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**“COMMERCIAL OUTER SPACE ACTIVITIES”**

**PhD Thesis by**

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A mio fratello Daniele, non ti arrendere mai.

A Julia, la mia stella polare.

*“Планета есть колыбель разума, но нельзя вечно жить в колыбели.”*  
*(Earth is the cradle of humanity, but one cannot live in a cradle forever.)*  
Konstantin Eduardovich Tsiolkovsky (1857 – 1935)

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## INTRODUCTION

Even if the outer space challenge started only a few decades ago, man has already destroyed a number of physical and technical barriers and great scientific improvements have taken place in order to explore (and exploit) what was once an uninhabitable and unusable environment for humans.

Since the very moment in which science, astronautics and other advanced technologies, found a way to leave our planet, the accessibility of outer space has proven to be full of opportunities and potential for the social, scientific and economic progress and benefit for all mankind.

To date, looking back, those early days of space exploration, concentrated on experimental space missions, were the first stage of human involvement in space. At this initial stage, in the middle of the cold war, space exploration was mainly carried out by only a couple of nations, basically motivated by considerations of national and military prestige.

Over the last 60 years, nonetheless, as a result of different factors, namely the huge technical developments of the last decades, this original involvement in outer space has changed to become much more multifaceted.

The main elements involved that have influenced changes in the global space exploration community and have brought about the evolutionary process towards the commercial use of outer space have been the following:

- Development of various space transportation systems facilitating scheduled travel to outer space. More generally, a higher degree of technical maturity of space technologies.
- The introduction of commerce in space-related activities as a by product of the progress in logistics connected with routine access.
- The rise of potential space applications through progress made in space technology and other related sciences have led to many different activities and an enormous increase in profits.
- Further development of space applications gained through practical experience.
- Increased and concerted use of the outer space's potential by a growing number of states and communities that are developing space programs and this includes developing countries such as Nigeria, Brazil, and Eastern European Countries.

The abovementioned factors, together with other less evident elements, have contributed to an decisive change in the concept itself of utilization of outer space: from pre-operational, experimental, and scientific-oriented activities to operational activities carried out by space agencies for an ever-growing number of application purposes in the commercial and pacific uses of outer space.

No one doubts and we must be well aware of the still considerable amount of military space projects (for which, by the way, most of the abovementioned developments are equally relevant and which led to a comparable shift towards application), however, it is not the objective of this work to evaluate the military aspects of outer space exploration and development.

Now that space programs and space agencies have become a part of our everyday existence, and which are now in the operational and application phase, all the above developments, synthetically considered, have added another important element that is the central theme of this paper, namely, the commercial uses of outer space.

Commercialization has assumed today a very important role as a catalyst for further space exploration and development. In fact, if on the one hand, commercial activities are the result of the various abovementioned elements and which form the constituents of the stage shift in space utilization, on the other, the commercial revenues of space activities reciprocally influence further developments in this evolutionary process. This trend is the basic subject of our interest, to the extent that it gives rise to legal questions



and practical problems.

The aim of this work is to assess the current status of space activity regulation (in the main fields) against the background of aspects of progressive commercialization and vice versa. On the basis of the outcome of this research and the legal implications resulting from applying this analysis to practical space utilization, the perspective scope of my effort is to provide at least one insight into the legal questions regarding space commercialization, an aspect almost neglected in the Italian academic landscape.

The conclusions of this paper take into consideration the fact that the basic (and substantially unique) legal framework was established when competitive space agencies were still in their infancy and basically experimental, a critical evaluation of its principles appears, not only overdue, but also appropriate.

An overall report on the juridical implications and relevant practical problems might, moreover, form a basis for new legislation to facilitate the ongoing process of progressive space utilization. Such a development would consequently influence the pace of the future space activity evolution through which commercial advantage is becoming one of the most forceful factors.

For the purpose of analyzing the numerous legal and practical issues surrounding the growth of commercialization in space activities, this work has been divided into chapters to deal with each specific aspect.

### ***I. First Chapter – The History of the Law of the Space***

The first chapter introduces the reader in the field of space law, giving a brief historical report on the development of international space law legislation, in the framework of a global cooperation in space-related sectors. It is here shown an intense and progressive activity in international law-making during the past decades (during the first years of the space age).

The attention is finally focused on the problems encountered in reaching global agreements in the field of space activities, problems arising due to the strategic and geopolitics' significance of the space in relation to national security as well as the will to exploit in the most profitable ways this new resource.

Finally, the chapter contains a list of the major governmental and non-governmental organization within the United Nations family with the specification of their respective fields of action in the space sector.

### ***II. Second Chapter – Commercial Space Actions under the conditions of the Corpus Juris Spatialis***

The second chapter affords in general terms the issue of the commercialization of space activities per se and its position within the terms and possibilities of existing international space law. It is evident that the acceleration impressed by the technical development and commercial potentialities in space imposes the need for and update of the current juridical framework: nonetheless this chapter gives an overview of the existing international space law in order to assess whether its principles - which were established at a time when space policies appear to have been base on quite different motivations and while those principles were focused on the early expectations of a brand new sector and environment and thus focused on the establishment of basic legal requirements – are now fit to accommodate the trends in space endeavor and particularly to the commercialization process in general.

Two crucial points have to be examined: (i) if the Outer Space Treaty permits commercial space activities and, if so (ii) if the Outer Space Treaty, in its present form is capable of dealing adequately with the legal consequences of commercial space activities. The examined legislation demonstrates in the first place a general permission to undertake commercial activities in outer space. Nonetheless, the too basic framework of public

international space law does not provide adequate regulation when commercial aspects are involved. Therefore, once again there is need for new international legislation (treaties) to provide a safe and legal basis and framework for such activities.

### ***III. Third Chapter – The law of space, private enterprises and private property***

The third Chapter deals with the striking phenomenon of the commercialization process taking place in space ventures represented by the increasing role played by private enterprises in various fields of space activities. Although the commercialization of space conducted by private enterprises is substantially a matter of national legislation, directed by national Legislator and implemented by national/regional regulation, nevertheless it effects space law at all levels.

Actually, international agreements declare that no government can claim outer space or celestial bodies in outer space as its own, while private companies and business operators wishing to invest in potential space enterprises frequently point out that such provisions constitute one of the major obstacles to true future commercial development of space.

The fact is that the lack of an adequate protection of property rights truly prevent the potential investors from obtaining adequate funds, hiding the protection of the relevant investments and depriving them of the assurance that they can appropriate income from their investment. In other words, the absence of whatever sovereignty in space, compromises the ability to make profits from private investment, since the private sector will not undertake the risk to develop the technology and invest the resources if it cannot be assured the benefits of its labor.

The Chapter describes how the utilitarian (and anti-militarization) nature of the so-called Outer Space Treaty, signed more than 50 years ago, is still preventing a precise individuation of what is permitted and what is not in outer space. An objective analysis of the Outer Space Treaty (and of the Moon Treaty) shows that property rights exist, but not to the extent that many business player would desire. The two treaties recognize sovereignty over properties placed into space, property produced in space and resources removed from their place in space, but prohibit any claims of sovereignty by the States. On the other hand, international law extends this ban to individuals. The so called Moon Treaty calls for “equitable” sharing of benefits among all states, but is clear that the technological advanced countries oppose a fierce resistance at having to give up their expensive and hard-earned benefits.

The chapter also deals with the involvement of private enterprises in space, showing how a passage is occurring from the indirect involvement of the very beginning of space age (when the private enterprises were engaged as contractor of the governments or the agencies which directly acted as a player in space) to a scenario in which the private sector is directly involved in space activities. Through the examination of the Articles 6 and 9 of the Outer Space Treaty, we can affirm that also non-governmental entities can be potential player of the outer space activities and, more precisely, no prohibition on participation by private enterprise in general can reasonably be voided. Nevertheless, this affirmation has to be contempered with the acknowledgment (though opposed by a minor school of thought) that activities conducted by private entities are governed and consequently also limited by the same general conditions and restrictions provided for by the Outer Space Treaty with regards to the Member States.

### ***IV. Fourth Chapter – Communications via satellite***

The fourth chapter affords the theme of space satellites communications, pointing out how this is currently the first and most successful space application in terms of commercial prospects and by-products on the earth. Many issues relating to this aspect of space law are discussed against the background of international regulation by the International Telecommunications Union (ITU) and the United Nations Committee for

the Peaceful Uses of Outer Space (UNCOPUOS).

The chapter provides an overview about the international regulatory framework dominating specifically this technical field of space ventures, taking into account the close relationship between the international space law and the regime of international telecommunication law. I will introduce the two main international bodies dealing with the regulation of telecommunication via satellite which are: the International Telecommunications Union (ITU) and the United Nations Committee for the Peaceful Uses of Outer Space (UNCOPUOS).

The chapter illustrates also the legal regime of the so-called GSO (geo-stationary orbit): the ever increasing use of the geostationary orbit for satellite communications, on one side, and the assurance for a fair and equitable sharing of it by the different countries of the world, on the other side.

It will be also examined another aspect that arises in connection with space communication services provided by satellites located in the geostationary orbit concerns the danger of damages deriving from radio interferences.

### ***V. Fifth Chapter – Space Transportation***

Although private enterprises within Europe, Asia and United States has become more and more involved into space activities such as telecommunications and remote sensing, until now only the government has provided transportation into outer space. To date, however, this scenario is changing, because all the major governments are withdrawing from the commercial space transportation market. And as private players will step into the void left by such governmental withdrawal, the regulatory framework which will govern private space transportation services will become very important. This chapter provides for a definition of “space transportation” (which, in example, does not include the space transportation operations performed for transportation purposes from one point on earth to another) explores space transportation and the derivative juridical issues, on the background of the perspective of existing regulation and present (as well as anticipated) practical developments. Controversial questions are scrutinized and areas of specific concern are identified. Among these: the legal regime of space transportation on earth’s surface as well as the legal regime of the high seas in comparison with the legal regime of airspace. In the context of the legal regime of airspace, the thorny subject of the definition/delimitation of outer space has been also broached. Moreover, the chapter deals with the examination of the legal regime of Outer Space. Finally, a special paragraph is dedicated to the study of the issue of the state responsibility and state liability for national activities in outer space, imposing this responsibility equally upon governmental activities as well as on activities carried on by non-governmental entities.

### ***VI. Sixth Chapter – Intellectual Property Rights and Outer Space Activities***

This chapter discusses the basic issue of intellectual property rights protection in the context of space endeavors’. Though this issue received only minor attention in the past years, copyrights and rights on invention in relation to space activities are expected to play an important role in the further development of space commercialization. It is clear that the process of develop and innovate ideas in space sector continues to supply mankind with ever increasing possibilities to utilize the specific opportunities offered by the space environment. However, seen from the point of view of the player involved in this sector, it is necessary to provide individuals with sufficient incentives to mobilize their full intellectual potential. In the light of the above, intellectual property rights relating to space activities are gaining substantial importance, and provisions for their adequate protection will be taken. With the intensification of international travel and trades, the need arose to establish a legal system to deal with the international protection of intellectual and industrial property rights. Therefore, in parallel with the creation of national rules, interstate cooperation has agreed upon a body of international regulation with respect to these areas of law (Berne Convention, 1886; Geneva Universal Copyright

Convention, 1962; Rome Convention on neighboring rights, 1961; Geneva Convention, 1971, Paris Convention, 1883; Washington Patent Cooperation Treaty, 1979).

Taking into consideration the perspected development of commercial space activities, combined with the increasing interest of private enterprises make it necessary to investigate whether further measures must be taken on an international level to secure adequate protection for intellectual and industrial property rights related to space endeavor. The chapter deals with various issues related: (i) to the application of satellite communication technology (problems with unauthorized interception and use of information and data; (ii) rights on inventions, including data's intangible product (US are very concerned with this point, also to encourage private contractors who have business relationship with NASA); (iii) remote sensing.

### ***VII. Seventh Chapter – Commercialization of Outer Space and Insurances***

In this chapter I tried to give an overview of a brand new insurance sector, settled on the needing of space missions and its practical and legal aspects in the light of increased space commercialization. Recent commercialization trends in the space sector have made space insurance a focal issue, which in its turn largely influences the future commercialization of space endeavor. Generally speaking “space risks” can be defined as the uncertainty regarding losses derived from a space activity.

We moved from a scenario in which the Governments involved in space activities were originally able and willing to take on the legal responsibilities and financial risks involved in space endeavor, at the present time budgetary restraints imposed on States systems due to the economic recession create a scenario where risks and liabilities are covered through insurance arrangements. On the other hand, private industries and corporation – being more and more directly involved in space participation, is even more inclined to resort to insurance cover in order to minimize risk factors in this high-risk field of business. All the mentioned causes, generated a new sector in the insurance market. Instigated by the advantages of risk-pooling and risk-spreading, insurance seems to be the ultimate answer to make economically viable each kind of space activity, per se always high risk characterized. The chapter analyzes the following categories of insurances: (i) property Insurance - subdivided in a) pre launch insurance, b) launch failure and initial operation insurance, c) satellite life insurance; (ii) liability insurance; (iii) product liability; (iv) personal accident insurance of space crews. Finally, some mention is made to the general space insurance market, and how badly it reacts to the specific characteristic of its relevant field of operation.

### ***VIII. Eight Chapter – Final Remarks***

The world's attention for outer space ventures increased hugely at the beginning of the so called “space race”, as exciting results were achieved by the two competing superpowers, the Soviet Union and the United States. This enthusiasm reached his peak with the 1969 moon landing. Since then, the space went out of the focus of the media and of the public, and only spectacular events continued to be covered by the press and noticed by the people. Nonetheless, we now experience that the non-exciting developments are those which changed and still are trying to change our life. Actually, many developments for space exploration and the exploitation of outer space made our civilization absolutely dependent on activities carried on in outer. To name just, reference can be made at: the raise of satellites for communication, television, Earth monitoring, weather forecasting, navigation and - what is even more unknown by the public, but changed life at least as significantly – the so called “spin off technologies”, with the Personal Computer being the most prominent one. Such important changes in our lives happened widely unnoticed by the public and, as a consequence, in an almost complete lack of a legal framework..

The factual starting point of this work is that outer space is, also now, a market with an impressive potential, not only because of the growing potentialities in to-date existing

applications like navigation and communication, but also due to a large potential in emerging applications (i.e. space tourism) and in future applications (i.e. mining on the moon). Many innovations related to space travel and to the use of outer space made and still make our culture totally dependent on outer space activities. Reference is hereby made to the development of satellites for communication, television, Earth monitoring, weather forecasting and navigation to name just a few.

We experienced a sort of deceleration since the times of the “space race”. Looking back on existing international space rules as they were envisaged and drafted within the UN, and especially studying the principles of space law, one cannot but be impressed by the foresight, the courage and the confidence shown by those early Fathers of the space law.

The creation of a regime of freedom with sovereign States as the subjects, “in accordance with international law”, without a supranational authority to enforce the new set of rules, risk the raise of conflicts and tensions among States and private entities, as nowadays there is no equal opportunity (which means: “no equal capability”) to use (and manipulate) the concept of “freedom to explore and use the outer space”. It enlightens once again the renowned problem of an equal or at least equitable participation by all States in space activities as well as the issue of the distribution of the “wealth of space”, in this case an equal (or equitable, economic and efficient) sharing of the benefits of the exploitation of the natural resources of outer space.

The lack of sovereignty on a “national territory” in outer space law, and the specific provision of (the concept of) “all mankind” in positive space regulations, and of nationality only with regard to the national jurisdictions over space objects (the State of registry), make it feasible to improve new kinds of cooperation under mainly “technical” public legislation, since it exists the possibility to apply present rules of international private law in space. One of the starting point should be the permission, under the existing international space law, to institute a number of limited, functional property rights in outer space.

The ultimate aim should be to create a “level playing field” for all the entities (public and private ones) to be active in outer space: equal chances, equal capabilities, shared “access rules” to the wealth of space for privates and companies who desire to expand their burdens of business into outer space. Close to this, and even more important is that the highest commission of the society of the States is to have all States benefit from such space activities on an equitable and widely shared legal basis.

To date, however, the current legal regime of outer space is more and more fragmented and inappropriate to face the challenges of the intensifying commercial use of space. It consists of several basic but still very general principles stated in a restricted set of space treaties adopted since 1967 (the so called “*Corpus Iuris Spatialis*”) and a weapon controlling treaty, together with general international law and the practices of the space faring nations. The legal framework also contemplates a number of agreements covering the commercial utilization of outer space, such as rights to use the geostationary orbit or agreements incorporating intergovernmental organizations (for instance, the Intergovernmental Agreement on the International Space Station, the International Telecommunications Union, the International Civil Aviation Organization, and the World Meteorological Organization).

