial bodies shall be the common heritage of all mankind'. (Cited from, Agreement Governing the Activities of States on the Moon and other Celestial Bodies, Prepared (by Mrs. Eilene Galloway) at the request of Hon. Howard W. Cannon, *Chairman*, Committee on Commerce, Science, and Transportation, United States Senate, May 1980, p. 14. In this paper, this document is referred to as the 'Eilene Galloway Report'). It is also relevant to note here that on May 3, 1972, the U.S. Representative to the Legal Sub-Committee of the COPUOS had stated that "On the broadest level of generality, it seems right to state that such resources (the natural resources of the Moon and celestial bodies) are part of 'the common heritage of all mankind'. This would parallel the policy proposed by President Nixon two years ago this month that all nations should regard the resources of the seabed lying beyond the point where the high sea reach a depth of 200 meters as the common heritage of mankind", Cf. the Eilene Galloway Report, op. cit., p. 14.

(d) 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 moon, shall be given special consideration."[42]

As mentioned earlier, it is important to note that the provisions relating to an "equitable sharing" would need to be respected only while designing the envisioned international regime.

The U.S., and other industrialised States, whose private entities would be engaged in research and exploration (and expectedly in exploitation) of the natural resources of the Moon, can not be expected to remain silent observers during the negotiations for the international regime, which would possibly happen only in about 20 to 30 years from now. In other words, it is unthinkable that the interests of the private industry would be compromised under the envisioned regime. However, to influence the scope and nature of that regime, these States must be parties to the Moon Agreement. Mr. Ronald Stowe, the Chairman of the Section on International Law of American Bar Association, in his testimony during the hearings by the United States Senate on the Moon Agreement, stated various reasons for its ratification by the United States, particularly to provide support to the efforts by the American public and private sectors to reap the benefits of exploitation of the natural resources of the Moon.

He cautioned that such "support should not, and in fact could not, come through refusal to ratify the present treaty. In my view, it should not, because the present treaty does not itself create any threat to such future investments. And it could not, because whatever investment insecurity exists arises from the fact that resources regime negotiations will be held in the future, not because the United States does or does not ratify this treaty. Failure to ratify would not dispel such insecurity; it would simply make it more difficult for the United States to protect its interests."[43]

On the other hand, though it is impossible to predict the nature and scope of the future international regime, whether it will be exclusively based on the current Moon Agreement or a new agreement, but I believe that the principle of CHM would feature in that regime too. If the principle of CHM could be retained in the Law of the Sea, after a major modification to the Law of the Sea Convention in 1994, I see no logical reason for the principle to be removed from the future legal regime for the exploitation of the natural resources of the Moon and other celestial bodies.

Though supporting the inclusion of the CHM throughout the negotiations on the Moon Agreement, the U.S. had been concerned about any insertion of "a moratorium on the exploitation of the resources of the moon and other celestial bodies pending the establishment of an international regime."[44] At its July 1979 session, the COPUOS took care of this concern by adding under paragraph 65 of its report a clarification to the effect that, "the Committee agreed that Article 7 is not intended to result in prohibiting the exploitation of natural resources which may be found on celestial bodies other than Earth, but, rather, that such exploitation will be

[42] The Moon Agreement, Article 11, paragraph 7.
[43] The Moon Treaty, Hearings before the Subcommittee on Science, Technology, and Space of the Committee on Commerce, Science, and Transportation, United States Senate, Ninety-Sixth Congress, Second Session on Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, July 29 and 31, 1980, (Serial No. 96-115), p. 75. (In this paper referred to as 'Senate Hearings on the Moon Agreement').
[44] The Eilene Galloway Report, op. cit. p. 27.

carried out in such manner as to minimize any disruption or adverse effects to the existing balance of the environment."[45]

The implication of this clarification is that there is no moratorium on the exploitation of the natural resources of the Moon before the creation of the envisioned international regime, particularly since the United Nations General Assembly, when adopting the final text of the Moon Agreement, has directed that this paragraph should to be taken into consideration for proper interpretation of the Moon Agreement.[46]

3. Right to Collect and Remove Moon's Minerals and to Use Them to Support Space Missions

Before the establishment of the envisioned international regime, the provisions of Article 6 (2) shall remain applicable, which State that:

> "In carrying out scientific investigations and in furtherance of the provisions of this Agreement, the States Parties shall have the right to collect on and remove from the moon samples of its mineral and other substances. Such samples shall remain at the disposal of those States Parties, which caused them to be collected and may be used by them for scientific purposes. States Parties shall have regard to the desirability of making a portion of such samples available to other interested States Parties and the international scientific community for scientific investigation. States Parties may in the course of scientific investigations also use mineral and other substances of the moon in quantities appropriate for the support of their missions."

It is quite clear that for scientific investigations and explorations, both public and private entities are entitled to collect and remove Moon's minerals and other substances and also use them for the support of their space missions. It is important to note that such right does not seem to exist under the 1967 Outer Space Treaty, whose Article II on non-appropriation[47] must be interpreted broadly and strictly. The Moon Agreement, being later in adoption, shall prevail over the 1967 Outer Space Treaty. Such entitlement is necessary to encourage investment and develop capabilities to determine the feasibility of exploitation of the Moon's natural resources.

IV. No Threat or Use of Force on and from the Moon

One of the most important factors for attracting significant financial investment and conducting commercial operations smoothly is a peaceful environment, which legally assures everyone involved that their activities could be carried out without any fear of hostility. The 1967 Outer Space Treaty and the Moon Agreement contain provisions to the effect that the Moon shall be explored and used *exclusively* for peaceful purposes. They demilitarise and deweaponize the Moon.[48] However, it is the Moon Agreement that specifically and expressly prohibits any threat

[45] Report of the Committee on the Peaceful Uses of Outer Space, United Nations General Assembly, Official Records: Thirty-Fourth Session, Supplement No. 20, 1979, Un Document No. A/34/20.
[46] The Eilene Galloway Report, op. cit. p. 53.
[47] Article II of the 1967 Outer Space Treaty specifies that "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."
[48] Article VI, para 2, of the 1967 Outer Space Treaty, specifies that "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

or use of force or any other hostile act on and from the Moon.[49] It is important to note that such prohibition, though implicitly and indirectly applicable to outer space and the Moon under the Outer Space Treaty,[50] has been expressly imposed on all States that would be involved in the exploration and use of the Moon under the Moon Agreement.[51] Moreover, the Moon cannot be legally used as a base for carrying out any threat or using force or any other hostile act or threat of hostile act in relation to the Earth, spacecraft, and the personnel of spacecraft. The Moon Agreement applies not only to the Moon but also to other celestial bodies within the solar system, other than the Earth, and orbits around or other trajectories to or around the Moon and other celestial bodies.[52] The impact of Article 3, para 2 of the Moon Agreement, according to Eilene Galloway, is that it will "prohibit a fractional orbital mass destructive weapon from being used in connection with the Moon or any other celestial body. The OST [Outer Space Treaty] does not prohibit use of fractional orbital bombardment system (FOBS), i.e*.,* a spacecraft that does not complete a full orbit of the Earth."[53]

Thus the Moon Agreement, as compared to the Outer Space Treaty, offers additional protection against any hostility and use of force to the States and private companies that would be engaged in the exploration and use of the Moon. In 1980, the United States Senate conducted hearings on the Moon Agreement. During these hearings, Mr. Franklin D. Kramer, Assistant Secretary of Defence for International Security Affairs of the United States. Department of Defence, was asked "How would the security interests of the United States be enhanced by this Agreement?"[54] Mr. Kramer's following answer to this question is important and revealing from the security perspective of not only the U.S. but also other space and non-space powers:

> "the United States security interests could be enhanced by the acceptance by other nations through their ratification of the Agreement, from its arms control

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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." Similarly, Article 3 paras. 3 and 4 of the 1979 Moon Agreement repeat these obligations of the States Parties; i.e. "(3) States Parties shall not place in orbit around or other trajectory to or around the moon objects carrying nuclear weapons or any other kinds of weapons of mass destruction or place or use such weapons on or in the moon. (4) The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on the moon shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration and use of the moon shall also not be prohibited."