Nonetheless, just as the pushing interests of industry have played a major role conditioning the development of the law of the sea, in the same way the interests of industrial and commercial parties will heavily influence policy in space. Since the private parties will have a preeminent role in the creation of a new legal framework for the commercial exploitation of the outer space, it could be worthy to agree on a set of common, widely shared, principles. Increasing commercial economic activity in space should be facilitated, for instance, by the introduction of a code of ethics or a sort of *Lex Mercatoria Spatialis* for the businesses involved, something that is now quite a commonplace among business operators. It should cover the most various areas such as

environmental stewardship of space, the promotion of honest dealings, making safety an important concern, ensuring a free-market economy and disclosure of conflicts of interest or political contributions.

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## CHAPTER I THE HISTORY OF THE LAW OF THE SPACE

### 1. INTRODUCTION

As soon as man's wits started to have a hold over the laws of nature to expand mankind's presence beyond his natural boundary, it has been understood the need to set up a legal regime for this new province.

The conquest of outer space followed the same path as every other precedent human expansion into a new dimension did. Valid precedents with this respect are: the development of the law of the sea, as well as the creation of the air law.

As for the opportunity to regulate human activities in outer space, this occurred in a specific context in which international law truly had become worldwide spread. Therefore, the widespread conditions seemed to be highly favorable to the setting of a universal juridical system for this brand new sector of human activity, and the international cooperation was chosen as the most suitable tool to achieve this goal.

Even if space law involves both international and national law, it possesses so many international features that it seems opportune to concentrate on the international aspects of space law, which instruments, mirroring reasons directly deriving from national policies, can be seen as a common denominator of originally varying national laws.

### 2. SPACE ACTIVITIES AND INTERNATIONAL COOPERATION

Due to the international nature of outer space affairs, it was evident that international relations were about to play a crucial role in setting the framework of the subsequent regulations and human activities therein. Moreover, it should be taken into account that, at the time when the need for a legal framework was more urgent, there was a commonly growing tendency towards cooperation in facing the problems and promoting the interests of the world community at large.

This led to an increased recourse to the international cooperation, in conjunction with a rising interest in space issues, which focused on the object of preventing outer space from becoming another geo-politic battlefield. Thus, a suitable framework was created in order to set up an on-purpose-institution to focus, on a global scale, with the basic regulation of space activities: the *United Nations Committee for the Peaceful Uses of Outer Space* (UNCOPUOS).

Prior to the analysis of the role and history of such an outstanding organization, it is worth making reference to other organizations which play an important role in international cooperation in the field of activities in (or related to) the outer space.

### 3. OUTER SPACE AND GOVERNMENTAL COOPERATION

Trying to keep up with the always updating science and space technology, a great number of organizations<sup>1</sup> within the United Nations, widened their own specific field of action to

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<sup>1</sup> Most of the United Nations Organization are directly or indirectly involved in space-related activities. See for an overview of the developments, M. Lachs, *The Law of Outer Space*, p. 29 etc., Sijthoff, Leiden 1972. See also *Report on the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 9-21 August 1982, International Cooperation and the Role of the United Nations*, par. 381; P. Malanczuk, *The Relevance of International Economic Law and the*

the most relevant space-related activities. Among these, the the International Telecommunication Union (ITU)<sup>2</sup> the World Health Organization (WHO)<sup>3</sup> the International Atomic Energy Agency (IAEA)<sup>4</sup> and UNESCO.

As regards UNESCO<sup>5</sup> it should be mentioned the scope of such Organization: “to contribute to peace and security, by providing collaboration among the nations through education, science and culture, in order to further universal respect for justice, for the rule of law and for human rights and fundamental freedoms”. With regard to its role in the setting up of space law, UNESCO has been functional in the creation of a New International Communications and Information Order<sup>6</sup>, mainly promoted by many Third World Countries. Its 1978 Declaration on Mass Media<sup>7</sup> really was a contribution to the development of international law and eventually had relevant consequences for space activities and legal implications, especially in the field of satellite transmission<sup>8</sup>.

#### 4. NON-GOVERNMENTAL SPACE LAW ORGANIZATIONS WITHIN THE FRAMEWORK OF COOPERATION PROCEDURES.

The International Geophysical Year 1956-57<sup>9</sup> was the ending event of a considerable progress of the non-governmental international cooperation in the field of space science and technology. In this period a number of international non-governmental organizations were instituted in relation to the outer space sector or affiliated to related features. Without willing to offer a complete enumeration, the following organizations must be paid a peculiar attention.

In 1958 the International Council of Scientific Unions (ICSU)<sup>10</sup> created the Committee for Space Research (COSPAR)<sup>11</sup> in 1958, with the task to cooperate and

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*World Trade Organisation (WTO) for Commercial Outer Space Activities*, in *International Organisations and Space Law*, Proceedings of the Third ECSL Colloquium, Perugia, Italy, 6-7 May 1999, R.A. Harris Edt., 1999;

<sup>2</sup> For an overview on the ITU mission see: <http://www.itu.int/net/about/mission.aspx>

<sup>3</sup> WHO's relationship with space activities is two-fold. On the one hand, it investigates the health implications of space flight and its effect on astronauts, the earth environment and outer space; on the other, it uses the many remote sensing data received from outer space to improve health on earth. This latter task is being executed in collaboration with FAO. See, among others, *Cosmic Radiation*, in [http://www.who.int/ionizing\\_radiation/env/cosmic/en/print.html](http://www.who.int/ionizing_radiation/env/cosmic/en/print.html)

<sup>4</sup> The International Atomic Energy Agency is not a specialized agency of the U.N.; the Agreement with the U.N approved by the General Assembly on 14 November 1957, is modelled on the agency agreements except that the IAEA is more autonomous. See G.H. Reynolds, *Outer Space: Problems of law and policy*, Westview Press, 1997; D.W. Bowett, *The Law of International Institutions*, London, Stevens & Sons 1975, p. 59. The IAEA is primarily concerned with the peaceful uses of nuclear energy and is particularly interested in the various aspects of nuclear energy in outer space, such as those related to cosmic rays as well as the use of nuclear materials for energy purposes in outer space activities. See M. Lachs *supra* note 1, p. 30. Notice also the role of the International Commission on Radiological Protection in the form of its basis recommendations on protection against exposure to ionizing radiation, which it is suggested should be applicable to nuclear power sources in outer space. See ICRP Publication 26 (1977). This linked with the efforts being spent in the Legal Subcommittee of UNCOPUOS to supplement the norms of international law relevant to the use of nuclear power sources in outer space. See U.N. Doc. A/AC.105/C.2/L.129, 30 March 1981 ([www.oosa.unvienna.org/pdf/gadocs/A\\_36\\_20E.pdf](http://www.oosa.unvienna.org/pdf/gadocs/A_36_20E.pdf))

<sup>5</sup> The United Nations Educational Scientific and Cultural Organization; Constitution of the United Nations Educational, Scientific and Cultural Organization, signed at London on 16 November 1945 (4 United Nations Treaty Series, p. 375 *et seq.*), Article I (1) (<http://untreaty.un.org/>).

<sup>6</sup> See N. Matte, *Aerospace Law, Telecommunications Satellites*, p. 49, 1982, Butterworths & Co. (Canada) Ltd.

<sup>7</sup> *Declaration on Fundamental Principles concerning the Contribution of the Mass Media to Strengthen the Peace and International Understanding, the Promotion of the Human Rights and to Counter Racialism, Apartheid and Incitement of War*, UNESCO General Conference, Twentieth Session in Paris on 28 November 1978 ([http://www.unhchr.ch/html/menu3/b/d\\_media.htm](http://www.unhchr.ch/html/menu3/b/d_media.htm)).

<sup>8</sup> See N. Matte, *Institutional Arrangements for space activities: an Appraisal*, IISL, Rome, 6-12 September 1981 (*Annals of Air and Space Law*, vol.VI, 1981 on <http://www.mcgill.ca/iasl/annals/contents/1981/>).

<sup>9</sup> The International Geophysical Year (<http://www.nas.edu/history/igy/>) was followed by continuing cooperation in this field, leading, *inter alia*, to the formation of the International Committee for Geophysics. See M. Lachs, *supra* note 1, p. 28.

<sup>10</sup> See *Role of Non-Governmental Organizations in Space Activities, Background Paper* (for the Second United Nations Conference on the Exploitation and Peaceful Uses of Outer Space) A/Conf.101/BP/12, 2 February 1981, p. 5 *et seq.*

<sup>11</sup> *Ibidem* p. 10 *et seq.* See also L.E. Schwartz, *International Organizations and Space Cooperation*, Durham, North Carolina 1962, pp. 32; See further *COSPAR Bulletins*, at <http://cosparhq.cnes.fr>.



coordinate the space researches on an interdisciplinary basis. The cooperation among the UN and the COSPAR in creating rules of international space law to date is a past practice<sup>12</sup> and will influence the international space regulation yet to come.

The World Intellectual Property Organization (WIPO) deserves a mention in its role of creator of the Convention Relating to the Distribution of Program Carrying Signals Transmitted by Satellite<sup>13</sup> which is discussed in Chapter VI on protecting intellectual property in space endeavour<sup>14</sup>.

The International Astronautical Federation (IAF), made up of astronautically national societies, was created to promote astronautics for peaceful uses and to encourage international cooperation on a wide gamma basis, while fostering researches and sharing of the technical data's and information.

In the Sixties the IAF started the creation of the International Academy of Astronautics (IAA) and the International Institute of Space Law (IISL) which works in strict connection with the IAF, even if their function is partially different.

While the Academy has is focused on three sectors: basic sciences, engineering sciences and life sciences, the International Institute of Space Law<sup>15</sup> has, pursuant its by-laws, the purposes (i) to advice to the Chairman of the IAF, (ii) to collaborate with the relevant international and national organizations in the field of Space Law; (iii) to carry out such other operation which may be considered desirable for fostering the social science aspects of astronautics, space travel and exploration; (iv) to publish proceedings and reports and other publications; (v) to make awards; (vi) to organize and manage events and workshop on juridical aspects of space sciences, making reports and study-papers.

In the performance of such duties and tasks, the IISL affords different legal aspects of the utilization of outer space, and its published proceedings truly are a valid contribution to the space law development.

Furthermore, it should be mentioned the International Law Association: it is involved with the space law, especially in particular through the contribution of its Space Law Committee<sup>16</sup>. More details on the above mentioned organizations references it is here made to the various publications dealing with these specific organizations<sup>17</sup>.

Under the impulse of the European Space Agency (ESA), in 1989 the European Centre for Space Law (ECSL) was created. Pursuant to its Charter<sup>18</sup> its goals are:

- to promote the knowledge of the space related law;
- to increase the cooperation and the communication between the professionals of the sector;
- to encourage university research in specific issues related to space law;
- to organize workshop and colloquia and by the spreading.

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<sup>12</sup> See for the role of COSPAR in space law, G.C.M. Reijnen, *Utilization of Outer Space and International Law*, Elsevier Scientific Publishing Company, Amsterdam 1981, pp. 27-39.

<sup>13</sup> This Convention is generally known as the Brussels Satellite Convention ([http://www.wipo.int/treaties/en/ip/brussels/trtdocs\\_wo025.html](http://www.wipo.int/treaties/en/ip/brussels/trtdocs_wo025.html)) and aims to protect originating broadcasting organizations from satellite broadcasting piracy.

<sup>14</sup> See *infra* Chapter VI.

<sup>15</sup> See E. Pepin, *History of the International Institute of Space Law of the International Aeronautical Federation (1958-1982)*, American Institute of Aeronautics and Astronautics Inc., New York.

<sup>16</sup> See the ILA Space Committee Reports at <http://www.ila-hq.org/en/committees/index.cfm/cid/29>.

<sup>17</sup> See, *inter alia*, N.M. Matte, *Droit Aérospatial de l'Exploration Scientifique à l'Utilisation Commerciale*, Editions A. Pedone, Paris 1976, pp. 22-24. See also Background Paper for the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space, *Role of Non-Governmental Organizations In Space Activities*.

<sup>18</sup> See *ECSL Charter* at [http://www.esa.int/SPECIALS/ECSL/SEMNCVGHZTD\\_0.html](http://www.esa.int/SPECIALS/ECSL/SEMNCVGHZTD_0.html) and <ftp://ftp.estec.esa.int/ftp/pub/ecsl/MATERIAL/Biennial-Report/BR-89-91.pdf>.

## 5. THE UNCOPUOS - UNITED NATIONS COMMITTEE FOR PEACEFUL USES OF OUTER SPACE

The UNCOPUOS holds a special and unique position, being an institution which contributes in the process of law-making in the space peaceful uses field.

The setting of such a Committee has been a logical consequence of the determination to employ the existing framework of a global organization to set up an organ to deal with problems in a certain field and which falls under the general competence of the mother organization, whose principal aim is “to maintain international peace and Security”<sup>19</sup>.

The General Assembly of the United Nations, pressed by the political concerns about the numerous questions arising in international relations related to space, took action which led to the setting up of an *Ad Hoc* Committee<sup>20</sup> followed by the creation of the permanent Committee on the Peaceful Uses of Outer Space, (the UNCOPUOS<sup>21</sup>).

Because of a delay, caused by the differing views on organizational and voting procedures<sup>22</sup>, UNCOPUOS initiated its operations three year after its creation, in 1962.

Since 1968, a special division, the Outer Space Affairs Division, which developed from a separate unit within the political and security council, provides UNCOPUOS with assistance with administrative and secretarial services, whilst it also assists the Secretary General in discharging his duty with respect to the peaceful exploration and use of outer space.

From the very beginning, the UNCOPUOS had a central role in international cooperation in the field of the exploration and exploitation of the space. Moreover, one of its primarily tasks is to research and study juridical issues connected with space sector. To date, the United Nations Committee on the Peaceful Uses of Outer Space is composed by 69 Members<sup>23</sup>.

Within the framework of UNCOPUOS has been established a legal Sub-Committee deputed to ‘to elaborate legal norms relating to space activities’<sup>24</sup>. It is crucial in the decision process regarding the juridical aspects of the issues to be dealt with. The Legal Sub-Committee prepares the legal basis of the treaties and, more generally, the juridical documents related to outer space and the related activities, to be resolved upon by the UN General Assembly entrusted with the task of ‘encouraging the progressive development of international law and its codification’<sup>25</sup>.

### 5.1. The law making procedures

Juridical discussions, studies, negotiations and drafting of juridical documents are carried out in the working and drafting groups of the Legal Sub-Committee. This informal procedures and activities, in time, reached the status of an useful instrument to achieve the consensus almost needed for the creation of international space law treaties.

Nonetheless, this consensus rule, is been proving itself to be an obstacle for the expansion of space law.

A number of factors seemed to badly influence on the consensus procedure, leading it to a deterioration of its potential as an instrument of international law-making. They

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<sup>19</sup> See *Charter of the United Nations*, Article 1, at <http://www.un.org/aboutun/charter/chapter1.shtml>.

<sup>20</sup> See *Res. 1348-XIII, New York 13 December 1958* (<http://daccess-ods.un.org/TMP/2223982.html>) which was opposed by socialist countries, for an *Ad Hoc Committee* consisting of 18 states being Argentina, Australia, Belgium, Brazil, Canada, Czechoslovakia, France, India, Iran, Italy, Japan, Mexico, Poland, Sweden, USSR, UAR, the United Kingdom and the US.

<sup>21</sup> *Res. 1472-XIV, New York 12 December 1959* (<http://www.oosa.unvienna.org/oosa/SpaceLaw.html>) created a permanent Committee consisting of representatives of 24 states, then increased by the Resolution 1721 (XVI) of 20 December 1961 up to a total of 28 states.

<sup>22</sup> See M. Lachs, *supra* note 1, p. 39.

<sup>23</sup> A regular update on the increasing number of UNCOPUOS members can be found at <http://www.oosa.unvienna.org/oosa/COPUOS/members.html>

<sup>24</sup> See the acts of 628<sup>th</sup> Meeting of the Legal Subcommittee of the COPUOS, at [www.oosa.unvienna.org/pdf](http://www.oosa.unvienna.org/pdf).

<sup>25</sup> See *Charter of the United Nations*, Article 1, at <http://www.un.org/aboutun/charter/chapter4.shtml>.

vaires from a complexity of recent political and technological developments combined with the always present variety of political and socio-economic structures and ideologies among the various State members. In other words, while the consensus procedure proved to be valuable in accommodating decisions made by a restricted number of space powers States, when their relevant interests almost coincided, the diversification of interests occurred through the years, made it really difficult to adopt unanimous decisions nowadays. Moreover, the technical developments widened the number of countries active in the space field and the resulting increasing in the number of UNCOPUOS subcommittees, decreased the consensus potential as an effective method of decision-making.

To these factors has to be added the currently enormous gap between industrialized and developing nations in many respects, phenomenon that made it more and more difficult to use consensus as a method of reconciliation.

It has to be noted, in any case, that such difficulties are shared by the UNCOPUOS Sub Committee with the majority of international organizations involved in the creation of global legal frameworks, included the ITU<sup>26</sup>.