[49] Article 3 (2) of the 1979 Moon Agreement asserts that, "Any threat or use of force or any other hostile act or threat of hostile act on the moon is prohibited. It is likewise prohibited to use the moon in order to commit any such act or to engage in any such threat in relation to the Earth, the moon, spacecraft, the personnel of spacecraft or man-made space objects."

[50] According to Article III of the 1967 Outer Space Treaty, outer space activities must be carried out in accordance with international law, including the Charter of the United Nations. And under Article 2(4) the U.N. Charter, all Members States are required to "refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state."

[51] It may be noted that when France signed the Agreement on January 29, 1980, it notified a clarification to the U.N. that, "France is of the view that the provisions of Article 3, paragraph 2, of the Agreement relating to the use or threat of force cannot be construed an anything other than a reaffirmation, for the purposes of the field of endeavour covered by the Agreement of the principle of the prohibition of the threat or use of force, which States are obliged to observe in their international relations, as set forth in the United Nations Charter." (cited from, Eilene Galloway Report, op. cit, p. 49.

[52] The Moon Agreement, Article 1, paras 1 and 2.

[53] The Eilene Galloway Report, op.cit. p. 49.

[54] Senate Hearings on the Moon Agreement, op. cit. p. 147.

> provisions and other provisions which would limit certain military activity. In view of the fact that not all nations, which are space powers, are signatories to the 1967 Principles Treaty [the Outer Space Treaty], another possible benefit could derive because of repetition of certain arms control provisions in this Agreement. Those nations may see benefits to be derived from the Agreement that do not exit with regard to the 1967 Treaty which would encourage them to ratify the new Agreement, thus subjecting themselves to its arms control provisions and other constraints on military activity."[55]

At the same time the non-space powers that ratify the Moon Agreement could also enjoy security from any hostility and use of force carried out against them by a State from the Moon. Therefore, Article 3, paragraph 2 of the Moon Agreement is certainly a significant improvement over the regime established under the Outer Space Treaty as it considerably enhances peaceful situation on the Moon – an important pre-requisite for encouraging exploration and use of the natural resources of the Moon.

Conclusions and recommendations

Since its coming into force in 1984, the Moon Agreement has been considered by some authors to have become dead-letter law. However, current fascination in this Agreement is aroused due to the recent global interest in the Moon missions. Like other international treaties, this Agreement has been no doubt a result of compromises on the part of the three major players at the international level; i.e. the Soviet Union (now the Russian Federation), the United States of America and a group of developing countries. The carefully thought-out compromises in the Agreement have given effect to a 'balance of interests' of all States.

It is fair to say that, while the CHM is the most significant principle of the Moon Agreement, it has also been the most controversial one. Contrary to the views of some individuals, including those in high positions in their respective countries, the Moon Agreement provides what the 1967 Outer Space Treaty lacks, an appropriate legal regime for encouraging and undertaking explorations and the use of natural resources of the Moon by non-governmental enterprises. Search for an international legal framework, in lieu of the Moon Agreement, will be un-necessarily time-consuming and could be adding confusion to the Moon's legal environment, thus would be putting-off private sector's involvement in the exploitation of the natural resources of the Moon and consequently in the exploration of outer space.

As missions to the Moon increase, and awareness of the importance of space law at international level enhances, one can expect an increased number of ratifications of the 1979 Moon Agreement, as is exemplified by Belgium's recent decision to ratify this Agreement. It is submitted that all States should accept the Moon Agreement as soon as possible so that the legal regime of the Moon is clarified and expanded in order to encourage and support the renewed interest in the exploration and use of this natural satellite of the planet Earth. The real challenge for the international community and space lawyers around the world is how to effectively 'sell' this Agreement in order to make it acceptable to all, particularly to those that will be making considerable financial and technological investments.

[55] Ibid.

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Professor Jakhu begins his paper recalling that very few States have ratified the Moon Agreement. And he is right. If we compare the spontaneous adhesion that was the aim of the Outer Space Treaty (OST), one cannot believe that the same spirit that could move States when they approved the OST by acclamation could not do the same in the case of the Moon Agreement. What happened in 1979 to originate such a different reaction?

What are we doing wrong? Prof. Jakhu attributes this little support to low conscience of the benefits in adhering to the Agreement and

> "…lack of knowledge of international space law in developing countries, as well, as the fact that developed countries are not willing to further develop international space law".

I partly agree with this argument, but I am sure that the main reason in the case, is a deficient understanding of the meaning of the principle of common heritage of mankind.

In 1970, we already knew what the Moon was composed of, we could dream of scientific and business projects, and what was so easily accepted in 1966, appeared not so convenient for space faring States. And something played a big role in this plot: teaching. The common heritage of mankind principle (CHM) was misunderstood, and maybe, we failed in explaining thoroughly its meaning.

We still teach students that this is one of the characteristics of space law. The Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space was originally consisted of great experts in international law and pioneers in developing space law. They were marvellous jurists competent to create what we all know now as *corpus iuris spatialis*. In spite of their status as representatives of their States, they were great jurists. Having law as an aim, they developed the positive law to govern human activities in space, on the Moon and on other celestial bodies. They were even capable of informing their own governments about what should be acquired as a legal framework, harmonizing political interests with what positive law must be: juridical, more than legal. The heart of law is justice; ethics beyond particular or local interests. Law must look for and protect the common good. These jurists needed no explanation, they taught us the spirit, meaning and goals of space law for the good and benefit of all mankind.

And so, we inherited a set of five treaties that enshrined principles so well conceived, that breaching one of treaty would infringe upon the others. However today we face a critical situation. The observance of the *corpus iuris spatialis* is often broken; the idea of modifying the treaties and their principles, enshrining them in only one text, has appeared.

When such an idea appears, it is useless to criticize or argue; one has to find the reason that explains it. I think that we are possibly failing in educating new lawyers, not only when

teaching space law, but also in enriching juridical culture to educate future lawyers, who are able to develop law, not only to apply what others have thought. It is true that something has stopped the development of space law, but what did we do to prevent this? We must aim at a strong, reliable and ethical law-thinking power, to reach an efficient, coherent and wise law-making power.

Dr. Jakhu said that "developed countries are not willing to further develop international space law". Countries are comprised of their people, and we are the people, we have a task to perform, each of us from our own place and with our own means. Let us follow developing this beautiful law. The International Institute of Space Law has become our voice in COPUOS and works without rest to preserve the law we have, and build the legal regime for the future activities. We have to do the same: teaching, writing, talking, giving our --great or poor-- knowledge with no fatigue nor discouragement.

One might think that this position is unrealistic. I think that to accept the present state of things is to be a conformist, not realistic. We cannot limit ourselves to be a leaf in the wind. Facts can be changed, it is a matter of will, conviction and determination.

Personally, I feel obliged to be loyal to the Professor, who generously educated me. I received this education not for granted, but to try to enrich it and transmit it, as well.

"The COPUOS and its Sub-Committees make decisions on the basis of informal rule of consensus", says Dr. Jakhu. I agree with this assertion. Consensus is a means for the elaboration and a guarantee of observance of a legal text. Some years ago, I wrote that consensus is a common feeling that a particular norm is the best to rule a certain activity, relation or legal fact. Approval by consensus is not a simple majority; it is a conviction that the text is the best solution that could be given. But, how can there be consensus when there is neither complete comprehension of the principles that govern the issue under study, nor a broad scope of the ideal legal framework?

When heading Prof. Jakhu's dissertation, one should bear in mind that there is no doubt that a very small minority of powerful developed States is monopolizing the decision-making process in the COPUOS and has been using the requirement of consensus as a veto power. These States see no need to elaborate further the legal regime of outer space. If this is so, we should conclude that good faith has disappeared from international relations. An abusive use of consensus as veto is unacceptable and should be a matter of international general and public condemnation.

A particular aspect of Prof. Jakhu's paper referred to the principle of common heritge of mankind. It may be useful to clarify that the principle was originally conceived by Prof. Cocca as *res communis humanitatis* to differentiate it from the Roman *res communis omnium*. The latter was applied to those things, which could be used by everybody anytime –as air, and the water from rivers, seas and coasts— nobody could claim property over these things. The right of use presupposed the ability of deterring any disturbance from another person wanting to exercise the same right in the same place and time. Cocca teaches us that, when we look at space we understand that its use must be ruled by the idea of a *ius humanitatis*, comprehending and defending the rights of all mankind, beyond international law, which puts limits to its application to the public and private rights of States, because States are the subjects of the above-mentioned law. Instead, space law has a subject: mankind as a whole.

In this sense, the agent exploiting resources in outer space or the Moon, may have a

fruitful compensation for the activity, but may not expect appropriation of the resource. This is so, because the product is obtained from a resource that belongs to mankind. Therefore, once the expenses, investments and risks are recovered, the person or entity exploiting natural resources on the Moon is obliged to share them with their owner: mankind. This affirmation is founded on the fact that accessory follows the legal nature of the principal, consequently, the product (accessory to the resource) is also a common property of mankind. This is strictly linked with Prof. Jakhu's assertion when he provides an example that:

> "The U. S. Army Space Reference Text on Space Policy and Law mentions that the Moon Treaty states that 'the Moon is a common heritage for all mankind which implies that all nations would share equally in any benefits derived from moon exploration'".

At the Innsbruck Colloquium (1954), Prof. Cocca presented a paper on the legal nature of outer space. On that occasion, he defined it as *res communis humanitatis*. The development of the principle took over ten years, but the first idea appeared in 1947, when Cocca presented a paper at the University of Buenos Aires considering humanity as the real subject of international law, thus making the concept of State a legal fiction.

Afterwards, Prof. Cocca followed his idea, as Prof. Jakhu recalls in his paper, when he says:

> "The concept of CHM was first proposed by Mr. Aldo Armando Cocca, the Ambassador of Argentina, during the discussions in the Legal Sub-Committee in 1967. This concept was later taken up by the Ambassador of Malta in the discussion on the equitable sharing of the resources of the high seas and was finally included in the 1982 Convention on the Law of the Sea. In 1970, Argentina presented to the Legal Sub-committee the first set of draft legal principles to govern the use of the natural resources of the Moon. Article 1 of these principles Stated that "The natural resources of the Moon and other celestial bodies shall be the common heritage of all mankind." As we know that the Argentinean proposal became the basis for the formulation of the Moon Treaty, though significant input was provided by several States through their respective proposals. The above-mentioned Article 1, as slightly modified, became the current paragraph 1 of Article 11 of the Moon Treaty and thus for the first time, the concept of CHM was transformed into a legal principle in 1979 when it was included in the Moon Treaty".

The equitable sharing of benefits implies that the exploiter's investments recovery and division of benefits are in accordance with the cooperation received by the agent. We must bear in mind that international cooperation is a *conditio sine qua non* for any legal space activity. Cooperation does not mean expectation, consent or approval; it means operating with the agent. Cooperation involves not only lack of disturbance, but it requires active participation. According to Prof. Cocca, in order to attain it careful, programmed and steady negotiations are needed. It must also be taken into account that cooperation agreements are easy to achieve if one progressively moves from a bilateral to a multilateral, from a regional to a global level.

On the other hand, justice and equity give equality a real sense. Hence, in spite of the fact that activity and exploitation are performed on a common property, it would infringe upon all justice and equity to force the agent to bestow his effort, risks and investments. This would imply illegal enrichment of the beneficiary of such a donation.

I think that in order to preserve the farsightedness of space law character of, it is opportune to begin working on the international legal regime that would govern the exploitation of natural resources in outer space, on the Moon and on other celestial bodies. Another coincidence with today's paper, is that exploitation presupposes "regular extraction and refinement of natural resources" -not exploitation- beyond any scientific investigation or exploration.

I also agree with Prof. Jakhu when he says that maybe when the international regime is elaborated, the concept of this principle shall appear clearer for those in doubt. But when he says that the principle is an evolving concept, I dare to say, that a legal principle, once established, should not change. What does evolve continuously is the heritage of mankind: every day we discover a new resource, a new possibility for the progress of mankind.

On the other hand, there are some commercial transactions relating to sale of portion of the Moon, which require an official legal opinion. The Board of International Institute of Space Law (IISL) already expressed itself in order to clarify the legal regime to be applied. The Board of IISL has concluded that there is a need for a statement regarding the current legal situation concerning claims to private property rights on the Moon and on other celestial bodies or parts thereof. The object and purpose of Article II of the OST was to exclude all territorial claims to outer space, including the Moon and other celestial bodies.

In the statement, the IISL Board says:

> "Article VI of the Outer Space Treaty provides that 'States 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 entities', that is, private parties, and 'for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty'."

Article VI further provides that "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."

Therefore, according to international law, and pursuant to Article VI, the activities of non-governmental entities (private parties) are national activities. The prohibition of national appropriation by Article II thus includes appropriation by non-governmental entities (i.e. private entities whether individuals or corporations) since that would be a national activity. The prohibition of national appropriation also precludes the application of any national legislation on a territorial basis to validate a 'private claim'. Hence, it is not sufficient for sellers of lunar deeds to point to national law, or the silence of national authorities, to justify their ostensible claims. The sellers of such deeds are unable to acquire legal title to their claims. Accordingly, the deeds they sell have no legal value or significance, and convey no recognized rights whatsoever.

Finally, the IISL Board statement declares that:

> "According to international law, States parties to a treaty are under a duty to implement the terms of that treaty within their national legal systems. Therefore, to comply with their obligations under Articles II and VI of the Outer Space Treaty, States Parties are under a duty to ensure that, in their legal systems,

transactions regarding claims to property rights to the Moon and other celestial bodies or parts thereof, have no legal significance or recognized legal effect."

Utilization and exploitation for exclusively peaceful purposes.

International cooperation and activities carried out for the benefit of all humanity need to be undertaken with confidence. The only way to be confident is by good faith and peaceful purposes. This principle, firstly enshrined in Article IV of the OST, means that any activity shall be carried out in order to maintain harmonic human coexistence. This principle presupposes much more than demilitarization. It implies that everything shall be done for the common benefit, without physical or psychological violence.

20 years of the Moon Agreement: Space Law challenges

Comment

María de las Mercedes Esquivel de Cocca

(Argentina)

None of the States Parties to the Agreement is a major space power

- Deficient understanding of the meaning of the principle of common heritage of mankind (M.A. art. 11) .
- *General lack of knowledge of international space law in developing countries and developed countries are not willing to further develop international space law.*

EDUCATION

- Education

- The heart of law is justice
- Strong, reliable and ethical law-thinking power, to reach an efficient, coherent, and wise law-making power.

WE ARE THE PEOPLE

The nations are their **people**

We are the people

Each one from its own place and with its own means

Let us follow developing this beautiful law

With no fatigue nor discouragement.

REALISM or A LEAF IN THE STORM

- Realism is different of conformism
- Things can be changed
- Let us not limit ourselves to be a leaf in the storm
- Matter of will, conviction, and determination

The COPUOS and its Sub-Committees make decisions on the basis of informal rule of consensus.

- *A very small minority of developed States is monopolizing the decision-making process in the COPUOS using the requirement of consensus as a veto power. These States see no need to elaborate further the legal regime of outer space.*
- Consensus means common feeling that the legal framework applied to an issue is the best.

The principle of Common Heritage of Mankind

- **Res communis humanitatis** (Aldo Armando Cocca, Innsbruck Colloquium, 1954) as a new legal framework for outer space, the Moon and other celestial bodies.
- In 1970, first draft of legal principles to govern the use of the natural resources of the Moon (Argentina, A/AC.105/101. May 11, 1972).
- 1979 Moon Agreement enshrined the principle of common heritage of mankind.

Article 11 does not require 'equal' sharing but an '**equitable**' sharing

- Equitable sharing of benefits:
  - recovery of investments; and,
  - dividing benefits in accordance to the cooperation granted.
- **International cooperation** is condition *sine qua non* for the legality of any space activity.
- **Cooperation** requires operating **with** the agent: it implies active participation.
- Justice and equity give equality a real sense.