## 5.2. The Corpus Iuris Spatialis

The legal framework to date established by the UN and the UNCOPUOS through the consensus procedure can be honestly be seen as one of the best results in international law making procedures. The jurisprudence commonly refer to this set of rules as the *Corpus Iuris Spatialis*. It consists of five major international treaties and conventions<sup>27</sup>:

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;
2. The Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space;
3. The Convention on International Liability for Damage Caused by Space Objects;
4. The Convention on Registration of Objects Launched into Outer Space;
5. The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies.

The first one, commonly referred to as 'Outer Space Treaty', was agreed upon on 1967, and constitutes the real basis of space law.

The four other conventions which followed can be seen as an elaboration of the principles put forward by the provisions of the Outer Space Treaty.

It has been preceded by a number of U.N. Resolutions on the use of Outer Space. Two in particular, Resolution 1721 (XVI) and Resolution 1962 (XVIII) – the so called Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space - were unanimously resolved by the UN General Assembly, as the leading principle on which establish a substantial global regulation of the outer space region and related activities.

Looking back at the *Corpus Iuris Spatialis*, it is easy to realize that four of the treaties were agreed upon within a rather short period of time, and suddenly shared and executed by a large number of States.

On the other hand, the Moon Agreement was completed only after a difficult and long negotiation and only in the eighties came into force, after a wait of years needed for the completion of the acquired number of ratifications.

Those difficulties were certainly related to the fact that this Convention was the first one expressly related to the establishment of international rules related to the exploitation

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<sup>26</sup> It would be worth to proceed – but this is not the most suitable seat - to a deeper analysis of the role of ITU with regards to the Geostationary Orbit, which basically consists in the allocation of the geostationary Orbital Positions on a *First Come First Served Basis*.

<sup>27</sup> The so called *Corpus Iuris Spatialis* can be found at <http://www.oosa.unvienna.org/oosa/en/Reports/publications>.

activities (related to commercial aspirations).

### **5.3. Evaluation**

There are also many other legislative initiatives, both within and outside the framework of UNCOPUOS, voiced in the United Nations, that can basically be divided into two different major categories.

The first one relate to the two UNCOPUOS SubCommittees (the Legal and the Technical-Scientific ones), which should be improved, also through an enhancement of their decisional methods.

The second one provides for the creation of a sort of World Space Organization, as an global inter-governmental organization operating on a permanent basis as one of the United Nations agencies in the international cooperation development through the coordination and execution space missions and programs. Moreover, it should have the function to keep the outer space for peaceful purposes provide assistance to all the member States, and especially to the developing countries the opportunity to have access to the so called 'space wealth'.

However, remaining in the in the framework of the existing bodies, and more specifically in the UNCOPUOS one, it should be opportune to overcome the consensus procedure, that appears to be a no longer practicable instrument.

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## CHAPTER II COMMERCIAL SPACE ACTIONS UNDER THE CONDITIONS OF THE CORPUS IURIS SPATIALIS

### 1. INTRODUCTION

The data now evidently point to that the method of the ever-increasing use of outer space commercially has taken such force that the point of no return has definitely been bypassed. The market of space actions is no longer just an academic question.

It is interesting to note, and not many people think about it, that in the United States, in Europe and in Asia, the private sector has equal opportunities to follow advanced space actions in addition to any of their Governments. This is due to the constant ruling created over decades that Governments and/or Space Agencies goals are contracted out and carried out by private companies. In so doing these private companies acquired know-how, technological expertise and insightful capabilities independently created entire space systems. It may be helpful to think about for example, if Bill Gate's Microsoft, for any reason (public relations, advertising,) prior to China, India and the United States Government, wants to put a man on the moon, the economic resources the organizational know-how, are already owned by them to undertake existing industry to complete such a "man on the moon" plan also. Honestly, launch ranges (like Sea Launch Company LLC<sup>28</sup>), already exist now, marketable ground stations and business companies able to carry out any business space mission not needing to use resources owned by Governments or Space Agencies however, Government authorization to carry out space missions are often required.

Before new potentials of space efforts get to the stage of being applied commercially, takes time, but not so much.

Additionally, since space actions while having high risks and in need of a lot of investments, allowing a special importance to space actions is economically crucial in every marketing process.

Obviously business use of outer space should no longer be envisioned as an omission to the rule when new projections increasingly turn up to add new prospective to the number of commercial space applications already existing, however, that which determines further action for commercialization in general, remains a question of feasibility and economics.

Furthermore, considerations based on commercial viewpoints are now often crucial in procedures foregoing the misuse of funds needed to start new fields of space applications, or to cover developments in existing fields, comparing to the past.

In many countries, this marketing approach can be observed.

Countries and communities that have reached a certain level of space technology, as a result, national and regional space policies, are easily manipulated by commercial concerns. The USA, the European countries, Canada, India, Japan and also China must be mentioned in this respect<sup>29</sup>. Obviously, one of the leading countries in space

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<sup>28</sup> Sea Launch Company, LLC, is an international partnership established in April 1995 of American, Russian, Ukrainian and Norwegian businesses providing reliable, cost effective, heavy lift launch services for commercial customers. The Sea Launch equatorial launch site provides the most direct route to geostationary orbit, yielding maximum lift capacity for increased payload mass or extended spacecraft life.

<sup>29</sup> See S. Twibell, *Space Law: legal restraints on commercialization and development of outer space*, in UMKC Law Review, 1996; ER. Finch Junior. and AL. Moore, *Astrobuisness, a Guide to the Commerce and Law of Outer Space*, Praeger Publishers, 1985; Aviation Week and Space Technology, *Commerce report cites potential of commercial space markets*, 6 June 1988, p. 17; Interavia, *Space Markets and Satellite Technology*, Winter 1987-IV, Aviation Week and Space Technology, *Growth, Stability Predicted for Commercial Space Ventures*, 14 March 1988, p. 109. See for Latin America, V. Leister, *Prospects for a Latin American Space Agency*, paper submitted during the *Colloquium on the Law of Outer Space of the IISL*, Bangalore, India, 8-15 October 1988. As for the Australian experience, Aviation Week and Space Technology, *Australia will use satellite purchase to foster domestic space industry*, 6 April 1987, p. 78. See for China, *inter alia*, Aviation Week and Space Technology, 9

technology, the USSR, also currently shows significant signs of structuring its business interests in space activities by their labors to market their launching systems worldwide<sup>30</sup>.

The future path and growth of space actions will strongly rely on the prospective to recoup investment in this sector<sup>31</sup>. While past military incentives or related motivations of homeland security and interest led the way to national space programs.

Business concerns are currently taking priority in the determination of space policy following a period of spending massive assets on research and expansion, in order to supply men with the basic tools to make use of the outer space environment.

It must be taken into consideration that this work provides solely an indication of the current situation. Future growth in new areas of space actions can hardly be pictured, let alone be currently agreed on. Whereas business interests are at risk, Space activities are handled under different subjects in the following chapters of this work. Space transportation, communication via satellite, direct broadcasting and remote sensing by satellite are included.

## **2. REASSESSING THE INTERNATIONAL LAW OF SPACE**

Acknowledging the facts above, it is, nevertheless, essential to look at the current international law of space so as to evaluate if its principles, which were founded at a time when space rules appear to have been founded on rather different incentives and whereas those principles were centered on the early hopes of an entire new realm of possibilities for mankind and therefore aimed at the enterprise of fundamental legal prerequisites, are now sufficient to provide accommodation for the tendencies in space effort especially related to in general the business process.

One has to first examine the background of space law, the Outer Space Treaty<sup>32</sup> if this vital international convention consents business space actions with the purpose of making such a re-evaluation.

The following imperative question will be: is the Outer Space Treaty in its current form, able of adequately handling the legal outcomes of business space actions, and if the response to this critical question is in the confirmatory: are business space actions allowed under the Outer Space Treaty?

## **3. DETERMINATION OF THE CONCEPT BUSINESS OR PROFIT-MAKING**

Let's start by clarifying the term, 'commercial space activities' or to a certain extent the expression, 'commercial use of outer space'.

I chose not to go after one of the best language dictionaries of English and utilize a detailed description as trying to label the term business. I favor to hand over an untainted approach linguistically so as to avoid misunderstanding, conscious of the fact that amid the European and the American awareness, there is considerable difference already in the opinion of the term business.

I consider that realistically the most noteworthy feature in all cases is that one should stress: 'the object is to make a profit' or in the slightest 'to secure a reasonable return on investment'. To describe the idea in the word 'business' or to be familiar with the properties of the phrase 'profit-making', one should stress the most major feature which

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March 1987, p. 134. See for Japan H. Yoshida, *The Meaning of Japan's Space Commercialization Efforts*, XLII IAF Congress, October 5-11, 1991, Montreal, Canada.

<sup>30</sup> Aviation Week and Space Technology, *Soviet Union to Broaden Commercial Space Activities*, 19 December 1988, p. 92.

<sup>31</sup> In the United States, on 16<sup>th</sup> July 1984, an additional paragraph (number 102) was added to the famous 1958 NASA Act of 1958, reporting: "the general welfare of the United States requires that (NASA) seek and encourage to the maximum extend possible the fullest commercial use of space".

<sup>32</sup> For the full text of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies see <http://www.oosa.unvienna.org/oosa/SpaceLaw>.

will be evident in a comparable word or phrase in numerous other languages.

#### 4. COMPLIANCE OF THE IDEA OF BUSINESS IN THE FRAMEWORK OF THE OUTER SPACE TREATY

Clearly the word 'business' does not emerge in any stipulation, when glancing at the Outer Space Treaty. The common language applied to state the branch of activity ruled by the Treaty is 'exploration and use of outer space'.

Whereas solely using 'exploration' may have omitted business use, the accumulation of the word 'use' provides a substantial argument to broaden it to cover business use. Rosenfield<sup>33</sup> states, "*The history of the Outer Space Treaty indicates that 'use' was specifically added, not merely as an explanation, but as an expansion of the limited term 'exploration'*". Combining the two words 'exploration' and 'use' points out the chance of a sort of utilization more inclusive than a sort of utilization limited only to exploration reasons. As of the preamble to the Outer Space Treaty, supplementary arguments which can be advanced to allow business use may be obtained. 'Motivated by the new prospects available 'and' in the steps forward to the exploration and use of outer space'.

According to our condition, since business use can only happen when a certain point of development has been acquired, this sort of use seems to be inspired by the Treaty providing the contrary is not apparent. Utilizing the word progress sustains in the end that a progressive utilization of outer space, despite the fact that within the restrictions of peaceful purposes, is not only allowed but even meant to be one of the entities of the Treaty.

Other suggestions which may be regarded as the determination of business use are established in the subsequent Articles:

Article I states: 'for the benefit and in the interest of all countries ... ' and additionally by the words: 'and shall be the province of all mankind'.

The second provision of Article I seem to have business use, especially the belief of freedom of outer space.

A prohibition has to be based upon a clear Treaty obligation, nonetheless, there are authors who understand Article I as a ban on business use, in which opinion I do not agree upon.

Even though some discrepancy of opinion existed over the significance of the word 'use' as distinguished from 'exploration', most delegations settled with the French delegate that 'use' denotes exploitation<sup>34</sup>. The legislative history of Article I illustrate this.

It is a fact that they can have many characteristics in common, even if 'exploitation' and 'commercial use' are not the same ideas.

Regarding outer space, Article II was definitely not intended to refuse the business use in general, but to strengthen the code of access and freedom in outer space by refusing national requisition claims.

What's more, in the specific branch of space actions, Article III substantiates the applicability of international law, in which condition can merely verify the suitable principles accepted of international law.

Business activities in all other environments of the planet are basically accepted, and the same should hold true for space actions.

While managing the essential topic of defending mankind against warfare in outer

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<sup>33</sup> See SB. Rosenfield, 'Use' in economic development of Outer Space', in Acts of the 24th Colloquium on the Law of Outer Space of the JISL, Rome, 6-12 September 1981, pp. 73-77, see also W. White, *Real Property Rights in Outer Space*, American Institute of Aeronautics and Astronautics, Inc., 1997;

<sup>34</sup> The french members cited the word 'use' of outer space for meteorological research and telecommunications, and 'potential use' of the moon, e.g., for the extraction of gasses and minerals, UN.Doc A/AC105/C2/SR63 and 69, pp. 8 and 5 respectively. See N. Jasentuliyana and R.S. Lee, *Manual on Space Law*, Vol. 1 p. 10, Oceana Publications, 1979.

space<sup>35</sup>, the first part of Article IV, has very little bearing to our issue.

Part two nevertheless, read the words “Shall be used” linked with the phrase ‘exclusively for peaceful purposes’, may bear a striking case of the fact that the word ‘used’ is placed at this time on its own.

I see no cause to understand this as not casing business use of other Celestial Bodies and the Moon, all the same.

The opposite would be more rational as ‘used’ relates here entirely to peaceful intentions.

Article V, does not give any suggestion regarding the sort of space activity completed but offers the rescue and safe return of space craft and astronauts.

Any grounds to utilize the word astronauts harmfully linked with the topic here under debate, the Rescue Agreements<sup>36</sup> which details the principle stated in Article V Outer Space Treaty, altered the phrase into that of ‘personnel’, which rationally fits within the framework of business.

The one Article that is most relevant to this issue is Article VI.

Whether completed by governmental entities, or nongovernmental agencies, this Article deals with state liability for domestic activities in outer space, and is the one stipulation concerned with space involvement privately. It distinguishes in fact participation in space actions by private divisions.

Creating this Article has to be considered as one of the strongest incentives of an overall recognition of commercial utilization within the general framework of the Treaty, given that space actions by the private sector automatically present the business aspect, which is not essentially the case with governmental activities.

Since its importance to the topic discussed here, this liability principle will be carefully handled more in a different chapter, in which an in-depth examination will be done of the idea especially in relation to space endeavours carried out by private enterprise<sup>37</sup>.

- The phrasing of Article VII dealing with the main state of liability that has been detailed by the Liability Convention does not hold back the use of business.

In contrast, its applicability seems even more relevant when space actions are performed for business purposes, in which economic instances in general will strengthen space actions with the major debate of risk factors.

The compensation of the relevant state, which is legally responsible under Article VII, will be a logical element, on the other hand, it is a question of domestic legal regulation creating a system in which non-governmental companies involved in space actions finally carry their own liability.

- Article VIII decides the registered state as the authority to implement the functions concerning jurisdiction and power over space objects and their personnel.

According to the stipulations of the Registration Convention, the registered state to be identified as such applies its own rules in each situation.

If any state wishes to omit business practices in outer space regarding space objects subject to its domestic registration, it is free to do so. This general authorization will logically include rules relating to business use.

Providing guidelines for international collaboration in the exploration and use of outer space, Article IX, plans to ensure the particular interests of states and to minimize issues

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<sup>35</sup> The Article intends to keep Outer Space free from nuclear weapons, etc., and to use it exclusively for peaceful purposes.

<sup>36</sup> See *infra* Chapter III.

<sup>37</sup> The Convention on Registration of Objects Launched into Outer Space, 14 January 1975, TIAS No. 8480.



at risk. These conditions as well seem to be relevant to business space actions. Especially, utilizing to insert 'and its nationals', in the framework of the condition that manages impending harmful interference, once again points out the chance of an action being completed in outer space by a body other than a governmental organization.

This entails private sector by citizens that automatically contains the component of the utilization of business.

Observing their issue at hand, even as the conditions contained in the rest of the Article barely give good reason for any implied mention to business aspects, they seem to be like the majority of the above Articles, to focus on definite obligations to be satisfied by states in their value as states in the implementation of space actions. Nonetheless, they do not supply any proof that space actions completed by states could or should not contain activities of business.

Article III, which is perfectly well-matched with the practice of business state undertakings strengthens this result by referring to international law.

One can only come to one conclusion and that is to say that no one condition can be accounted for as a debate to rebuff the business use of outer space, when glancing over the total sum of conditions compiled in the Outer Space Treaty.

Nevertheless, one must not overlook that the stress on 'state' in the Treaty on whole combining with the condition of Article VI obliges a considerable restriction on space actions completed by non-governmental entities, which will be the same institutions pre-eminently concerned the use of business. Whereas the majority of the Articles do not articulate an exact position on the topic, a lot seem at least to comply the use of business in outer space, as we have just shown.

## **5. OTHER RECOGNIZED TOOLS OF THE INTERNATIONAL LAW OF SPACE**

The following three of other international space law conventions victoriously founded in the wake of the Outer Space Treaty, have been in power for a some time:

- The Rescue Agreement<sup>38</sup>
- The Liability Convention<sup>39</sup> and
- The Registration Convention<sup>40</sup>

These Articles show a thorough embellishment of the principles acknowledged in the Outer Space Treaty and represent important explanation and augmentation on the topics specified.

Therefore, they do not present any new part which could give good reason for a revision of the conclusion that business space actions are allowed under basic law of space.

The most current concluded international agreement on the law of space the Moon Agreement<sup>41</sup> demonstrates another path and as a result cannot be handled in the same manner. Even though it is very rewarding to examine that after countless years of high-strung hopes, the Moon Agreement is now in operation<sup>42</sup> its function is still rather limited so long as the main space authorities have not approved the Agreement.