Need to begin studying an international regime

In order to preserve character of farsighted in Space Law, it is opportune to begin working on an international regime legal framework to be applied to the exploitation of natural resources in outer space, the Moon and celestial bodies.

Sales on the Moon

IISL Board Position:

- … The activities of non-governmental entities (private parties) are national activities.
- The prohibition of national appropriation by Article II … includes appropriation by non-governmental entities… since that would be a national activity.
- The prohibition of national appropriation also precludes the application of any national legislation on a territorial basis to validate a 'private claim'. …
- Accordingly, the deeds they sell have no legal value or significance, and convey no recognized rights whatsoever.

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Introduction

Almost a quarter century ago, when I knew about the Moon Agreement, I had the opportunity to introduce myself on its study as an auspicious but moderate advance in the development of space law.

Those research activities gave me the opportunity to impel our Authorities towards the approval of the Agreement which was signed by Uruguay on 1 June 1981 and ratified on 9 November 1982 a record that has not been imitated by others, in view of the low number of ratifications received since now.

My comments were published in Volume V of McGill Annals in 1980.

While I was waiting for the discussion paper to make my commentaries to this Workshop, I read what I had written once again, and, although the years passed, I maintain my opinion with reference to the need -and now the opportunity- for the Agreement to reach an adequate number of adherences, without abandoning the Common Heritage of Mankind principle (CHM) and finally addressing the establishment of an international regime for the exploitation of natural resources of the Moon.

As it was not possible for me to attend this Workshop for reasons beyond my control, through this means I want to express my deepest thanks to the organizers for their kind invitation to participate, and to all participants my faithful regards.

Now, I will shortly develop my present reflections about the issue.

I. The Moon Agreement

Certainly, the most important provision of the Agreement is its Article 11 that declares that the Moon and its natural resources are the CHM.

The principle is recognized in a specific and categorical way, ratifying that part of the most acknowledged space doctrine, which had been supported under the leadership of Professor Cocca, in the sense that, outer space and celestial bodies are *"res communis humanitatis",* considering that the space law subject was humankind as a hole.

[*] At the workshop the paper was presented by Prof. Moserrat Filho Filho on behalf of Prof. Gaggero.

It is also stipulated that an international regime will be established in order to govern the exploitation of the natural resources of the Moon, as such exploitations areabout to become feasible. .

That condition is about to become a reality. In view of this, the international regime could be established by a protocol. .

This can make the Agreement more attractive, which could achieve a larger number of ratifications. .

According to the text, State Parties should have the right to participate, on the basis of equality (from the Latin *"aequitas"* which is synonymous with equality and balance) in the benefits obtained from those resources. The meaning of the term "equal" relates to the principles of equality and balance, and, as it is evident, very unequal countries compose the international community.

Consequently, the issue to be solved is to determine who will administer the CHM and distribute, in an equitable way, the benefits derived from the exploitation of its resources. '

An international organization should be established, which, on behalf of humankind, would administer those resources.

In the early 1950s, Professor Cocca supported this idea, which he later presented to the UN, remarking the need to establish a universal authority for the distribution of the CHM benefits, an international cooperation enterprise.

Recently, in 2001, the COMEST Sub-Commission on the Ethics of Outer Space of UNESCO, in a document presented to the Legal Subcommittee of COPUOS, suggested to profit from the experience acquired in the field of the law of the sea to examine the possibility of setting up a " high authority" that will organize the use of space for the benefit of mankind.

I maintain that the organization must be conceived as a cooperative, open to all State Parties. I absolutely disagree with the administration of space resources by an already existing international commercial organization, such as the World Trade Organization (WTO), which has only reduced its members.

Unlucky solutions adopted to regulate commerce on Earth, must not be extrapolated to space commerce. This place should be kept free from any terrestrial "pollution".

The organization to be created, would have, among others, the following functions:

- Grant concessions or exploitation licences.
- Exercise control over exploitations.
- Charge a canon to exploiters in proportion to their profits. This would be like a tax collected in order to settle a common fund administrated by the said international organization, encouraging the participation of developing countries.
- Exercise a jurisdictional function to apply sanctions in case of non-observance of the obligations established in concessions or licenses.

It would be a cooperative concentration of public resources as well as private ones.

It would imply putting into practice the principle of cooperation, the cornerstone of space activities, recognized by the Latin-American doctrine as an obligation, which conditions the legality of every space activity.

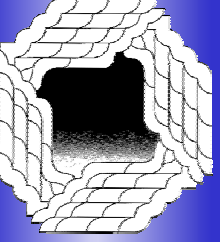
It was broadly recognized by the Declaration on International Cooperation adopted by consensus by the United Nations General Assembly in 1996. It establishes that:

> *"It shall be carried out for the benefit and in the interest of all States, irrespective of their degree of economic, social or scientific and technological development, and shall be the province of all mankind".*

It should not be a passive cooperation. On the contrary, it should be active, positive, not considered as a gift but as an incentive, in the sense that it encourages other countries to participate in the cooperative activity.

I consider that the principle of cooperation is a rule of *"jus cogens",* and, consequently, it must be observed. It cannot be derogated from and it affects all States, whether they are parties or not to the Agreement.

CNS/ATM and Space Law

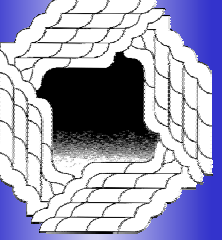


INTERNATIONAL INSTITUTE OF AIR AND SPACE LAW

CNS/ATM and space law

Dr. Frans G. von der Dunk
Director, Space Law Research
International Institute of Air and Space Law

CNS/ATM and space law
UN Workshop, Rio de Janeiro



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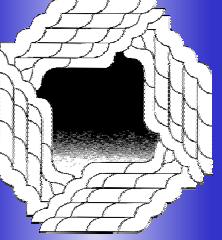
Contents

- GNSS: the current status
- CNS/ATM
- The near future: towards Galileo
- Legal aspects of GNSS
  - Case study: liability
- Concluding remarks



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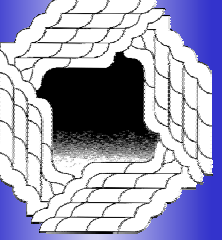
GNSS: the current status

- GNSS is the generic concept
  - Satellites & receivers with atomic clock
  - 3 sats for 2D, 4 sats for 3D, 5 sats for failure detection; 6 sats for identification failing sat
- Primary systems
  - GPS & GLONASS
- Augmentation systems
  - WAAS, LAAS, MSAS, EGNOS



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From ATC to CNS/ATM

- Traditional ATS, incl. ATC
  - Terrestrial: control through sovereignty
  - Airborne: control through registration a/c
- ICAO quick to see potential benefits
  - …esp. of GPS at the time
  - 1983: FANS Ctee.
  - ➔ Concept of CNS/ATM

*N.B.: **use** of GNSS **in aviation**; not GNSS operations or usage as such!*

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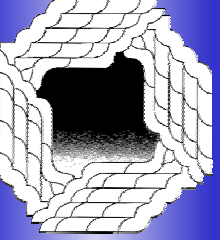

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SARP's

- Chicago Convention

→ SARP's in Annex 10

- Amendment No. 76, Nov. 2001
  - Standards for radio navigation aids
  - Termination GNSS service on 6-years notice
- Amendment No. 77, Nov. 2002
  - Specifications for GNSS-aided Landing Systems
  - Sections on SBAS & GBAS specifications
  - Use GBAS for terminal RNAV

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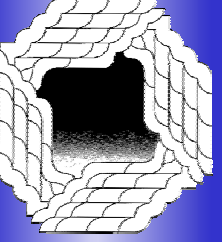

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Europe & GNSS: Towards Galileo

- EGNOS
  - But still dependent upon 1 (2) system(s)
- Commission & ESA:
  - European autonomy (political & strategic)
  - Interests European industry (incl. spin-off)
  - Demand for higher accuracy, integrity, guarantees & liability → **contracts**

→ Galileo

CNS/ATM and space law

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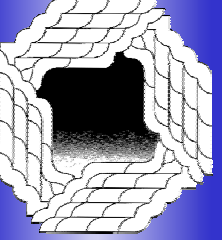