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<sup>38</sup> Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, 22 April 1968, TIAS No. 6599, 672 UNTS 119.

<sup>39</sup> The Convention on International Liability for Damage Caused by Space Objects 29 March 1972, TIAS No. 7762.

<sup>40</sup> The Convention on Registration of Objects Launched into Outer Space, 14 January 1975, TIAS No. 8480.

<sup>41</sup> The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement), 5 December 1976.

<sup>42</sup> See *infra*, paragraph 6.1

As luck would have it, the Moon Agreement is what presents an extraordinary set of conditions<sup>43</sup> especially those relating to the misuse of the natural resources of the moon that appear to be of particular importance to this topic of profit-making and thus must be examined closer.

## 6. ESTIMATION OF THE MOON AGREEMENT

We must primarily, decide the range of request of the Agreement. According to Article 1, beside the Moon the Agreement covers orbits around or other routes to or around it - other than the earth, also other celestial bodies inside the solar system, to the extent that precise legal norms enter into power with regards to any of these celestial bodies. Henceforth, we will refer simply to the Moon, which will, nonetheless, for sensible reasons include the whole area.

Referring to the debate, the business of space activities, it has to be underlined that the Moon Agreement offers for a rule which has gone further than any preceding space treaty in stating its aim of a more advanced use of outer space. The utilization of the words in its preface 'bearing in mind the benefit which may be derived from the exploitation of the natural resources of the moon and other. Celestial bodies' are noteworthy for this reason.

Despite the fact that the same preface begins with the words, 'noting the achievement of States in the exploration and use of the moon and other celestial bodies ... ', the accumulation of the constituent of misuse seems to point out that such actions are in any case presumed to be possible inside the structure of the pertinent convention.

The end of Article XI par. 5 is verified by which it brings in the chance of 'the misuse of natural resources of the moon as such misuse is about to become possible'.

When trying to find a characteristic element for the term 'misuse' of the natural resources of the moon, it seems necessary to approach the topic linked with the code of the common legacy amid humans concerning the natural resources of the moon, circulated in paragraph one of Article XI.

Nevertheless, this code represents a very contentious topic. Even though the

Concluding parties have finally reached agreement upon its enclosure in the relevant Article, parties that have been split on its precise bearing throughout its negotiating history<sup>44</sup>.

As a result, advocates as well as opponents of business space actions utilize the terminology Common Heritage of Mankind to move on with their point of view.

Furthermore, homologies with the idea of the Common Heritage of Mankind as proposed in the modern Law of the Sea<sup>45</sup> can end up to be all the more confusing mainly so long as the newly invented maritime system has still to provide evidence that it functions adequately or on a complete basis.

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<sup>43</sup> See *Proceedings of the 23rd Colloquium on the Law of Outer Space of the IISL*, Tokyo, 21-28 September 1980, pp. 13-60.

<sup>44</sup> See Committee print of the 96th U.S. Congress 2nd Session, Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, prepared at the request of the Chairman of the Committee on Commerce, Science and Transportation, U.S. Senate, May 1980.

<sup>45</sup> For the application of the CHM concept to the Law of the Sea and its history, one should recall Malta's Ambassador Pardo's speech to the United Nations General Assembly on the future of the resources of the high seas in constituting the Common Heritage of Mankind, United Nations General Assembly Official Records, 22<sup>nd</sup> Session, Agenda Item 92(2), Doc.A/6695, 18 August 1967. See also UN Declaration of Principles Governing the Seabed and the Ocean Floor and the Subsoil Thereof, beyond the limits of National Jurisdiction, reprinted in *International Legal Materials*, 220, 1971, Article 1. Also Article 136 of the Law of the Sea Treaty, which reads that "*the Area and its resources are the common heritage of mankind*", U.N. Convention on the Law of the Sea, December 10, 1982, U.N. Doc. A.Conf.62/122, hereafter referred to as the Law of the Sea (at <http://www.un.org/Depts/los/index.htm>).

P. Klaanappel stresses, that, in contrast with the Moon Treaty, the Law of the Sea Treaty through Article 153 includes both exploitation and exploration to be ruled by an elaborate international regime, Comparisons between the Sea and Outer Space Law, a paper presented at the 28th Colloquium on the Law of Outer Space of the IISL, Stockholm, October 7-12, 1985, p. 145 et seq.

The conditions of paragraphs 2 and 3 of Article XI, stipulating, *inter alia*, the non-requisition principle in regards to the moon and its natural resources, in dissimilarity with the disagreement on the Common Heritage of Mankind principle, do not seem to entail controversy. Obviously bearing upon business attempts in regards to the ultimate misuse of natural resources will be considerable.

The misuse of the natural resources of the moon will be ruled by an international administration 'as such misuse is about to become possible'. This is clearly apparent from the related conditions of paragraph 5 together with the last part of paragraph 3.

### 6.1. Assessment

Even though the Moon Agreement recognizes, *expressis verbis*, for the first time in international law of space history the legitimacy of acts of misuse in relation to the natural resources of the moon, etc., at the same time it puts the provisions for such actions in the shape of the institution of an international administration.

It relies on the provisions stipulated to be the major reasons of such an international administration whether business ambitions will be well-matched with the suggested administration, since the terminology 'misuse' signifies a use of which most likely comprise an element of business.

It will be essential consequently to complete a cautious assessment of the exact significance of these intentions as articulated in par. 7 of Article XI.

They comprise:

1. the systematic and secure expansion of the natural resources of the moon;
2. the sensible management of those resources;
3. the growth of opportunities in the utilization of those resources; and,
4. an even-handed sharing by all States Parties in the benefits obtained from those resources.

Furthermore, special deliberation will be given in view of the interests and requirements of the developing nations, in addition to the attempts of those countries which have put in either directly or indirectly to the misuse of the moon.

I believe these aims do not essentially forbid the misuse of natural resources in terms of business.

If a business organization will be capable to practice its business function inside the confinements of the stated objectives, will be a whole other ball game.

Relying on response to this enquiry will be the understanding and the actual awareness of such an international administration. Regarding herewith it should be illustrated that the political-economic philosophies held by the variety of nations, being either Parties or hopeful Parties to the Moon Agreement, show a wide variety, which fact presents a great deal of doubt in the areas of expected policy purpose.

Especially on behalf of those states which are most likely interested in the eventual misuse of the natural resources of the moon, etc., this topic has actually, also given a major hesitation to approve the Moon Agreement.

An additional aspect which has hindered further approval has been the enquiry of whether, and in what shape, misuse could be started before an international administration similar to that of Article XI. In association special mention should be made of the concern stated on behalf of private sector in view of a possible moratorium<sup>46</sup>.

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<sup>46</sup> See D.D. Smith, *The Moon Treaty and Private Enterprise*, *Astronautics and Aeronautics*, January 1980, pp. 62-65. See N. Jasentuliyana, *Conditions essential for the peaceful uses of outer space - the Moon Treaty*, paper presented at the Symposium sponsored by the U.N. University and the TISL, Peace Palace, The Hague, the Netherlands, 12-15 March 1984: "the Treaty is neutral as far as the relative claims of private and public enterprise for resource development rights are concerned, and the few restrictions imposed are not prejudicial to the socio-economic system of any State operating in outer space. The treaty does not presume to

In my opinion, the conditions of Article XI do not inflict a moratorium on Parties to the Moon Agreement, at least not on condition that the organization of an international administration, stated in paragraph 5, has not been recognized.

Furthermore, the conditions written out in paragraph 3, although conditioning the non-requisition principle, leave considerable room for avoidance by the phrase 'natural resources in place'.

What is quite another enquiry is whether commercial misuse of the natural resources of the moon will be cost-effectively possible by private sector. In this respect the chance of exclusive rights - after the case of 'miner's right'<sup>47</sup>-

to defend asset and allow systematic exploration and recuperation throughout the path of exploratory training and business misuse may be vital.

The conditions of Article VIII, about the ban of intrusion, especially paragraph 3 seem to verify at least a defensive right regarding actions 'in the exploration and use' of the moon anywhere on or under its surface by States, Parties. However it has to be disclosed that also in the Moon Agreement these conditions relate only to States Parties.

The topic of the organization of an international administration under the conditions of Article XI, is increasing in significance since the Moon Agreement has been in force since July 11, 1984. How the organization of an international administration will be effected inside a reasonable duration of time nevertheless, will rely on the action taken by States Parties.

The conditions of Article XVIII, making it possible to a re-examine of the Moon Agreement 10 years following its admission into power, might provide evidence to be useful in giving drive to the path of action to go after. The opportunity for such a re-examine through a re-evaluation conference to be assembled by a majority of States Parties at the appeal of one third of the States Parties is also offered at any time following the Agreement that has been in power for 5 years.

Suitable measures, to rule the misuse of the natural resources of the moon, a reassess conference will include deliberation of the enquiry of applying Article XI, paragraph 5, regarding the organization of an international administration.

The minimal delay of 5 years before such a review conference may take place seems to be a reasonable requirement, which might encourage aspirant member states to decide in favour of ratification.

Furthermore, it should be made a note of that the enquiry of application of Article XI, paragraph 5, shall be deemed by the reassess conference 'on the fact of the principle regarded to in paragraph 1 of that Article and taking into considerable account any pertinent technical growth'.

As we have mentioned above, the principle in relation to is, the principle of the Common Heritage of Mankind, applying to the moon and its natural resources. As has been stated before, the close association between this principle and the hopeful international legal administration is primarily obvious by the phrasing of Article XI, par. 1.

Referring herewith we will return to our topic about profit-making and examine whether the idea of Common Heritage will be capable to contain an international administration founded on the principles of business.

## **6.2. The Common Heritage of Mankind Principle in reference to the Moon Agreement**

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*prescribe conditions and rules for all present and future space activities. However, it does not seek to establish general conditions concerning those activities which will be undertaken in the near future so that, as further progress is made, international law and space technology can develop in tandem in order to ensure the best and safest distribution of the benefits of space to all of us here on earth'.*

<sup>47</sup> See M.L. Smith, *The Commercial Exploitation of Mineral Resources in Outer Space*, in *Space Law View of the Future*, pp. 45-55, Kluwer Law and Taxation Publishers, 1988.

Insight into the past conditions may supply some help when trying to decide the contents of the Common Heritage of Mankind<sup>48</sup> principle. For example, Menter's observations<sup>49</sup> considering the etymology of the Common Heritage idea supply valuable direction into the source of the idea as detailed in the Moon Agreement. The debating background of the Moon Agreement discloses the close association, already highlighted above, amid the Common Heritage of Mankind principle and the foreseen international legal administration for misuse of the natural resources of the moon, in view of the fact that this was clearly so constructed to permit for a concession to be reached so as to allow the attainment of an agreement on the conditional outline in regards to the addition of the Common Heritage of Mankind idea in the Moon Agreement.

A prospect which has been proposed on many occasions, follows that the Common Heritage of Mankind principle as stated overtly in the Moon Agreement will have its own traits and will principally not be deemed subject to elucidation by analogy; this method of reasoning agrees with the opinion of Cocca<sup>50</sup> who as the delegate of Argentina, suggested in 1970 a 'Draft Agreement on the belief of governing activities in the use of the 4, Ural resources of the moon and other celestial bodies', which in the first article contained the Common Heritage of Mankind principle.

Studies on the thought of Cocca in reference to the actual content of the Common Heritage of Mankind principle nonetheless demonstrates extreme cautiousness when he claims, agreeing with Galloway<sup>51</sup> that one should rather expect 'the outcome of the implementation of the rules set forth in the agreement' than to decide an idea 'which is just being created in the new domain of the law of space, such as the common heritage of all mankind as it was recognized in the Moon Agreement'.

This method seems to entail business, economical political, and technological, deliberations, as component factors of the purpose of such an idea, even though definitely limited inside the provisions and purposes of an international administration as specified by the Moon Agreement. Nevertheless, when formulating the ideas of the Common Heritage of mankind principle in the Moon Agreement, I believe it seems not only reasonable but even essential to account for the spirit of the Outer Space Treaty, which has laid out the base for such an idea by containing principles such as the non-requisition principle and the principle that outer space should be used for the good of all mankind.

It does not seem to be justified to assume that a business based system would be conflicting with the international law of space, since it is still unsure whether and how the actual misuse of the moon resources will be realized within the structure of an international administration.

Whereas the Moon Agreement basically seems the most sufficient instrument of the international law of space to contain a more broad use of outer space by space actions, concluding in the foreseen misuse of the natural resources of the moon, reality illustrates that business ambitions in space attempts still tend to focus on space actions which are done in earth orbit, an area of outer space which is not covered by the Moon Agreement<sup>52</sup> but by the Outer Space Treaty besides by the other three international law of space conventions<sup>53</sup>.

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<sup>48</sup> See also C.Q. Christol, *The Legal Common Heritage of Mankind: Capturing an Illusive Concept and Applying it to World Needs*, paper presented to the 18<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, Lisbon, Portugal, 21-27 September 1975.

<sup>49</sup> See cit. M. Menter, *Commercial Space Activities under the Moon Treaty*, p. 36.

<sup>50</sup> See *Report of the Legal Sub-Committee on the Work of the 12th Session*, April 10-May 5, 1962, A/AC. 105/101, May 11, 1972, Annex I, pp. 6-7.

<sup>51</sup> See E. Galloway, *Conditions for Success of Institutions for International Space Activities*, p. 105, in Proceedings of the 24th Colloquium on the Law of Outer Space of the IISL, Rome, 1981, p. 58.

<sup>52</sup> See, for the Contents of Article I of the Moon Treaty, this Chapter.

<sup>53</sup> For determination and/or delimitation of outer space, see *infra*, Chapter V on Space Transportation.

## 7. THE CONCLUSION

Primarily, the above examination of the Outer Space Treaty, complemented by a short statement on the other three international laws of space conventions, reveals a general authorization to undertake business actions in outer space. Nevertheless, this essential structure of public international law of space does not offer sufficient rule when business features are being brought into the spotlight.

With the intention to regulate the legal insinuations and operational characteristics, international and local collaboration has happened in numerous branches of business space effort<sup>54</sup>.

Nevertheless, these conclusions connect as a matter of fact only a restricted number of States Parties respectively assigned entities, Parties that are members of companies referred to.

On going international debates and collaboration will be essential to identify other branches of business space activity which needs international regulation in order to ease a systematic use of the vast prospective of outer space with, as its final object, the good of all mankind.

An instance hereof can be established in the currently founded principles on satellite remote sensing activities.

What's more, I should declare the steady efforts undertaken by the ITU in the branch of satellite communications, which give to its orderly growth through international organization of radio frequencies and to the sensible use and even-handed access to the radio frequency spectrum and the satellite positions related to the Geostationary Orbit.

Questions of a private law nature will also increase with the input of private sector in space efforts, whereas the business of space actions raises issues of international public space law.

With the role of private sector gradually mounting in space business, so are the doubts regarding its legal insinuations for space law growth, and vice versa.

Mentioning this, I concur in principle with Boeckstiegel<sup>55</sup>, when he states 'in comparison to the many legal questions appearing in connection with commercial space activities of private enterprises, these general as well as the specific law rules are in no way sufficient to provide a safe and legal basis and framework for such activities'.

Bing Cheng<sup>56</sup> also currently highlighted the requirement for new treaties in association with the growth of business in space. For example, besides from the

Liability Convention, no other space treaty contains a proper argument resolution process, insists on the embellishment of such an tool, which has been undertaken in fact by the International Law Association Space Law Committee 33 a matter which is being handled at the conclusion of this work.

Bing Cheng debates further that besides the necessity to clear up a number of terms and ideas applied in the space law conventions (and to be debated on throughout the line of this work), the business growth of space actions would be given out by the extension of domestic laws to space. Such act would be advantageous for example in the regions of intellectual property rights, tax laws, employer's liability, manufactured goods liability and safety rules. In association with this an international treaty to solve potential problems of private international law regarding actions in outer space would clearly be eye-catching to **future business growth**.

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<sup>54</sup> See *infra*, Chapter IV.

<sup>55</sup> See K.H. Boeckstiegel, *Reconsideration of the Legal Framework for Commercial Space Activities*, proceedings of the 33<sup>rd</sup> Colloquium on the Law of Outer Space of the IISL, Dresden, 1991.

<sup>56</sup> See Bin Cheng, *The Commercial Development of Space: The Need for New Treaties*, in *Journal of Space Law*, Vol. 19, No. 1, 1991, pp. 28-40.

## CHAPTER III

# THE LAW OF SPACE, PRIVATE ENTERPRISE AND PRIVATE PROPERTY

### 1. INTRODUCTION

A striking connected phenomenon of the business process taking place in space ventures is the mounting role played by private enterprise in a number of branches of space activities<sup>57</sup>. It would appear to be suitable to dedicate a separate chapter to the phenomenon in order to handle at length with the pertinent legal implications, even though the matter has already come across in connection with the examination of the expansions towards business and their consequences on the applicability of the international law of space.