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Galileo: overview

- Development phase 2002-5
  - ε 1250M: EU (ε 700M) & ESA (ε 550M)
  - Joint Undertaking (Reg. 876/2002/EC)
    - Tendering process for operator
    - EC & ESA; later EIB? Private investors?
- Deployment phase 2006-7
  - ε 2150M: ε 600M EU, rest by operator
- Operational phase as of 2008
  - ε 220M per year - for operator

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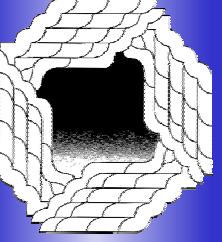

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Galileo services (envisaged)

1. Open Service (OS)
2. Commercial Services (CS)
3. Public Regulated Services (PRS)
4. **Safety-Of-Life Services (SOL)**
   - ➢ Integrity & better accuracy
   - ➢ Liability & (integrity) guarantees
   - ➢ Indirect service fee as part of user charges

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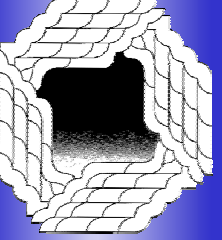
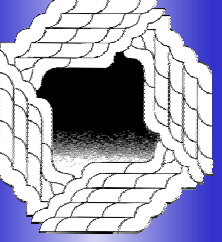


Galileo: status quo

- Tendering phase
  - Two consortia remaining:
  1. iNavsat
     - EADS Space; Thales & Inmarsat
  2. Eurely
     - Vinci Concessions, Alcatel Space & Finmeccanica
  - End 2004: choice of concessionaire
  - Throughout 2005: detailed negotiations
     - Services, guarantees, fees / payments, risks...



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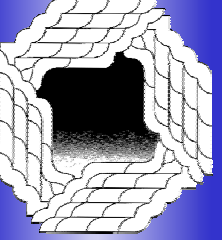
Case study: liability & GNSS

- No GNSS-dedicated liability regime…
- ←→ Many partially applicable regimes
- Nature of damage to be focused on
  - ‘Indirect’ - cf. e.g. air law liability
- → Largely matter of third party liability



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Liability & GPS

- Discussions in ICAO

1. Lack of liability acceptance US
   - ➢ No contract, no guarantees, no fees
2. US acceptance of civil liability
   - ➢ Liability under national US law
     - ◆ Federal Tort Claims Act; Admiralty Act
     - ◆ Sovereignty-issues foreign user states
     - ◆ Practical problems with US cases
   - ➢ No 'international' liability acceptance

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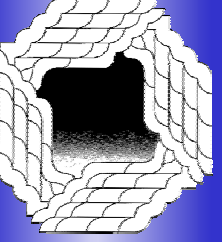

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Liability & Galileo

- International civil system
  - Commercial, with key private participation
- Towards liability acceptance
  - No (additional) product liability
  - Non-contractual liability
    - Not for 'Galileo' itself to change, outside EU
    - ➔ Deal with it through contracts!
    - ➔ Provide for black box-like monitoring
  - ➔ Role contractual liability:

  To allow appropriate derogation of liability ...

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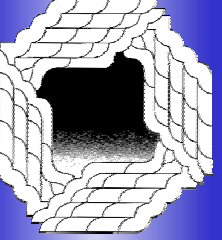

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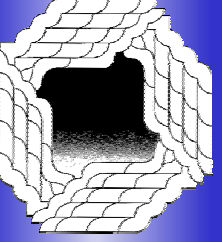
Concluding remark

- Interesting ‘clash’ 2 models
  - GPS: basic & for free ➔ let private initiative develop down-stream commercial applications (cf. also CBERS data!)
  - Galileo: main focus on enhanced but paid services ➔ keep commercial developments & benefits in house (public sector crucially involved)



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Points for discussion…

- Do we need more GNSS systems?
- Is there liability for free services?
- Do we need a GNSS Liability Convention for CNS/ATM users?
- Is there a market for paid services?
- What is the right mix of public & private involvement (PPP's etc.)?

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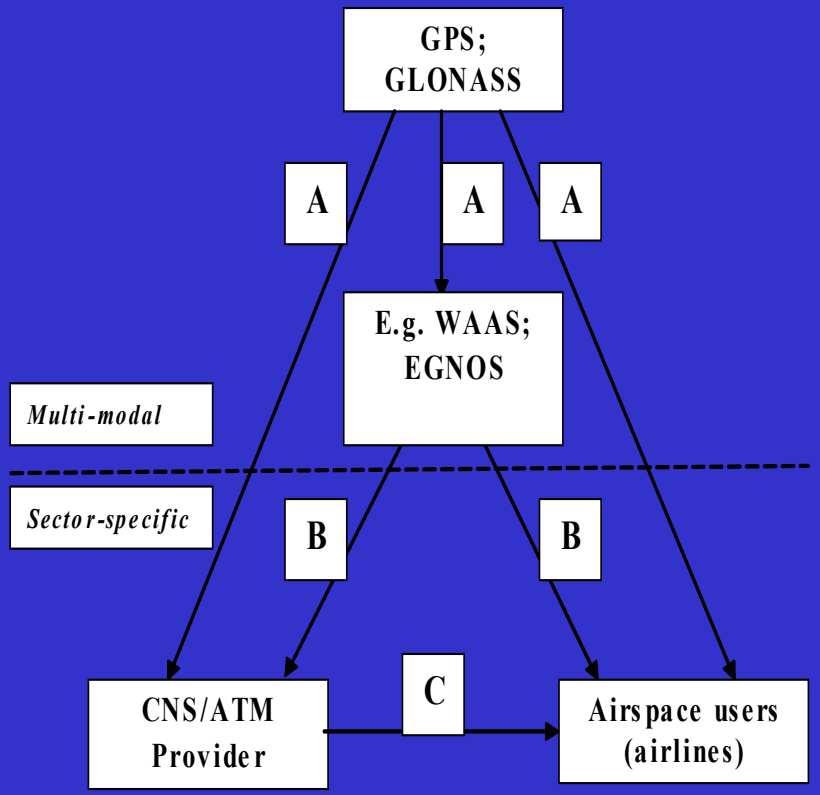
GNSS legal/functional model

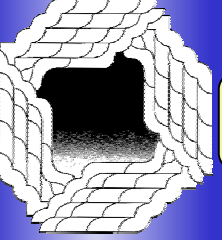


- Legenda:

A = basic signals (free, non-augmented, ≈ no liability)

B = augmented signals (provided outside GPS/GLONASS framework)

C = value-added services involving GNSS signals



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Galileo Legal/Functional Model

Galileo Public Authorities – EU & ESA States, Commission, Others?

Galileo Convention

IGO's (ITU, ICAO, IMO, etc.)