Basically, business does not essentially involve the partaking of the private division. Such partaking relies on the political financial structure of the particular nation as to what means it will use to achieve its business aspirations and whether investments privately and entrepreneurial actions are amid the options. Nevertheless, in the alleged private financial system nations, where financial profits are considered to be maximally obtained when pursued by private individuals, business of a certain division involves almost automatic privatization.

It is a question of national concern, this whole method of privatization which is generally directed by domestic politics and following lawmaking execution, it does affect space law at all levels. Obviously, global relations especially are swayed, which comes the fact that space actions by its very nature has so many worldwide traits.

Therefore, the continuing trends towards privatization as seen in numerous space-faring nations have to be examined with an analysis to their results for global relations and their influence on the worldwide legal order.

Contrastingly, such tendencies should be looked at in light of the inquiry whether the current legal structure for outer space actions is favorable to further expansion by private enterprise in those actions. In connection with this one goes on the assumption that such an expansion would appear to be attractive and even a necessity in private financial system nations, where, as a rule, government leaves the liability to the private subdivision to become engaged in set up branches of human actions, which directs to financial expansion and human advantage.

Some essential facts need to be made clear, before continuing in more detail on the matter.

The growing participation of private enterprise and its influence on the directive of space issues can be separated on two levels, derived from the method of relevance, being either direct or indirect involvement.

### 2. INDIRECT INVOLVEMENTS

Industry has been involved in space actions as a supplier of the goods and services required for the growth of space endeavors since the beginning of the space age.

Such industry can be a governmental body as well as a non-governmental body or some intermediate idea, as a matter of practice, relying on the political orb of a specific nation and its socio-economic makeup.

A lot of private companies with this viewpoint have been involved with space actions, while staying largely out of the orb of action ruled by the international law of space.

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<sup>57</sup> See *Private Enterprise and the Exploration of Outer Space*, UN Information Note, Doc. A/AC.105/L. 131, 2 May 1983 ([http://www.oosa.unvienna.org/oosa/en/natact/sdnps/sd\\_nps\\_docsidx.html](http://www.oosa.unvienna.org/oosa/en/natact/sdnps/sd_nps_docsidx.html)).

Boeckstiegel<sup>58</sup> brings this kind of involvement in space action under the common characteristic 'indirect participation of private enterprise in space activities'. He not only talks about the position of private industry as a service provider or subcontractor of the state, but also states several other fields in which indirect contribution happens, such as insurance and financing, coping with the many forms of this so-called indirect contribution by the private sector in space actions.

One more example of indirect contribution by private enterprise in actions can be one of those moments when private industry operates as a purchaser of the outcome of space actions carried out by the state or a state establishment.

Domestic law determines mainly the relationship amid the private body and the interested state, in all the above examples, which, nevertheless, has to be in agreement with the stipulations provided for by the international law of space conventions.

### 3. DIRECT INVOLVEMENTS

It is clear currently another level of private space action involvement is happening which has far more direct reference to global space law rule and therefore merits special attention in parallel with the above type of indirect involvement.

It is more logical to limit oneself to a more restricted method and try to basically recognize those parts of private concerns which stand for direct space involvement and, as a result, are most likely to raise inquiries regarding the current system of international space law, even though it may be highly appealing to study all those different phases and appearances of privatization in diverse space active nations.

In addition to diverse number of space application services such as remote sensing and substances dispensation happening on board orbiting space facilities, the growing concern currently shown by the private subdivision in direct space action contribution can be mainly seen in the parts of space transportation, space communication including direct television broadcasting and other types of specialized telecommunication services.

Furthermore there are, various different ways and levels of involvement from full ownership to more limited titles of right or relationships, the contents of which, can differ depending on the legal structure of the individual nation interested, concerning all these areas of direct involvement in space endeavor by private bodies.

First, it would seem to be practical to look at the Magna Carta of space law, the Outer Space Treaty of 1967, and to review whether its directives hold in principle direct private enterprise contribution in space actions.

### 4. ACCEPTABILITY OF PRIVATE ACTIONS IN OUTER SPACE

Regarding examinations made earlier linking the question of the acceptability of outer space actions of a business characteristic, it was decided that the stipulations set forth in Articles VI<sup>59</sup> and IX<sup>60</sup> of the Outer Space Treaty obviously involve recognition of non-governmental bodies as potential members of outer space actions. Looking into background of Article VI<sup>61</sup>, explained by the *travaux préparatoires*, can only strengthen this conclusion.

What is more, by stating the phenomenon of nongovernmental bodies involved in

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<sup>58</sup> K.H. Boeckstiegel, *Present and future regulation of space activities by private industry*, paper presented during the International Conference on Doing Business in Space: Legal Issues and Practical Problems, 12-14 November 1988, Washington D.C., All-aba Conference Materials, 1981, The American Law Institute. See also K.M., Zullo, "The Need to Clarify the Status of Property Rights in International Space Law", in *Georgetown Law Journal*, 2001;

<sup>59</sup> See supra Chapter II on the commercialization of outer space and the *Corpus Juris Spatialis*.

<sup>60</sup> *Ibidem*.

<sup>61</sup> Article VI of the Outer Space Treaty was taken almost *verbatim* from Article VI of the Soviet Draft (U.N. Res. 1962 (XVIII) 13 December 1963; see N. Jasentuliyana, *Manual on Space Law*, Volume I, Oceana 1979, p. 17; see also Volume III, p. 19 et seq. (A.AC.105 /C.2/L. 13, 11 July 1966).



outer space actions and subsequently issuing it to special terms, the Treaty would appear to have recognized its legality. Therefore, the exceedingly presence of this Article especially could only conclude that no ban on private enterprise contribution in general can logically be supported.

A lot of the other debates the studies made earlier on the acceptability of the business use of outer space can at the same time be utilized to support the acceptability of space actions by private enterprise. The freedom code as personified in Article I can also be stated in this regard.

However, it is further than a doubt that actions performed by private bodies are ruled and as a result also restricted by the same general terms and limits offered for by the Outer Space Treaty, which primarily tie States Parties. An example of this is the limits specified throughout the conditions of Article IV<sup>62</sup>, which are basically accepted to relate to governmental in addition to private, space actions.

Regarding Article II in contrast of the Outer Space Treaty, which stipulation propagates the non-appropriation code for outer space, there is a school of deliberation, even though apparently not a majority, that expresses uncertainties as to the applicability of this code where 'non-national' actions are concerned. This method leads to the result that private bodies and possibly even global associations are not covered by the forbidden code<sup>63</sup>. Looking at the whole Outer Space Treaty and reinforced by its incentives and aims, understanding Article II along such lines does not appear to be warranted.

One must consider that general international space law does not forbid non-governmental bodies or private enterprises from completing actions in outer space, according to the above analysis that is.

An additional matter is the question regarding the terms to which private bodies are subjected under the international law of space.

Special terms with which non-governmental space actions must abide by are specified by the stipulations of Article VI, in addition to the above general terms and limits offered by the Outer Space Treaty.

Obviously during the examination of the legal insinuations of state liability in a following chapter<sup>64</sup>, this code indicates a general right and legal state liability regarding any action in outer space which is to be thought of as framing a domestic attempt, whether to be completed by a governmental group or a private body. The specific term of approval and continuing regulation by the suitable state was thought of to set the minimum requisites to promise the state's duty to carry out its duties especially in case of non-governmental (and thus private actions) in outer space.

## 5. NATIONAL ACTIONS

A major complexity came about in the determination of the appropriate criterion to set up the qualification of 'national actions', as trying to determine the matter of such a global liability for 'national actions' in outer space.

The decisive factor for a launching state as elaborated in the Liability and Registration Convention, after carefully evaluating all the various options, in my opinion, has the best possibility of securing the realistic fulfillment of the duties of states in the implementation of space actions especially by private enterprise.

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<sup>62</sup> Article IV of the Outer Space Treaty reads: "*States Parties to the Treaty, undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kind of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any matter. The Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes...*".

<sup>63</sup> See S. Gorove, *Studies in Space Law: its challenges and prospects*, 1977, Sijthoff Edition, Leiden, p. 81; see also V. Pop, *Appropriation in outer space: the relationship between land and ownership and sovereignty on the celestial bodies*, Elsevier Science Ltd., 2000;

<sup>64</sup> See Chapter V.

The clearly-specified condition of approval and to have power over the accountable state and its realistic potential to carry out such a job in order to warrant the fulfillment of the state liability code, strongly supports the general recognition of this 'launching state' measure as the requirement for 'national actions'.

Additionally I have proposed a second measure based on the nationality and/or seat of the person or association launching a space entity in the case of private enterprise space actions. The applying this second method will introduce a solution when, for example, a private body launches a space entity from global waters, and no launching state can be assigned. The United States, which can be thought of a leader in the realm of domestic space law and which has already come up with the legal terms in which private enterprise contribution in space actions must abide by, has already acknowledged its global liability for domestic space actions and proceeded effectively through the institution of the Commercial Space Launch Act<sup>65</sup> with respecting the legal insinuations flowing from global state accountability.

US national policy and regulation, because of their progressed phase in the realm of space business, is an example of the course that will most-likely be pursued by other space-faring countries ready to control the contribution of private enterprise in space actions.

Thus, in the following part and its subsections many aspects of US policy towards commercialization<sup>66</sup> of space actions will be stressed, whereas private enterprise, often supported by governmental measures, is inspired to play an mounting role in space endeavor and in fact acts as a tool for further commercialization of the space sector<sup>67</sup>.

## 6. LEGISLATION AND US POLICIES

Amid the precise realms to be handled with there is a number of certain facets in which have already been talked about above against the backdrop of global relations and business tendencies. Nevertheless, coping cannot always be steered clear of if one is to show the concern of domestic directive for the completion of the international law of space and its growing power in the business process.

### 6.1. Launch Services

A licensing method for expendable launch vehicles (ELVs) is being introduced which, because of the methods involved, promises governmental protection to fulfill with global compulsions, as set forth in Article VI of the Outer Space Treaty<sup>68</sup>, in so far as launch services are concerned.

This way, a pledge has been shown to offer a practical meaning especially to the idea of 'authorization and continuing supervision'. Nonetheless, several times US government officials have articulated the position that global space law leaves the meeting of these duties<sup>69</sup> to the discretion to each of the states.

Endeavors taken to streamline licensing methods have, however, demonstrated an on going determination to fulfill global duties. This willpower has been turned into the

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<sup>65</sup> See later in this Chapter, section on Launch Services.

<sup>66</sup> *National Policy on the Commercial Use of Space*, the White House, 20 July 1984 (<http://www.space.commerce.gov/general/>). On 15 August 1984 the President of the U.S.A. approved a national space strategy, which *inter alia* reaffirms the earlier commercial policy and was designed to supplement the national space policy. See H.R. Marshall jr., *Commercialization of Space: Incentives, Impediments and Alternatives*, Journal of Space Law, Vol. 13, 1984, No. 2, p. 166 et seq.

<sup>67</sup> According to the Report of the UNCOPUOS Scientific and Technical SubCommittee on the work of its 25<sup>th</sup> Session, "United States private companies had a total of 14 signed contracts for the launch of 28 communications satellites, with 10 additional reservations", A/AC.105/409, 1 March 1988, p. 15.

<sup>68</sup> See H.R. Marshall, jr. *Outer Space Commercialization in the United States: Effects on Space Law and Domestic Law*, p. 90, in Proceedings of the 27<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, Lausanne, 7-13 October 1984, AIAA, 1985.

<sup>69</sup> See E.J. Steptoe, *United States Government Licensing of Commercial Space Activities by Private Enterprise*, in Proceedings of the 27<sup>th</sup> Colloquium on the Law of Outer Space, Lausanne, 1984, AIAA, p. 191.

stipulations of the Commercial Space Launch Act<sup>70</sup>, which hands over to the Secretary of Transportation the power to license and otherwise control non-governmental space launchings completed by bodies from any place or by foreign nationals conducted from US territory.

As a stipulation of getting a license, a launch site operator must be ready to allow access by US government officials, besides the conditions set to get a license to launch a vehicle or to work a launch site<sup>71</sup>, stipulations have been specified to control the actions of licensees<sup>72</sup>.

Regarding extra territorial authority, US officials engaged in the lawmaking process have stressed the practical method<sup>73</sup> which tends to equal-out 'the need for regulation by the responsible nation and the need to avoid excessive extraterritorial jurisdiction'.

As a result the Commercial Space Launch Act<sup>74</sup> offers inter alias a US citizen or business will be required to get a license, whether launching or working a launch site in the US or overseas;

with respect to a, foreign business regulated by US interests, no license will be needed if the launch happens from or if the site is in the territory of another nation, except if there is an accord with such a nation provided that for US law in such cases;

whether the launching or the launch site is not inside the territorial authority of any country (for example on the high seas or in outer space), the foreign auxiliary of a US company must get a license except if there is an accord with the nation in which the auxiliary is planned for such a country to declare authority over the action.

Furthermore, the Act codifies a one-stop licensing method. Whereas before the Act the method was awkward and time-consuming practice because of many sectors and companies practiced their directive authority over business space launches pursuant to their own functions, the Act in fact codified the policies itemized in Executive Order No. 12,465, which assigned the Department of Transportation as the head executive agency in business space launch issues.

In the beginning on condition that for obligatory insurance and expression of economic responsibility, the 1988 Amendments<sup>75</sup> to the Commercial Space Launch Act ended in another inducement for increased business of the private launch sector by improving the problems facing the business launching industry on the basis of hazardous distribution, by location, on the one hand, maximum legal responsibility amounts and insurance conditions for third-party asserts, harm to government property and on the other, as long as for reimbursement by the government in the subsequent fashion.

Every licensee must either show monetary responsibility or get legal responsibility insurance for third-party claims in a quantity of the maximum likely loss (as determined by the Secretary), not to go over the lesser of (1) 8 500 million or (2) the utmost insurance obtainable on the global market at a sensible price.

Every launch supplier must get insurance to cover the utmost likely loss to government property not to go over the lesser of (1) 8 100 million or (2) the utmost insurance obtainable at sensible prices.

Every licensee is has to enter into 'reciprocal waivers of claims' with all service providers subcontractors, clients and their service providers and subcontractors, and with the United States for any injury that goes over the insurance coverage upheld by each

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<sup>70</sup> Commercial Space Launch Act of 1984, 49 United States Code 2601-23 (<http://www.law.berkeley.edu/journals/btlj/articles/vol3/fought.html>).

<sup>71</sup> *Ibidem* at Section 6.

<sup>72</sup> *Ibidem* at Section 14.

<sup>73</sup> See H.R. Marshall jr., *supra* note 66.

<sup>74</sup> See *supra* note 68.

<sup>75</sup> 49 U.S.C.A. App. para. 2601-2623 (West Supp. 1989), Pub. L. No. 100-657,102 Stat. 3900 (1988) (<http://www.law.berkeley.edu/journals/btlj/articles/vol3/fought.html>).

because of a launch<sup>76</sup>.

The Secretary has to decide the utmost possible loss in talking with the NASA Administrator, the Secretary of the Air Force, and the heads of other suitable companies<sup>77</sup>.

For the above needed insurance to cover the United States, in return, its companies, staff, service providers and subcontractors, the United States agrees to assure others and pay third-party claims in over the utmost possible loss, but not to go over \$1.5 billion<sup>78</sup>.

Moreover, the Amendments address the utilization of government belongings in a mixed effort to ease the utilization of government launch sites and to stimulate the expansion of business ranges<sup>79</sup>.

A Commercial Space Launch Policy has been printed in September 1990<sup>80</sup>, even though Satellite Procurement Contracts in addition to Launch Service Agreements are left to the parties engaged. Its goal at creating a free and fair market to inspire the development and health of the US business space launch industry, the policy verifies the necessity to act but in compliance with non-propagation and technology transfer purposes. It stresses in the longer condition on technological developments to reduce the price and to boost the dependability of US launchers. The shorter term action contains the on going utilization of US produced launch crafts for US Government satellites, while foreign policy will be headed in the direction of commerce accords and reinforcing those agreements to restrict unjust competition.

The expressed action plans and objectives mentioned above would seem to entail an extension of the long-standing US policy to deny, unless in extraordinary situations, exports of satellites and satellite parts to the USSR in order to avoid purposefully vital US satellite technology<sup>81</sup>.

Parallel with such a policy<sup>82</sup> is the policy directives on expertise transfer set by the Coordinating Committee on Multilateral Export Control (COCOM)<sup>83</sup>, which obstruct many exports to the USSR such as those under the Military List including space station apparatus.

This circumstance added to the on going panic of US launch contributors of price reductions by the strongly spirited Arianespace in addition to by the so called non-market launch contributors intimidates the growth of a genuine liberal, free global launching market.

This viewpoint may be verified by the US approach towards the non-market launch contributor, China demonstrating signs of an on going of limited policy on the variety of launches in addition to the cost of freedom offered for in a Memorandum of Agreement<sup>84</sup> to stay in force until the end of 1994<sup>85</sup>.

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<sup>76</sup> Pub. L. No, 100657 para. 16 (a)(1)(A)-(C) (<http://www.law.berkeley.edu/journals/btlj/articles/vol3/fought.html>).

<sup>77</sup> *Ibidem*.

<sup>78</sup> *Ibidem*.

<sup>79</sup> Pub. L. 100657 para. 4(b).

<sup>80</sup> See NSPD-2, September 5, 1990 (<http://www.fas.org/spp/military/docops/national/nspd2.htm>).

<sup>81</sup> See *infra* note 84, H.P. van Fenema.

<sup>82</sup> However, the ban on exporting US built satellites to the USSR for launch is being reconsidered by the US as a result of USSR requests to reexamine restrictions on imports of Soviet aerospace hardware and exports of hightechnology items to the USSR.

<sup>83</sup> Consisting of Western industrialized countries, Japan and Australia. See D.J. Burnett and M. Fuchs, *Amendment of COCOM Rules and the Commercialization of Space*, in Proceedings of the 33th Colloquium on the Law of Outer Space of the IISL, Dresden, Germany, October 6-12, 1990, AIAA.

<sup>84</sup> The American-Chinese Agreement related international trade in commercial launch services was concluded in January 1989, see H.P. van Fenema, *Cooperation and Competition in Space Transportation, The Highways of Air and Outer Space*, in Conference on the Law, Policy and Commerce of International Air Transport and Space Activities, Taipei, 29-31 May, 1991. For China's space policy see *inter alia* Janping Chen, 'China's space policy - a historical review', pp. 116-128, Space Policy, May 1991, Butterworths-Heinemami, Ltd.

<sup>85</sup> However, after a short ban resolved by the White House in May 1991, Chinese will to abide by international guidelines to containment of missile proliferation may lead the US government to revoke the satellite export sanctions. See CRS Report for Congress, *China: Economic Sanctions*, 2005 ([www.au.af.mil/au/awc/awcgate/crs/r131910.pdf](http://www.au.af.mil/au/awc/awcgate/crs/r131910.pdf)).

## 6.2. Remote Sensing

Considering US legislation on remote sensing there is the Land Remote Sensing Commercialization Act of 1984<sup>86</sup>. This directive offers a complete civilian program of study, growth and shows to have to boost both the United States abilities for remote sensing from space and the application and use of such abilities<sup>87</sup>.

The Act in fact sets up a relationship amid the Federal Government and private companies to additional development of a land remote sensing structure. It starts with such collaboration with staged transition to a fully business structure.

The entire make up of the Act comes from the proposal that a certain level of government knowledge must be sustained to warrant that private division actions are in the national interest and that the global commitments and policies of the US are respected.

It should also be noted that, under the Act, marketing climatic satellites is currently forbidden<sup>88</sup>.

To devoid the many stipulations of the Act in more specifications, it should be stressed that certain facets which will have precise interest for global relations, in which the subsequent important points should be underlined: - civilian unimproved remote sensing information will be accessible to all possible users on a non-biased basis<sup>89</sup>.

Concerning the current LANDSAT structure, the Secretary of Commerce will be accountable for the LANDSAT structure in addition to the stipulation of data to foreign ground stations according to the conditions of agreement amid the US government and countries that work such ground stations, which are admitted on the date of the start of the contract granted for marketing of unimproved data to a US private division party<sup>90,91</sup>

the following segment of a remote sensing structure following the LANDSAT structure is handled by Title III of the Act:

1. to supply for a changeover from Government operation to private business operation of civil land remote sensing structures; 2. to supply data without interruption for six years following the practical termination of the space segment of the LANDSAT structure.

Linking all of this to all suggestions issued by private division parties for a contract for the expansion and operation of a remote sensing space structure must be able to offer uninterrupted data for duration of six years and for marketing unimproved data, which must be accessible to all possible users on a non-biased basis. Furthermore, stipulation and support of domestic security in addition to study and execution of US global duties will in addition be a stipulation for awarding an operation license<sup>92</sup>.

The requirement to advise the Secretary of any accord that the licensee plans to go into

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<sup>86</sup> Land Remote Sensing Commercialization Act of 1984, ([http://www.jaxa.jp/library/space\\_law/chapter\\_3/3-1-2-3/index\\_e.html](http://www.jaxa.jp/library/space_law/chapter_3/3-1-2-3/index_e.html)).

<sup>87</sup> *Ibidem*, Section 102(4).

<sup>88</sup> *Ibidem*, Section 102(5).

<sup>89</sup> *Ibidem*, Section 103(b).

<sup>90</sup> *Ibidem*, Section 201(a)(b).

<sup>91</sup> The following provisions are worth mentioning: "Any decision by the Secretary of Commerce shall be transmitted to the Committee on Commerce, Science and Transportation of the Senate and the Committee on Science and Technology of the House of Representatives for their review and -eventual objection (Section 202). The Secretary shall inter alia identify and publish the international obligations as part of the advertisement for the competition for the contract (Section 203). In selecting a contractor he shall consider inter alia the contractor's ability to meet these obligations (Section 203). A specific Section (205) devoted to foreign ground stations provides: 'that the contractor shall act as the agent of the Secretary by continuing to supply unenhanced data to foreign ground stations for the life and according to the terms of those agreements between the US Government and such foreign ground stations that are in force on the date of the commencement of the contract'. However, a second paragraph of the same Section reads: 'upon the expiration of such agreement with the United States on the date of commencement of the contract, the contract shall provide: 1. that unenhanced data from the LANDSAT system shall be made available, to foreign ground stations only by the contractor; and 2. that such data shall be made available on a non-discriminatory basis'".

<sup>92</sup> Sec. 401(b) along with Sec. 607.

with a foreign country, body or group linking foreign countries or bodies<sup>93</sup>, is one other vital stipulation linking global relations.

Section 601 of the Act regarding the non-biased data accessibility, is of vital significance by warranting accurate accessibility of un-improved data to all clients on a non-prejudiced basis under precise terms such as a public pricing policy.

What is more, a part entitled Archiving<sup>94</sup> of data contains stipulations for the storeroom, preservation and updating of a 'basic data set'. This government archive will be diverse from any record of data that a system operative may uphold for sales or other reasons.

Since the Secretary considers suitable, the above basic data set will contain, un-improved data produced either by the LANDSAT structure, or by licensees under Title IV of the Act, or data composed by foreign ground stations or by foreign remote sensing space structures.

As replicated in the pertinent Act, and especially the stipulations about privatization of the structure, consciousness of the US attempts to market civil land remote sensing actions, is supposed to generate a substantial transformation in the structure of remote sensing data accessibility<sup>95</sup>.

Even though it will not change the main US standard of freedom of information<sup>96</sup>, however, enforce this idea, the sensible move to the private division of this space action has increased concern from diverse nations as to the sensible accessibility of precious information.

Primarily, many industrial nations have stressed their distress about the growing prices that are expected from a change of this means to the private division. They equally dread that private enterprise concerns might risk their domestic concerns in diverse realms, starting from homeland security to the misuse of natural sources.

The USSR mentioned<sup>97</sup> their fear not only about the utilization of space segments, underlining the fact about the relating ground segments, but the trend of the US privatizing remote sensing. It articulated its exact worry for the requirement to control the Earth characteristic of space actions, because of 'global relations usually increase linked with the results of space actions on Earth'. It underlined that in its point of view, 'actions of private industries would certainly make relations difficult in this realm'. What is more, it reconfirmed its opinion to support amplification of the codes ruling the utilization of space expertise for sensible reasons, and suggested,

'such coded should describe operations with ground based segments of space structures as part of space actions, which would carry the ground-based facets of space actions into the capacity of the major codes of the law of space.

These codes may contain the duty of states to advise the global community about all the authorizations handed to private industries for the use of ground-based segments of space structures and the liability of states to oversee the actions of private industries in utilizing ground based segments of space structures'.

This last statement proposes to lengthen the coverage of the permission and regulation stipulation placed by the conditions of Article VI of the Outer Space Treaty to ground based space segments concerned in space actions<sup>98</sup>.

While the present wording of the pertinent conditions utilizes the words 'actions in outer space' and thus may not automatically involve actions that are linked outside the

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<sup>93</sup> Sec. 402.

<sup>94</sup> Sec. 602.

<sup>95</sup> See also Chapter VI.

<sup>96</sup> See the Freedom of Information Act (FOIA) (<http://www.gwu.edu/~nsarchiv/nsa/foia.html>).

<sup>97</sup> Sentence of the Sovietic delegate at the XXVth Ses. of the United Nation COPUOS, March 1985 (<http://www.oosa.unvienna.org/oosa/en/COPUOS/past.html>).

<sup>98</sup> See for the developments of remote sensing activities' international regulation *supra* Chapter II.

space area, according to my opinion, amplification is required for a new global agreement to efficiently convey such space segment processes according to the compulsory liability and regulation of the interested state<sup>99</sup>.

### 6.3. Communications via Satellite

The motivation of private space actions alongside the background of present US domestic space marketing policy<sup>100</sup> not only concerns the realm of remote sensing and launching actions, but can be examined in other parts of space action too, for example, space communications and other realms of human attempt which utilize the properties of the space area to improve life on earth, such as substances development in outer space.

Private enterprise in the US has from the start has a vital position in that nation in which communication services traditionally have been exploited by private industries, comparing with the tradition of most other nations, as much as the realm of space communications is concerned. Yet, the US has adequately mixed this method with its global duties and built a legal structure in line with both concerns, up to now.

Linking here the Comsat Act<sup>101</sup>, which has been in power since 1962, has been used as a negotiation to offer the broadest type of private industry contribution combined with a suitable calculation of governmental rule in applying the policy of the US linked to a global business satellite communications structure.

Basically, glancing over the past of space commercialization and bearing in mind that it was actually the Comsat Act that comprised the first step in the marketing procedure. What is more, debate has increased referring to the current US domestic policy vis-à-vis global satellite telecommunications services to be furnished by US private industries.

Something must be known about the developments which have happened before and since the organization of that establishment, to comprehend these dilemmas, which are linked to the shifting role of the Communication Satellite Corporation (hereafter Comsat).

Before the space age, global communications services in the US were conventionally offered by private industries, working as common communication carriers, under government rule. Those common carriers had been able to set up and use by a joint accord with their foreign reporters (often communication services offered by government-owned domination), global broadcast facilities by which to offer their US clients with global communication services, under directive by the Federal Communications Commission (FCC).

The start of the new satellite equipment to be relevant in telecommunications and the goal of institution of a better international communication network, supported by the US, led to the vital directive in that nation, basically, the Communications Satellite Act<sup>102</sup>, which, inter alia, generated Comsat.

The FCC was given authorization in addition to those it already had under the Communications Act of 1934<sup>103</sup>, attaining the goals and principles of the Comsat Act.

Besides owning the concerns of the US regarding satellites containing the international structure and owning and working earth satellites as established by the FCC, Comsat was given powers by the Comsat Act to supply channels of communication to the US communication common carriers plus to other official bodies, national and abroad, and

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<sup>99</sup> As for the application of the remote sensing principles resolved by United Nations Res. 41/65, make reference to (<http://www.un.org/documents/ga/res/41/a41r065.htm>).

<sup>100</sup> *National Policy on the Commercial Use of Space*, The White House (July, 1984) ([http://www.jaxa.jp/library/space\\_law/chapter\\_3/3-1-1-1\\_e.html](http://www.jaxa.jp/library/space_law/chapter_3/3-1-1-1_e.html)). See also, J.B. Gantt, *The commercialization of space - twenty years of experience; some lessons learned*, Journal of Space Law, Vol. 12, 1984, p. 109 et seq.

<sup>101</sup> Communications Satellite Act, 1962 ([www.presageinc.com/contents/experience/satellitereform/contents](http://www.presageinc.com/contents/experience/satellitereform/contents)).

<sup>102</sup> See D.D. Smith, *Communication Via Satellite*, Chap. V, Sijthoff Edt., Leiden/ Boston – MA, 1976.

<sup>103</sup> Make reference to the Communications Satellite Act, par. 441 (<http://dic.academic.ru/dic.nsf/enwiki/4954444>).

to contract with official clients, as well as the US Government for the services of the international structure.

Therefore, the Comsat Act consented that Comsat would be a communication common carrier, ruled by the FCC.

The Comsat Act specified that the US common carriers were from this time forth required to offer global communication services by means of the government forced go-between, Comsat, as a result, comparing to the rule of global telecommunication services in the past.

Whereas Comsat's authorization in honor of what was to become INTELSAT's international structure was widespread, a Declaration of Policy by the US Congress put a possible restriction on the amount of Comsat's exclusivity, by claiming the Comsat Act '... did not preclude the creation of additional communications satellite systems if required to meet unique governmental needs or if otherwise required in the national interest'<sup>104</sup>.

Nonetheless, the first ten years of Comsat's presence its all-powerful role was sustained by mixing the role of authority power of US concerns in global space communication services, offered by the INTELSAT organization, with at the time still elite role as carriers' carrier and its function as a vital earth station proprietor.

Combined with basic US inclinations towards deregulation<sup>105</sup> and liberalization, plus the growing concerns of US private industries in diverse realms of global space communications, have slowly shifted Comsat's function, whereas regarding INTELSAT's dominating role in global public communications services is being menaced also.

### 6.3.1 New Improvements

In an effort to purify its licensing rule towards candidates of separate<sup>106</sup> structures in the location of global space communications, the FCC lucidly showed new lines<sup>107</sup> to be pursued in the US business method in reference to the role recognized to private industry concerns in space communications services.

This strategy has been eased by the Administration's Determination<sup>108</sup> to endorse the business procedure and has been allowed by Congress by means of relevant lawmaking in the way of the State Department Authorization Bill 1984<sup>109</sup> and the 1985 Supplemental Appropriation Bill.<sup>110</sup>

The Presidential Determination stated that 'separate international communications satellite systems are required in the national interest' and the US would 'consult with INTELSAT regarding such separate systems as are authorized by the FCC' meeting its duties under the according<sup>111</sup> Congressional action that followed was started leading to the Authorization Bill 1984, needing the US Secretary of State to take firm actions linked with the institution of separate structures.

From this point on, it would be helpful to illustrate those stipulations of the Authorization Bill 1984 that are of main concern: The Authorization Bill recognizes and endorses the Presidential Policy on limited international systems apart from INTELSAT under the condition of technical compatibility with the INTELSAT space segment and of

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<sup>104</sup> See J.B. Gantt, *supra* note 100, p. 114.

<sup>105</sup> See L.M. Knight, *The deregulation of international satellite communications: US Policy and the INTELSAT response*, in *Space Communications and Broadcasting – 1985*, pp. 40 et seq., Elsevier Science Publishers B.V.

<sup>106</sup> See *Aviation Week and Space Technology*, publications of 11 December 1984 p. 5.

<sup>107</sup> Especially regarding its Authorized User Policy as well as Direct Access Earth Station Ownership Policies, see L.M. Knight, *supra* note 105

<sup>108</sup> President Reagan speech dated 28 November 1984 (<http://www.reagan.utexas.edu/archives/speeches/1984>).

<sup>109</sup> The State Dept. "Authorization Bill", converted in law by the President on August 1985, No. 99/93.

<sup>110</sup> The following "Supplemental Appropriations Bill" was resolved as a law on August 15, 1985 No. 99/88.

<sup>111</sup> See R.R. Colino, *Formulation of the Reagan Administration Policy on International Satellite Telecommunications*, *Journal of Space Law*, Vol. XIII, 1985, pp. 110 et seq..



avoidance of significant economic harm to the global system of INTELSAT.

Permission for use and operation of such additional space segment services can only happen after US obligations are met according to Article XIV (d) of the INTELSAT Agreement.

Meeting with INTELSAT regarding this is bound to a precondition:

1. To guarantee observance of any offered part of global satellite communications structure with the stipulations set forth by the Presidential Determination<sup>112</sup>;
2. To guarantee the permission of using such a structure by one or more foreign establishments.

A special stipulation<sup>113</sup> has to do with Congressional Consultation. What is more, the Authorization Bill has an Amendment for an alteration to Article V(d) of the INTELSAT Agreement which would allow INTELSAT to set up price based rates for individual traffic means, in rare cases linked with the need to avoid vital financial injury to the international structure of INTELSAT including United States domestic and foreign policy concerns<sup>114</sup>.

The 1985 Supplemental Appropriation Bills<sup>115</sup> guide the FCC to take firm actions, one stipulation for example is: the deterrence of the FCC from giving a construction consent or final approval for a separate structure pending the procedure as offered by Article XIV (d) of the INTELSAT Agreement has been executed<sup>116</sup>.