GCS

GSA

Concession Agreement

GOC

Regional Elements

Local Elements

OS | CS, SOL, PRS | OS

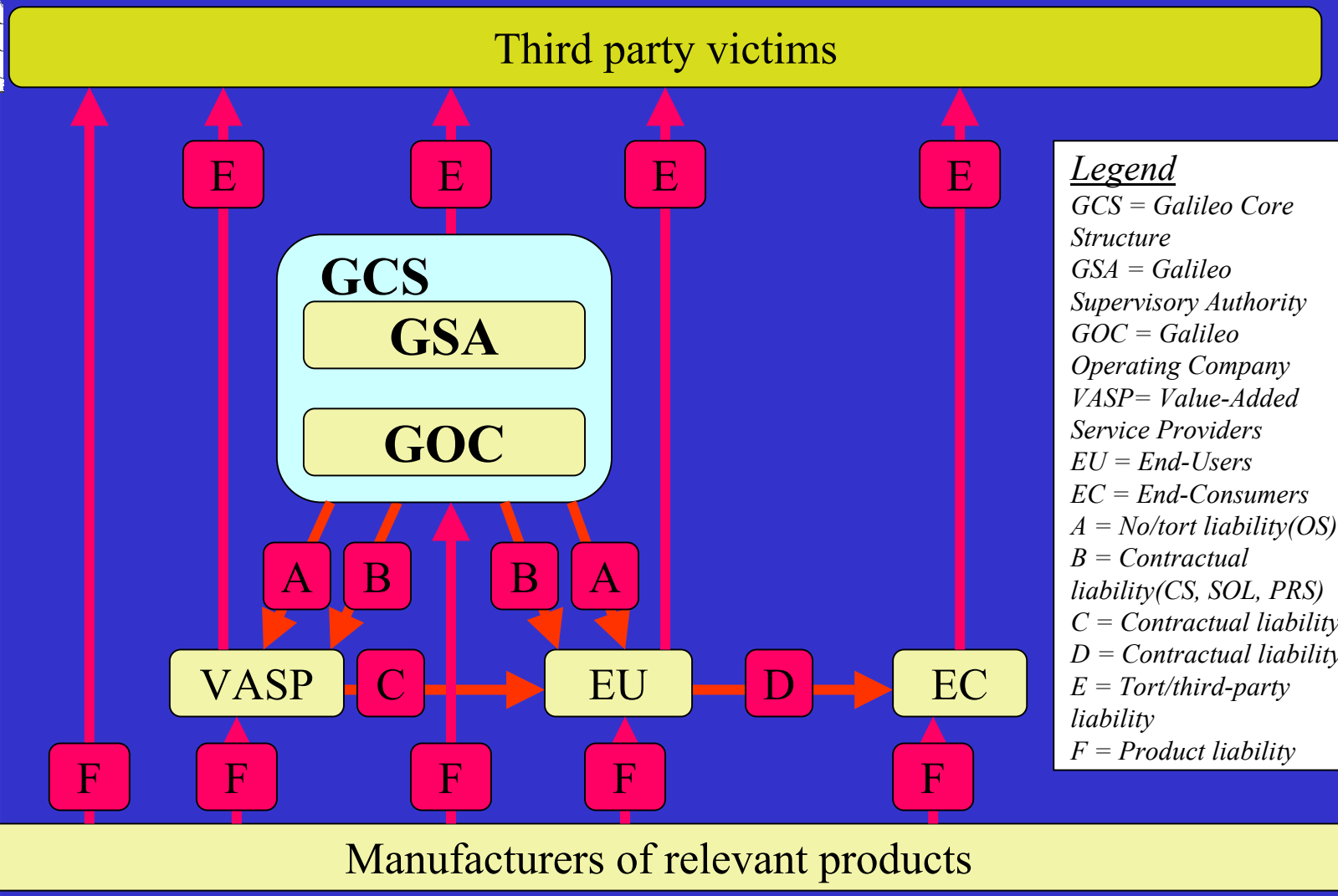
Providers VA Services → VAS → End Users → CES → Consumers

Non-Galileo Public Authorities (Third States)

Legend

EU = European Union
ESA = European Space Agenc
IGO's = InterGovernmental Organisations
GCS = Galileo Core Structure
GSA = Galileo Supervisory Authority
GOC = Galileo Operating Company
OS = Open Service
CS = Commercial Services
SOL = Safety-Of-Life Services
PRS = Public-Regulated Services
VA = Value-Added
VAS = Value-Added Services
CES = Consumer End-Service

Galileo Legal/Functional Model: liability



Disseminating and developing international and national space law:

The Latin America and Caribbean perspective

CNS/ATM and Space Law

Geraldo Antonio Diniz Branco

Rio de Janeiro, Brazil
22-25 November 2004

United Nations/Brazil Workshop on Space Law


CNS/ATM
Communications, Navigation,
Surveillance /
Air Traffic Management

CNS/ATM

- System Conception
- Satellite services
- Sensitive questions
- Brazilian policy
- Possible clients
- SGB Multi-mission
- Possibilities

CNS/ATM

A new generation air traffic management system based on satellite digital data transmission, allowing increase in airspace capacity, economy and safety.

CNS/ATM

AMSS – Aeronautic Mobile Satellite Service

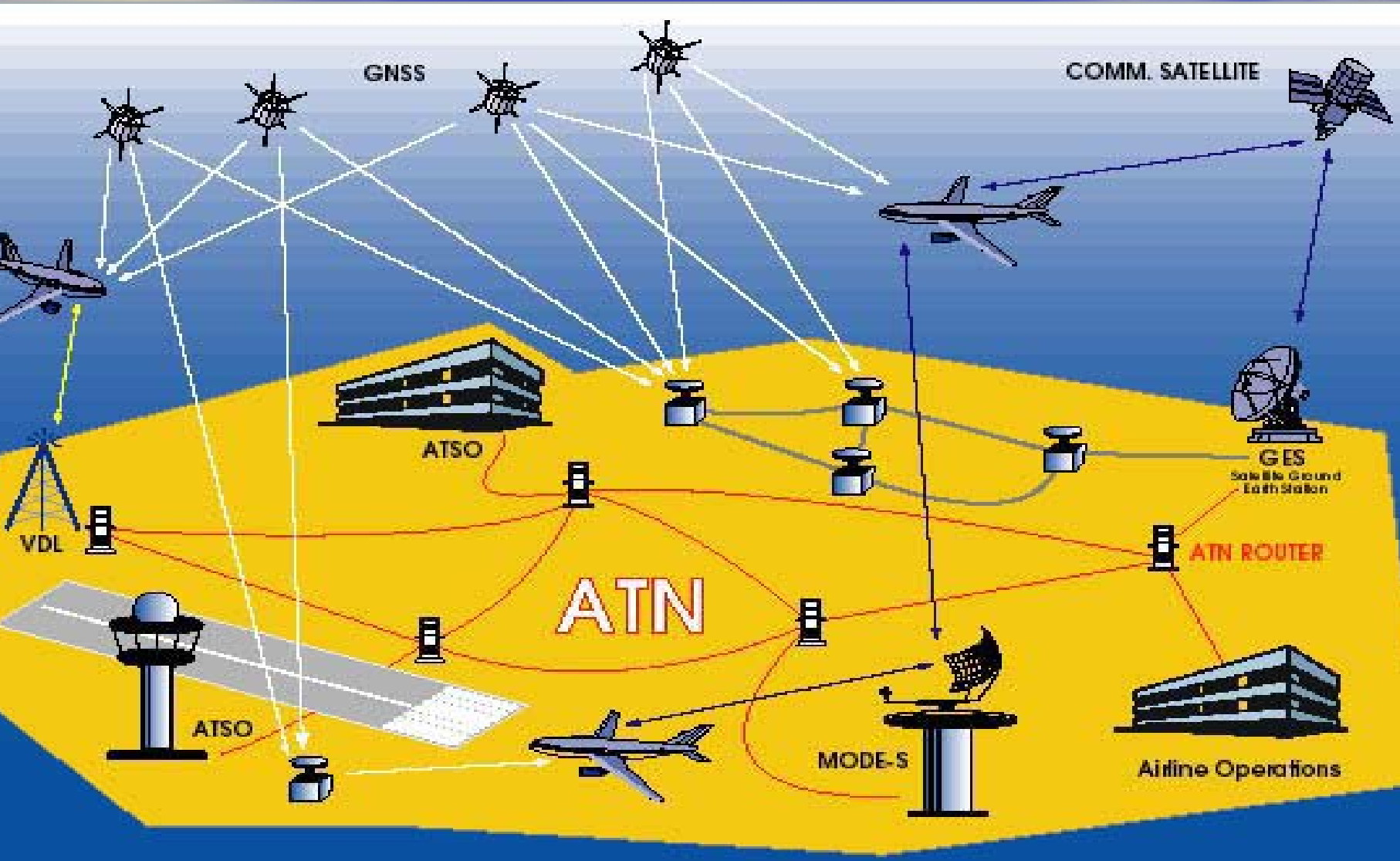
AMSS supports comunication, surveillance and air companies applications

CNS/ATM

- CNS/ATM applications based on satellite service:
  - Navigation:
    - SBAS – Satellite Based Augmentation System
  - Surveillance:
    - ADS – Automatic Dependent Surveillance (uses AMSS)
  - Communication:
    - CPDLC – Controller-Pilot Datalink Communication (uses AMSS
    - FIS – Flight Information Services (uses AMSS)