The Bill contains a Conference Report and a Statement of Managers, which inter alia insisted on the US Executive Branch or FCC in any activity to attempt to steer clear of vital financial injury to INTELSAT and underlines<sup>117</sup> the continued stipulation of telephone services (including other services) by INTELSAT to industrial nations at reasonable rates. Nevertheless, the administrators also stressed the need for the US to hold up methods to allow INTELSAT to execute 'fully and fairly' particularly on new telecommunications services and in any services the stipulation is confronted by competition. Regarding this, is in reference to the amendment of Article V (d) of the INTELSAT Agreement so it allows costs on a course-by-course basis, something that never was in the past.

In conclusion, the Statement specifies that, in case of an unfavorable synchronization compatible to the INTELSAT Agreement and the Secretary of State chooses to go ahead, the Secretary will offer the Congress a study pin-pointing the reason for his choice, offering the Congress a sensible occasion to make a decision whether to permit his suggestions to be put into practice.

The FCC submitted a Notice of Inquiry and Proposed Rule Making (NOI-PRM) on the 4th of January 1985. On February the 8th of 1985, the Department of State and Commerce together issued a white paper on New International Satellite Systems of the Senior Interagency Group on International Communication and Information Policy (SIG), to the FCC, pointing to inter alia the grounds for the Executive Branch's purpose that split structures are in the public interest, and adding, in proposing a restriction for such structures, that those services would concern 'the sale or long term lease of transponders or space segments capacity for communications that are not interconnected with public-switched message networks'.

Following the linked advances and events mentioned above, the FCC permitted several US private companies to offer competitive global satellite services<sup>118</sup> on the foundation of the terms detailed above.

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<sup>112</sup> See *supra* note 111.

<sup>113</sup> Authorization Bill, Sec. 146; see R.R. Colino, *supra* note 111.

<sup>114</sup> *Ibidem* p. 148.

<sup>115</sup> See the site: <http://www.presidency.ucsb.edu/ws/index.php?pid=39003>.

<sup>116</sup> Supplemental Appropriation Bill, 1985 (see *supra* note 110).

<sup>117</sup> The conference proceedings include the Statement of Management on the Appropriation Bill, making supplemental appropriations for the fiscal year ending September 30, 1985.

<sup>118</sup> See Aviation Week and Space Technology August 1985, p. 64.

Nevertheless, participating in the continuous procedure of additional liberalization, the US Executive Branch as of late showed in a letter to the FCC Chairman its aim of total elimination of the limits against private satellite interconnecting with public-switched systems by January 1997<sup>119</sup>. Several recommended satellite structures will gain from the US Administration's choice resulting from a policy started in February 1991<sup>120</sup>.

The approach of INTELSAT towards private industries in offering 'separate structures' has, primarily, been led by the directives articulated by Article XIV of the INTELSAT Agreement<sup>121</sup>. Execution relies greatly on the total of resistance leveled by states, and in the opinion of Gantt<sup>122</sup>, seems to 'view international communications as a means of facilitating economic growth and commerce rather than an end in itself'.

Swayed by the growth detailed above happening in the US including liberalization tendencies in other parts of the globe, especially inside the European Community, INTELSAT now also appears to be attempting to find other ways to combat the opposition and to enforce its role as an economically-feasible organization for the good of the global community<sup>123</sup>.

#### **6.4. Broadcasting by Satellite Directly**

The following space action where private concern may be seen in the US, deals with a particular realm in the space communications division, primarily, broadcasting by satellite directly.

While brushing aside resistance from the broadcasting industry and others, in 1981<sup>124</sup>, the US FCC approved in opinion the idea of DBS to home recipients by encouraging widespread contribution in this new form of communication. From that point on, besides Comsat's additional Satellite Television Corporation, a lot of<sup>125</sup> private companies have been given permission to build direct broadcasting satellites. Nonetheless, the completion of DBS services in the US at large currently appears to be pretty slim because of diverse aspects, many that are of a financial nature. The business outlook for the new DBS equipment, particularly in the US where cable infiltration in urban locations is high, it is still in doubt, as a result of indecision amid private investors.

Regarding the worldwide legal insinuations of DBS and the role assumed by the US, it is obvious that the nation is one of the most energetic backers of the free flow of information code. The US however adheres to the International Telecommunications Convention that offers a directive to avoid technical overspill<sup>126</sup>, as far as across the border broadcasting is concerned.

Moreover, the US has agreed to the chart for DBS explanation for their area by the ITU that only eases national DBS services. Furthermore, when dilemmas come up in the future as a result of US across the border broadcasting, they will possibly focus on the border area of Canada and vice versa.

The circumstance in North America has to be viewed as diverse from the circumstance that is happening in Europe, where the DBS marks in one domestic channel especially, intended according to the DBS chart, has coverage throughout the land of a lot of foreign nations.

#### **6.5. Substance development in Space**

One other realm where it is foreseen that private industries will play bigger role in

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<sup>119</sup> The new policy outlined in the November 27 letter states that by January 1997 all contractor for satellite communications services in the US will compete on an equalitarian basis.

<sup>120</sup> See Space News, July 8-14. p. 6, *Private Satellite Firms Continue Push for Change*.

<sup>121</sup> See <http://www.eric.ed.gov>.

<sup>122</sup> See *supra* note 100, especially at p. 125.

<sup>123</sup> See Space News, October, 1992, p. 7, *Intelsat Chief Defends Business Practice*.

<sup>124</sup> See International Herald Tribune, April XXIII, 1981 (<http://www.iht.com/>)

<sup>125</sup> See Aviation Week and Space Technology, March 1984 - Vol. 1 (<http://www.aviationweek.com/aw/>).

<sup>126</sup> See the proceedings of the New International Telecommunications Convention Malaga-Torremolinos 1973 (<http://www.eric.ed.gov/ERICWebPortal/custom/portlets/recordDetails>).

space efforts is the realm of substance development in space, where the manufacturing of pharmaceuticals, semiconductors, fiber optics, particular metals and the development of crystals are to be highlighted.

The National Aeronautics and Space Act<sup>127</sup> of 1958 rule the relationship amid private substance development undertakings and NASA regarding the utilization of the space shuttle, since the beginning of substance development research in outer space. Furthermore there exist additional federal in addition to state decrees which will affect the performance of substance development in space<sup>128</sup>.

For example, the 1982 US federal statute permits the duty-free admission into the United States of substances coming from space. Quite a few other new lawmaking suggestions have been presented to guarantee that substances giving out actions completed on board space crafts under the authority of the US will obtain the same treatment as substances developing actions completed inside the US<sup>129</sup>.

Furthermore, compatible to the US marketing plan, a lot of Joint Endeavour Agreements<sup>130</sup> have already been set up in this realm amid NASA and private companies, while other types of private industry stimulus have also turned up<sup>131</sup>.

When business accomplishment turns out to be more apparent in this area, a more sovereign role for private industry participation has been foreseen.

Linked with such expansions, topics of owner rights and the defense of industrial property rights will come to the surface.

It is fascinating to make a note of that in 1983 the US President signed a Memorandum on Government Policy planned to promote the marketing of new skill. Along with Luxenberg<sup>132</sup>, this policy is unswerving to all US government organizations, to the degree allowed by decree, to offer service providers or grantees the first alternative to maintain designation - that is to say, the marketing rights- to all inventiveness made by them under Government backing, while the Government maintains a wide royalty-free license and legislative 'march-in rights'. It is in fact, NASA's past policy that is being pursued, made of a wide waiver policy in reference to the original title to inventiveness as offered for by the conditions of Section 305 of the NASA Act.

The well-built defense of industrial and intellectual property rights in general, might become fundamental to offer the private subdivision with adequate enticements to put in the marketing of outer space actions to the benefit of private entrepreneurs. Thus, apart from copyrights, as well the safeguard of information --- wherein copyright exists - and which may be created during substance dispensation in space has to be looked upon as being vital to the marketing space industry.

Linked with this, the US Freedom of Information Act<sup>133</sup> should be highlighted in general conditions.

The stipulations of Section 203(a)(1) of the NASA Act, providing for 'the widest possible and appropriate dissemination of information concerning its activities and the results thereof', will rule NASA's role in space actions. In relation to Luxenberg it is NASA's policy not to obtain 'safeguarded' information except it is vital and then merely

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<sup>127</sup> Hereafter NASA Act. Public Law 85/568.

<sup>128</sup> See A. Dula, *Materials Processing as a subject of space law*, pp. 230-238, in Proceedings of the 28th Colloquium on the Law of Outer Space of the IISL, Stockholm, Sweden, October 7-12, 1985, AIAA.

<sup>129</sup> *Ibidem*,

<sup>130</sup> See M. Menter, *Legal Aspects of Commercial Space Activities*, in Aviation Litigation and Space Law, Washington DC, 1982.

<sup>131</sup> Inter alia through Technology Exchange Agreement (TEA) and Industrial Guest Investigator (IGI) arrangements; see NASA Technical Paper 1925, Brown and Zoller, 'Avenues and Incentives for Commercial Use of low gravity environment', September 1981.

<sup>132</sup> B. Luxenberg, *Protecting Intellectual Property in space*, p. 177, in Proceedings of the 27th Colloquium on the Law of Outer Space of the IISL, Lausanne 7-13 October 1984, AIAA.

<sup>133</sup> Public Law No. 94/409, 1976.

to obtain it with restricted rights<sup>134</sup>.

Regarding to repay launch services, it is NASA's policy that the user will retain all copyright and information rights.

Since domestic intellectual property rights are in basically derived from territories, the claim of domestic law to circumstances happening in space will usually be grounds for problems. This has also been happened in the US, where a resolution has been found in the realm of copyright rights and inventiveness by claiming the fabrication of territories.

By adding a new section to the existing US Patent Act<sup>135</sup>, the US legislature has taken action<sup>136</sup> by bringing national legislation in order with this fabrication of nationality claimed in the Space Stations Agreement<sup>137</sup>. It is named the Patents in Space Act and it specifies:

'Any inventiveness made, utilized or wholesaled on a space craft or element thereof under the jurisdiction or control of the US will be deemed to be made, utilized or wholesaled inside the US (...).'

Nevertheless, it should be stressed that the wording utilized in the Act- 'jurisdiction or control' - derives from the terminology, 'jurisdiction and control', utilized in the International Space Station Agreement, which in turn conforms to the terminology of Article VIII of the Outer Space Treaty<sup>138</sup>. In an effort to find an answer to this, whereas equally insisting on sustaining the idea of 'jurisdiction or control' over a space element as a basis for US patent claim, the US Patent in Space Act has included

an articulate exemption to the above quoted claim by stating: 'Inventions made, used or sold in outer space on a foreign registered space object or any components thereof, shall not be subject to US patent laws, even if the object or component is at the time within the jurisdiction or control of the US, unless it is specifically so agreed in an international agreement between the US and the state of registry'.

In light of this condition, the Patent in Space Act will not be relevant to foreign listed mass transported even though the US has jurisdiction or control, thereby easing the distresses voiced by foreign States Parties to the Space Station Agreement. Simply if explicitly stated in a global accord amid the US and the registered State the US patent law is relevant to foreign-registered space elements.

By pertaining to the fabrication of territories in outer space, the US regulation will lengthen the request of US patent law to inventiveness in space on US recorded space elements according to the jurisdiction or control of the United States, which will involve the subsequent consequences<sup>139</sup>:

- inventiveness in space will ascertain the same priority as if it had happened in the US, contrary to inventiveness created on foreign territory (due to the first-to-invent concept)<sup>140</sup>;
- a space action can suggest violation of a US patent<sup>141</sup>;
- actions in space are handled as happening inside the US for 'prior art' purposes<sup>142</sup>;

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<sup>134</sup> The user only has to supply NASA with the data sufficient to verify peaceful purposes, ensure launch vehicle safety, and government compliance with existing laws and government objectives. However, NASA acquires data from performance of a contract with limited rights. See G.J. Mossinghoff, *Protecting Intellectual Property in Space Activities*, paper submitted to the Colloquium on Air, Space and Law, Paris, France, April 1983.

<sup>135</sup> The renown 35 U.S.C. sec. 101 (<http://www.uspto.gov/web/offices/pac/mpep/documents>).

<sup>136</sup> See the Journal of Space Law, Vol. 18, 1990, p. 90.

<sup>137</sup> Art. XXI of the International Government Agreement on the Space Station (IGA) ([http://www.jaxa.jp/library/space\\_law/chapter\\_4/4-2-2-16/index\\_e.html](http://www.jaxa.jp/library/space_law/chapter_4/4-2-2-16/index_e.html)).

<sup>138</sup> See *infra* Chapter VI.

<sup>139</sup> See P. Meredith, *Status of the Patents in Space Legislation*, in Journal of Space Law, 1990, Vol. 17, pp. 166.

<sup>140</sup> See *supra* note 135, sec. 104.

<sup>141</sup> *Ibidem* sec. 271(a).

- the Invention Secrecy Act<sup>143</sup> will be relevant to space inventiveness.

## 6.6. Government Assistance Regarding Space Industrialization

It may be appropriate to talk here about the concept of an investment bank for space actions, because of future progress in the approach of the US Government in addition to Congress in reference to the requirement to motivate further the participation of private industry.

This concept of building a publicly-owned company to work as an investment bank in the part of space marketing shaped the foundation of the 'Bill to establish a space industrialization corporation', already introduced in 1979<sup>144</sup>.

In accordance with Fugua<sup>145</sup>, the Bill, that inclines to offer an adequate level of flexibility to equal the concerns of the country and those of private industry in motivating insistent and valuable space projects, would provide private subdivision concerns and goals by offering a foundation of investment capital which would be entrusted to high-technology plans having vital viewpoints of business success, but which can go beyond suitable degrees of hazard for private shareholder investment<sup>146</sup>.

The primary reason of this lawmaking effort is to offer capital by means of straight equity investment, credit and credit assurances.

In accordance to the Bill, a trust fund would be set up<sup>147</sup> and at the beginning funded by means of federal appropriations<sup>148</sup>.

A Space Industrialization Corporation<sup>149</sup> (henceforth the Corporation), would offer the business associations amid the trust fund and private industry.

As an investment bank having equity concerns in space endeavors, the Corporation would be in the beginning under the Corporation Control Act<sup>150</sup>. Nonetheless, after being established as a private company<sup>151</sup>, the Corporation would be controlled by the District of Columbia Business Corporation Act.

The Fund would be moved from the control of the Secretary of the Treasury to the elite control of the Board of Directors, after reimbursement of the total sum of all Congressional appropriations from the Fund.

In accordance to Fugua, the Corporation would carry out its operations in a way similar to the private subdivision and therefore enter into agreement on a sound business foundation<sup>152</sup>. Nevertheless, the conditions of the Bill distinguish the variations that are in business agreements when private industry takes on study and growth for the aggressive market as in opposition to manufacturing goods and services for government organizations.

There is the conventional relationship amid government as a client, on the one hand, and the government as service provider, on the other, where requirements and needs are to be articulated by the Government, while funding, extinction conditions and property rights are under government control, regarding this last event.

Regarding business agreements brought to a close by the Corporation with private

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<sup>142</sup> 35 U.S.C. Sec. 101/2 (to be recordable, an invention must be novel and non-obvious).

<sup>143</sup> *Ibidem*, Sec. 181/8.

<sup>144</sup> Space Industrialization Act of 1980 ([www.gao.gov/products/112559](http://www.gao.gov/products/112559)).

<sup>145</sup> See D. Fugua, *Space Industrialization: Some legal and policy considerations for private enterprise*, Journal of Space Law, Vol. 8 no. 1, 1980, pp. 2 et seq..

<sup>146</sup> See *supra* note 142, Section 102.

<sup>147</sup> *Ibidem* Sec. 103(a).

<sup>148</sup> *Ibidem* Sec. 103(b).

<sup>149</sup> *Ibidem* Sec. 101.

<sup>150</sup> United States Government Corporation Control Act, 1945 (<http://www.usdoj.gov/olc/nasaopinionfinal.htm>).

<sup>151</sup> Upon Board of Directors resolution assessing its capabilities of acting effectively and successfully as a private company.

<sup>152</sup> See *supra* note 142.

industry, and founded on basic business practice, the Corporation's approach would be less conventionally government oriented.

This, for example means conditions which would safeguard company undertakings a high level of dependence on the on going of the mandatory funds<sup>153</sup>, whereas private ownership of patent and owner information<sup>154</sup>, in addition to safeguarding the handling of aggressive data, would be warranted.<sup>155</sup>

The same approach of the Corporation, nonetheless, would entail stipulations for the reimbursement of the assistance offered. Nevertheless if the project is financially successful, this reimbursement will contain a profit for the investment of the Corporation.

If this Bill, that is suggesting setting up a Space Industrialization Corporation to endorse, encourage and aid in the growth of new manufactured goods, procedures and companies, utilizing the belongings of the space environment, will ever become a law, is yet to be seen.

However, the idea may motivate the advocates of space industrialization, who are believe that private industry requires to be inspired by government assistance so that it attains its full power.