- Air companies applications by satellite
  - AOC – Aeronautical Operations Communications (uses AMSS)
  - AAC – Administrative Aeronautical Communications (uses AMSS)

CNS/ATM Concept



CNS/ATM

- Sensitive questions:
  - high level of understandness, cooperation and confidence
  - sovereignty, national security and technology
  - liability aspects
- Needs:
  - solid guarantee of universal accessibility, continuity, integrity, precision and reliability
  - new safegard international treaty

CNS/ATM

Brazilian policy:

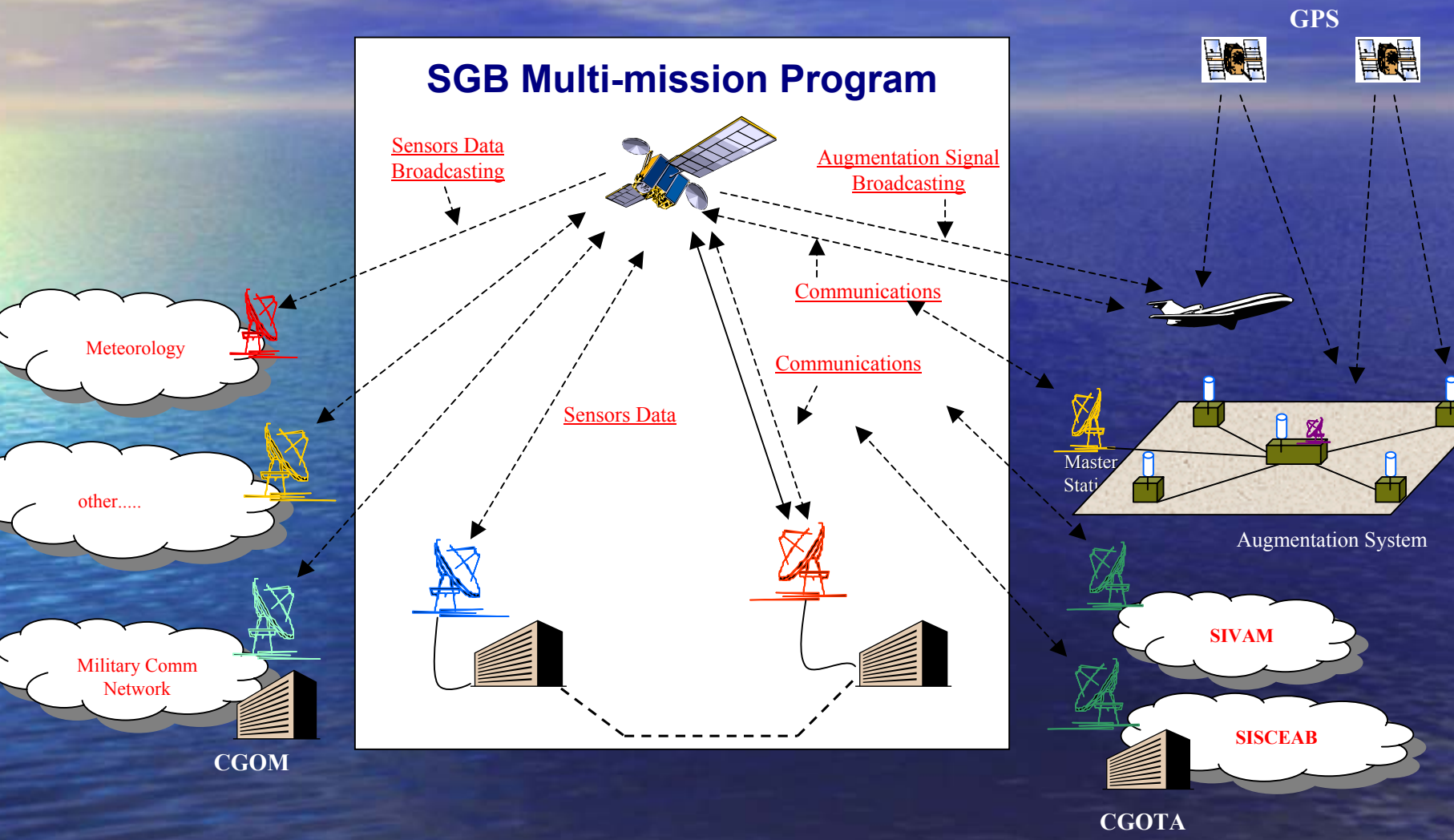
- launch it's own geostationary satellite (SGB)

CNS/ATM

Possible clients for a brazilian geostationary satellite (SGB):

- **Air navigation:**
  - **DECEA (CNS/ATM), SIVAM-SIPAM and other government needs**
- **Other applications :**
  - **military, DPF, Civil Defense, etc.**
- **Adicional Payload :**
  - **Meteorological Sensors**

CNS/ATM



Rio de Janeiro, Brazil

United Nations/Brazil Workshop on Space Law

CNS/ATM

- Possibilities:
  - Latin America coverage
  - Second satellite: South Atlantic coverage

Annexes

Annex I

Observations, recommendations and conclusions of the Workshop

1. The Workshop recommended that States not yet parties to the space treaties take the necessary steps to ratify or accede to them.

2. The Workshop agreed on the importance of promoting a better understanding and knowledge of international space law.

3. The Workshop recognized the necessity to further develop international space law to address contemporary questions relating to the exploration and use of outer space, including issues arising from the increasing involvement of private and other commercial entities in space activities.

4. The Workshop recommended that States consider the development of national space legislation and regional agreements to enable them to offer entities involved in space activities legal certainty and transparency.

5. The Workshop observed that enacting national space legislation was one of many mechanisms by which to authorize and continue to supervise space activities of non-governmental entities and that States were free to use any mechanism they deemed appropriate.

6. The Workshop agreed that 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 (General Assembly resolution 51/122, annex), reflected current aspirations of States with respect to international cooperation, in particular when fostering the development of relevant and appropriate space capacities.

7. The Workshop agreed that information on existing international space law should be widely disseminated to professionals in the legal and space science and technology fields, in particular in developing countries.

8. The Workshop agreed that implementation of space law and policies by States required availability of qualified professionals. The Office for Outer Space Affairs should continue its efforts to actively support and promote education and capacity-building in space law. This was essential for promoting national expertise and capacity in this field.

9. The Workshop agreed that the regional centres for space science and technology education affiliated to the United Nations could play an important role in building capacity in space law. The Workshop recommended that the regional centres in Latin America and the Caribbean include space law in their curricula.

10. The Workshop recognized the valuable public service provided by the website of the Office for Outer Space Affairs (www.unoosa.org) and recommended that the Office further develop its site, in particular the section on space law.

11. The Workshop agreed that the principle of “common heritage of mankind” in the Moon Agreement and the principle of “province of all mankind” in the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (General Assembly resolution 2222 (XXI), annex) were two different principles.

12. The Workshop welcomed the efforts undertaken by national institutions in the Latin American and Caribbean region to ensure the peaceful uses of outer space for the benefit of humankind and recommended that they continue to support the development of space law.

13. The Workshop agreed that multilateral and bilateral cooperation among States in space law and activities was a practical means to allow full access to information. This would be useful for the development of Latin American and Caribbean States in overcoming poverty, mitigating the damage caused by natural disasters and addressing other priority areas.

14. The Workshop noted the commitment of SBDA to continue collaborating with the Office for Outer Space Affairs and other international bodies to further develop space law, in particular in Latin America and the Caribbean. The Workshop also noted that SBDA had committed itself to increasing regional cooperation in space law and to establishing specific programmes for education, training and research in international and national space matters.

15. The Workshop expressed its deep appreciation to the Instituto Nacional de Pesquisas Espaciais and the Centro Técnico Aeroespacial for the excellent opportunity provided to participants at the Workshop to learn about the technical aspects of space activities and to become aware of Brazil's significant efforts in space activities.

16. The Workshop also expressed its appreciation to the Government of Brazil, SBDA and the Office for Outer Space Affairs for organizing the Workshop.

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Annex II

Programme

MONDAY
22 NOVEMBER 2004

Opening

08:30 – 09:00 **REGISTRATION**

09:00 - 09:30 **OPENING CEREMONY AND WELCOMING STATEMENTS**

Adyr da Silva
Associação Brasileira de Direito Aeronáutico e Espacial

Sergio Camacho
United Nations Office for Outer Space Affairs

Morning Session

09:30 – 13:00 **CURRENT AND FUTURE DEVELOPMENT OF INTERNATIONAL SPACE LAW**

09:30 – 09:35
Introduction by the Chairman

09:35 – 10:30
Current and future development of International Space Law

Stephan Hobe
Institute of Air and Space Law, University of Cologne, Germany

10:30 – 11:10
Comments and remarks

Vladimir Kopal
Czech Republic

11:10 - 11:30
Coffee Break

11:30 – 12:40
Discussion

12:40 - 14:30
Lunch

Afternoon Session

14:30 – 18:00 **CURRENT AND FUTURE DEVELOPMENT OF NATIONAL SPACE LAW AND POLICY**

14:30 – 14:35
Introduction by the Chairman

14:35 – 15:35
Current and future development of National Space Law and Policy

Frans von der Dunk
International Institute of Air and Space Law, Leiden University, The Netherlands

15:35 – 16:00
Comments and remarks

Sylvia Ospina
Colombia

16:00 - 16:20
Coffee Break

16:20 – 16:45
Comments and remarks

Oscar Fernandez-Brital
Argentina

16:45 - 18:00
Discussion

TUESDAY
23 NOVEMBER 2004

Morning Session

08:30 – 12:30 **SPACE LAW AND TECHNOLOGICAL COOPERATION**

08:30 – 08:35
Introduction by the Chairman

08:35 – 09:35
Space Law and Technological Cooperation

Alvaro Fabricio dos Santos
Instituto Nacional de Pesquisas Espaciais (INPE), Brazil

09:35 – 10:15
Comments and remarks

Armel Kerrest
Uni. Institut de Droit des Espaces Internationaux, France

10:15 – 10:35
Coffee Break

10:35 - 12:30
Discussion

12:30 - 14:00
Lunch

Afternoon Session

14:00 – 16:00 **SPACE LAW AND THE WORLD LAUNCHING INDUSTRY**

14:00 – 14:05
Introduction by the Chairman

14:05 – 15:30
Panel on Space Law and the World Launching Industry

Coordinator:
Carlos Campelo
Agência Espacial Brasileira(AEB), Brazil

Natalya Malysheva*
International Centre for Space Law, Ukraine

Frans von der Dunk
International Institute of Air and Space Law, Leiden University, The Netherlands

15:40 – 16:00
Coffee Break

16:00 - 18:30 **NATIONAL INSTITUTIONS AND EDUCATION IN SPACE LAW**

16:00– 17:10
Round Table on National Institutions

Coordinator:
Maureen Williams
Conicet (Argentina) and Space Law Committee of the International Law Association

Augusto David Arzubiaga Scheuch
Air and Space Affairs, Ministry of Foreign Affairs, Peru

Alicia Elida Presto
CIDA-E, Uruguay

Jeanette Irigoin-Barrene
Instituto de Estudios Internacionales, Chile

* The paper was delivered by Mr. Oleksandr Serdyuk of the National Space Agency of Ukraine

Le Brecht Hesse
Ministry of Justice and Legal Affairs, Antigua and Barbuda

17:10 - 18:30
Round Table on capacity building and education in space law in the Latin America and Caribbean region

Coordinator:
Tania Sausen
Regional Centre for Space Science and Technology Education for Latin America and the Caribbean-CRECTEALC, Brazil Campus

Maria Eleonor Picarel
Argentina

Nareshwar Harnanan
Attorney General's Chambers and Ministry of Legal Affairs, Republic of Guyana

Fermín Romero
Ministry of Foreign Affairs, Mexico

Martha Gaggero
CIDA-E, Uruguay

Sergio Camacho
United Nations Office for Outer Space Affairs

WEDNESDAY
24 NOVEMBER 2004

Morning Session

08:30 - 11:30 **SPACE LAW AND REMOTE SENSING ACTIVITIES**

08:30 – 08:35
Introduction by the Chairman

08:35 – 09:15
Space Law and Remote Sensing Activities

Maureen Williams
Conicet (Argentina) and Space Law Committee of the International Law Association

09:15 – 10:30
Comments, remarks and discussion

Jose Prof. Monserrat Filho
Associação Brasileira de Direito Aeronáutico e Espacial, Brazil

Joanne Irene Gabrynowicz
National Remote Sensing and Space Law Centre, United States of America

Afternoon Session

10:30 – 20:30 **VISIT TO INSTITUTO NACIONAL DE PESQUISAS ESPACIAIS (INPE) AND CENTRO TÉCNICO AEROESPACIAL (CTA)**
São José dos Campos, São Paulo

10:30 – 11:30
Departure for Airport

12:30 – 18:15
Flight to São José dos Campos, São Paulo, Visit to INPE and CTA

18:15 – 19:00
Departure for Airport

19:00 – 20:30
Flight back to Rio de Janeiro

THURSDAY
25 NOVEMBER 2004

Morning Session

08:30 – 10:40 **20 YEARS OF THE MOON AGREEMENT: SPACE LAW CHALLENGES FOR RETURNING TO THE MOON**

08:30 – 08:35
Introduction by the Chairman

08:35 – 09:15
20 years of the Moon Agreement: Space Law challenges for returning to the Moon

Ram Jakhu
McGill University, Canada

09:15 – 09:55
Comments and remarks

Maria de las Mercedes Esquivel de Cocca
University of Buenos Aires, Argentina

Eduardo Gaggero*
CIDA-E, Uruguay/

09:55 – 10:20
Discussion

10:20 – 10:40

* The paper was delivered by Prof. Monserrat Filho of the Associação Brasileira de Direito Aeronáutico e Espacial, Brazil

Coffee Break

10:40 - 12:30 **CNS/ATM AND SPACE LAW**

10:40 – 10:45
Introduction by the Chairman

10:45 – 12:30
Round Table

Frans van der Dunk
International Institute of Air and Space Law, Leiden University, The Netherlands

Geraldo Antonio Diniz Branco
Aeronautics Research and Development Department (DEPED), Brazil

12:30 - 14:00
Lunch

Afternoon Session

14:00 - 18:30 **RECOMMENDATIONS AND CONCLUSIONS OF THE WORKSHOP**

14:00 – 14:15
Introduction

14:15 – 16:10
Discussion

16:10 - 16:30
Coffee Break

16:30 – 18:15
Discussion

18:15 – 18:30
Closing remarks

Cocktail

Annex III

List of Participants

No	Last Name	First Name	Country of Origin	Position	Mail Address
1	AMORIM	Osmar	BRAZIL	Asessor DIPAA-DAC	Departamento de Aviaçao Civil (DAC) Rua Sta-Luzia, 651 10 andar Centro 2003-040 Rio de Janeiro Brazil
2	ARZUBIAGA SCHEUCH	Augusto David	PERU	President of the Consulting Council of the Civil Aviation & Director of Air & Space Affairs	Ministro Consejero Director de Asuntos Aereos Y Del Espacio Dirección Nacional de Soberania y Limites, Ministerio de Relaciones Exteriores del Peru, Jirón Lampa 535 Lima 1, Lima Peru
3	BRAGA	Fernando César	BRAZIL	Major-Aviador	Brazilian Air Space Control Department Av.General Justo, 160 Centro – Rio de Janeiro Brazil
4	BRITTO	Roberto S F	BRAZIL		Brazilian Air Space Control Department
5	CAMACHO LARA	Sergio	UNITED NATIONS	Director	United Nations Office at Vienna Vienna International Centre P.O. Box 500 A-1400 Vienna Austria
6	CAMPELO	Carlos J.	BRAZIL	Chefe, Assessoria de Cooperação Internacional Fone e-mail:	Agência Espacial Brasileira (AEB) Setor Policial Sul - Área 5 - Quadra3 Bloco A CEP: 70610-200 - Brasília-DF
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United Nations publication
Sales No. E.05.I.76
ISBN 92-1-100977-4
ST/SPACE/28

Printed in Austria
V.05-84475—June 2005—640