Under the title of the Omnibus Space Commercialization Act<sup>156</sup> a Bill was recently presented, offering inter alia quite a few tax incentives in addition to legal responsibility restriction of business launch suppliers with in regards to government refunds. Furthermore the Act, guides the National Space Council collectively with the Office of Space Commerce of the Department of Commerce to account on regulations and treaties having an effect on the business of space, and on what deed might be done to better the circumstances.

#### **6.7. Current US Business Space Policy Motivating Private Industry Participation**

Private space actions have been motivated in the US throughout the years by domestic policies, of which the National Policy on the Commercial Use of Space of 20 July, 1984<sup>157</sup> needs to be highlighted. This trend has only grown recently by action following acquired to hold up business, for instance the New National Space Policy of January 5, 1988<sup>158</sup>.

According to this policy, the federal government plans to obtain business space services whenever probable instead of utilizing government sources to get a civil space job. The policy supports the utilization of government agreements to warrant federal market share to industries offering business space services.

Improving their location in competition with foreign structures the policy facilitated marketing by removing imaging resolution restrictions<sup>159</sup> from business remote sensing satellites, in the realm of remote sensing actions.

The US, is in the process of creating a legal structure to have this tendency and to put in the legal consequences attaching thereto, which, because of its approach articulated in its domestic policies, can be seen as a leader and motivator of private industry involvement in many realms of space endeavor. Concluding, it has ratified national legislation to put into practice the conditions of Article VI of the Outer Space Treaty and

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<sup>153</sup> *Ibidem* Section 102(f).

<sup>154</sup> *Ibidem* Section 102(i).

<sup>155</sup> *Ibidem* Section 102(l).

<sup>156</sup> See G.H. Rynolds, *The Omnibus Space Commercialization Act*, p. 173, in *Journal of Space Law*, Vol. IX, 1991.

<sup>157</sup> See J.B. Gantt, *Space Station Intellectual Property Rights and U. S. Patent Law*, in *Les Stations Spatiales Habitées - Aspects Juridiques. Manned Space Stations - Legal Issues. Proceedings of the Colloquium held 7-8 November, 1989 in Paris.* Edited by Duc Guyenne. ESA SP-305. European Space Agency, 1990., p.107.

<sup>158</sup> See for the "Presidential Directive on National Space Policy" February 11, 1988. (<http://www.fas.org/spp/military>) and ([www.espi.or.at/index2.php?option=com\\_content&do\\_pdf=1&id=172](http://www.espi.or.at/index2.php?option=com_content&do_pdf=1&id=172)).

<sup>159</sup> A limit of 10 metres had been resolved before.

to react to the legal insinuations flowing from Article VII of the Outer Space Treaty<sup>160</sup>.

Moreover, in view of the fact that in accordance to Article VIII of the Outer Space Treaty, States keep jurisdiction and control over their space items and staff on board, they may expand the claim of their domestic laws to actions completed by private bodies regarding such space elements. The US this way has already taken action by extending the 'special maritime and territorial jurisdiction' in order to enlarge it to include space crafts admitted in the records of the US<sup>161</sup>. Consequently, particular acts committed on board space crafts, together with killings and fire-starting, would be federal crimes.

Regarding copyright law, it has already been specified that a law has been ratified to bring created inventiveness utilized or wholesaled in outer space on a space item according to jurisdiction or control of the US inside the applicability of US copyright law regulation.

What is more is that tax laws are being suggested so as to ease a tax environment favorable to further participation by private industry in space activities<sup>162</sup>.

The New National Space Policy Directive of September 5, 1991, distinguishes the many advantages which the business space launch industry offers to the United States, and will additionally encourage the expansion of US private subdivision space actions that complements the National Space Policy of November 1989. The policy articulated a synchronized set of deeds for the next ten years intended at attaining a balance amid launch industry requirements with those of other companies and with vital domestic safety concerns. As mentioned before, my concern is of the institution of a free and authentic global market for space actions in the opinion of the US role against the so-called non-market launch suppliers and its putting into practice action to dominate the launches of US government satellite by the launch of US-produced crafts.

## 7. DOMESTIC SPACE LAWS IN THE EUROPEAN STATES

Up to now, only US law efforts in the realm of private industry contribution in space actions have been deemed, and certainly that nation seems to be the most progressed regarding this.

In many of the Western European countries, an increasing participation of private industry in space action participation is happening and action has been taken to control this progressive development.

So as to introduce a basic idea of this method of domestic directive in the individual states one should distinguish three kinds of feat:

- the association of space actions inside the individual states;
- the amalgamation of global space law into the body of domestic legislation of the individual states;
- the addition of current domestic law structures by the latest legislation.

All these domestic activities should be thought of along the lines of the history of the growing part of private industry in space actions and the need to have this trend and to bring it inside the field of lawmaking directive.

Looking at the first activity stated, one finds that in those West European nations more or less non-dependent entities have been generated to handle space activities. Emerging in the structure of National Space Agencies their legal standing varies, nonetheless, in accordance to the interested state, from an organizational entity to a base or a public

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<sup>160</sup> See in this Chapter, sections 5 and 6.

<sup>161</sup> See P. Dann, *The Future Role of Municipal Law in Regulating Space Related Activities: Space Law: Views of the Future*, International Institute of Air and Space Law, Kluwer Law and Taxation Publishers, NL 1988, p. 130 et seq.

<sup>162</sup> See Dula cit., *Materials Processing...* p. 163.

capital industry, therefore involving equivalent varieties of entrusted state authority<sup>163</sup>.

Austria, France, Germany, Italy, the Netherlands, Norway, Sweden and the United Kingdom are the states which currently have set up such a National Space Agency.

In regards to the second kind of action taken, the amalgamation of global space law into domestic law by the individual states, it is important to highlight that this type of domestic directive has been utilized from the very start of the formation of the international space law.

In many Western European states amalgamation of international space law into domestic law happens by means of the act of ratification of global accord by the parliament of the individual state.

This of course depends on the legal system of each state - the addition of the conditions of the relevant global accord in the domestic legal system.

Besides such act of approval, it establishes positive domestic law, in many Western European states domestic law as a rule takes priority over current domestic law at the time of approval of the global accord.

This in fact sometimes will require the involvement of new domestic legislation, which possibly pertains to private law, for example, in conditions of global space law therefore fits in to contrast current domestic legislation. When this principle overrides the right of the proprietor<sup>164</sup>, an example can be found in the amalgamation of the 'freedom principle' of Article I of the Outer Space Treaty.

Moreover, involvement of new domestic legislation might be needed when conditions of global space law literally need that domestic legal action should be taken to ease agreement with those conditions.

The conditions of the Registration Convention<sup>165</sup> together with the condition of Article VIII of the Outer Space Treaty may be mentioned regarding this, asking the States Parties to arrange a domestic list so as to ease the listing of every space item by the launching state in accordance with the stipulations as specified in the Registration Convention. Such action will be received especially in the opinion its significance regarding the liability conditions of Article VII of the Outer Space Treaty and the Liability Convention.

Furthermore, the amalgamation of the conditions of Article VIII in reference to jurisdiction and control over the space item and its staff even as in outer space, and the ownership of such items launched into outer space, will usually lead to new domestic legislation in the private law division when private identities or concerns are at risk.

One more remarkable example of domestic directive regarding private concerns comes from the amalgamation into domestic laws of the global space law conditions embodied in Article VI of the Outer Space Treaty on liability and the concerned state authority and control over space actions.

Wide-ranging action by the US legislation on this topic, as handled above<sup>166</sup>, can be an example for other nations when they get to the phase of privatization.

In Europe, getting to this phase has led to the same action assumed by means of the adoption of quite a few domestic space deeds.

### **7.1. The Space Action Act of Sweden**

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<sup>163</sup> See G.C. Sgrosso, *Establishment of the Italian Space Agency*, pp. 162-164, Proceedings of the 31d Colloquium on the Law of Outer Space of the IISL, Bangalore, 8-15 October, 1988, AIAA, 1989.

<sup>164</sup> According to Bourelly this could be the French Law case; see M. Bourelly, *National Space Legislation in Europe*, pp. 110 et seq., in Proceedings of the 30th Colloquium on the Law of Outer Space of the IISL, Brighton, United Kingdom, 10-17 October 1987.

<sup>165</sup> The Registration Convention of 1975 (<http://www.islandone.org/Treaties/BH653.html>).

<sup>166</sup> See in this Chapter, sections 5 and 6.



In 1982<sup>167</sup> Sweden set up the Space Activities Act to be put into practice towards actions in outer space in addition to the launching of items in outer space and to all dimensions and control actions of such items.

A particular permit is needed for all actions of this sort carried out from Swedish territory by an entity that is not the Swedish state.

Swedish individuals or corporate entities which carry out space actions from foreign territory as well must have such a permit. The permits are given by the Swedish Government and can be made subject to stipulations. Any permit can be taken back by the Swedish Government if the stipulations are not honored or for any other motives.

The actions inside the capacity of the legislation are controlled by the Swedish Board for Space Activities.

Any person, who deliberately or carelessly completes space actions not having first obtained a permit, can be condemned to prison for one year maximum or fined.

Without deemed as being 'space activities' inside the conditions of the Outer Space Treaty are the launching of sounding missiles, those actions which merely comprise in getting signals sent by satellite by means of ground stations, or the allocation of information from the same ground stations.

The identical Act gives the Swedish Government a right to repayment of the amount of the total claimed as damages for injury on the foundation of the Liability Convention<sup>168</sup> from the legal theme who was to blame for the injury.

What is more, the ruling sets up a domestic list The Swedish Space Activities Act is enhanced by a Decree stating the provisions under which the study of the permit application by the National Board for Space Activities occurs.

Space items and complicated in its contents, the Secretary General of the United Nations via the Swedish Ministry of Foreign Affairs, must be advised.

Obviously because of this domestic directive Sweden has fulfilled its duties under global space law, in particular those stipulated by the Outer Space Treaty and the Registration Convention.

## **7.2. The Outer Space Act in The United Kingdom**

The United Kingdom<sup>169</sup>, with the Outer Space Act of 1986, was the second country in Europe to have set up domestic space legislation. The inspiration this act was the growth of private enterprise participation in space actions eased by a basic trend in the direction of privatization in many divisions of companies and services. The Outer Space Act includes conditions for example:

The scope of application of the Act encompasses the following activities whether carried out in the U.K. or elsewhere:

- a) launching or procuring the launch of a space object;
- b) operating a space object;
- c) any activity in outer space when such activities are performed by U.K. nationals, Scottish firms, or bodies incorporated under the law of any part of the United Kingdom<sup>170</sup>.

A particular article<sup>171</sup> offers *inter alia* for the purpose of the material of the conditions 'outer space' and 'space object', according to the Outer Space Treaty.

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<sup>167</sup> See J. Reifarth, *Nationale Weltraum Gesetze in Europa*, ZLW, March 1987; see for an unofficial translation of the Swedish Space Activities Act: [www.uni-koeln.de/jur-fak/instluft/projectplus/002.doc](http://www.uni-koeln.de/jur-fak/instluft/projectplus/002.doc).

<sup>168</sup> The Convention on International Liability for Damage Caused by Space Objects, 29 March 1962 ([www.faa.gov/about/office\\_org/headquarters\\_offices/ast/media/Conv\\_International\\_Liab\\_Damage.pdf](http://www.faa.gov/about/office_org/headquarters_offices/ast/media/Conv_International_Liab_Damage.pdf)).

<sup>169</sup> Outer Space Act 1986, Chapter 38 ([www.bnsc.gov.uk/assets/channels/about.pdf](http://www.bnsc.gov.uk/assets/channels/about.pdf)).

<sup>170</sup> See *supra* note 169, Articles I and 2.

<sup>171</sup> *Ibidem* Article XIII.

A permit to appoint in the above actions is, according to the conditions of the Act, needed in all cases apart from those indicated in the Act.

The Act gives the power to grant, move, change, end or postpone a permit according to the provisions and methods as stipulated in the Act for the Secretary of State.

In case actions, under the Act, are completed without a permit or against its provisions, the Act offers for action to be assumed in addition to prosecution of the lawbreaker.

Furthermore, the Act forces everyone it pertains to assure the U.K. Government contrast to claims regarding injury or loss coming from actions under the Act.

So as to protect the resolving of the licensee, the permit may force the responsibility of insurance as a stipulation<sup>172</sup>.

Amid the stipulations which can be forcibly attached to the topic of a permit by the Secretary of State, the subsequent should be especially highlighted:

- to protect U.K. national security,
- to avoid any violation of global obligations to the U.K.,
- to avoid intrusion with the actions of others in the peaceful study and utilization of outer space, and to avoid the contagion of outer space or adverse modifications in the environment of the earth.

The last three groups of stipulations, if put into practice, will be instrumental in bringing domestic directive along the lines of the conditions of global space law, especially when private industry is concerned.

What is more, the Act states that the Secretary of State will keep a list of space items where the 'particulars' will be supplied as the Secretary of State believes necessary to the global duties of the U.K.

## 8. MULTINATIONAL DIRECTIVES INSIDE ESA

Besides the domestic legislation presented by each Western European state, it is to be noted that similar multinational activity assumed amid states unified in ESA, and planned to bring this type of collaboration along the lines with global space law, especially regarding private industry concerns.

At the time of the advancement of the Ariane launcher, a non-compulsory program by ESA, the involved states chose to trust assembly and marketing of the Ariane to Arianespace, a restricted company ruled by French law. So as to control their relations with Arianespace through ESA, the involved states signed a Declaration<sup>173</sup>.

This Declaration, what is more, reacted to a duty of global space law by stating that all Ariane launches shall be for peaceful motives, in addition to launches by the involved states for their own' needs plus launches by ESA for its own projects.

Additionally, the Declaration stipulates that launches assumed by Arianespace for non-affiliate states must also act in accordance with the peaceful motives requirement, which shall be protected by a Sales Control Committee having the power to forbid a sale in case of breach of this obligation. Therefore, Arianespace is obligated to act along the lines and the French Government is liable for fulfillment with this directive.

The Declaration has one more condition, which regards the needs of global space law, on the one hand, and private industry participation, on the other. According to the Liability Convention France, meet the requirements according to the launching state

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<sup>172</sup> *Ibidem* Article 5 (2)f.

<sup>173</sup> See for the status of the Declaration, entered into force on April 1980 see Robert F. A. Goedhart, *The never ending dispute: Delimitation of air space and outer space*, Editions Frontières, Vol. 4 of Forum for Air and Space Law, 1996, Ed. M. Benko and W. de Graaff.

criterion<sup>174</sup>, can be held globally responsible for injury caused by the launchings of space items operative by Ariespace at the Space Center in French Guiana. In connection with the contents of the Declaration, on the one hand, an acknowledgment by the government of France and of its liability to abide the economic costs of the compensation of damages, whereas on the other, Ariespace is forced to reimburse any insurance paid up to no more than 400 million French Francs per launch<sup>175</sup>.

Even though the Declaration above per se may not be thought of as a global accord, I believe it ties in other words, the states which have approved it, and by approving it have presented its conditions into their domestic laws.

## 9. REGIONS OF FUTURE DOMESTIC DIRECTIVE

Linking with the amalgamation of global space law into their domestic laws, and by mentioning the actions completed in each diverse state in Western Europe, we have automatically handled the addition of the current domestic space law, the third type of domestic action mentioned regarding the rising private enterprise participation in space effort.

Nevertheless it must be noted that this sort of activity is still in its beginning stage. As mentioned above, the directive focuses on having space actions and the completion of global duties by means of lawmaking action.

As a result of ever-rising participation of private industry in space actions, amid the regions of domestic law which need to be added in the near future, obviously, in proportion with the standing and measure of participation of the nation concerned, are that which pertain to:

- financial law;
- responsibility for injury caused by space items concerning private bodies; - space indemnity law;
- intellectual and industrial property law;
- directive of the legal results from remote sensing and broadcasting directly actions on board satellites.

International directive is already being created inside the structure of the Council of Europe in addition to inside the E.E.C. linked with the understanding of cross-border broadcasting in Europe and the organization of the Single European Market by means of financial incorporation and liberalization, matters mentioned earlier, in so far as broadcasting directly by satellites is concerned.

## 10. DISENSSIONS OF LAWS

Whereas the tendencies in the direction of privatization of space actions in diverse nations insists on such states to present domestic legislation so as to control their domestic concerns in addition to protect fulfillment with global duties, the possibility of dissensions of laws happening shall equally grow, once more than one nation assumes to control the identical action.

The diversity of liable states fulfilling many diverse requirements shall improve the possibilities of a dissension of laws, as the Outer Space Treaty forces liability upon quite a few groups of states.

In the description of 'launching state' offered by the Liability and Registration Conventions the diverse entitled groups specified offer a striking illustration thereof<sup>176</sup>.

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<sup>174</sup> See *infra* Chapter V.

<sup>175</sup> See M. Bourely, *supra* note 164.

<sup>176</sup> See *infra inter alia* Chapter V.

Global liability, in accordance to Article VI of the Outer Space Treaty illustrates<sup>177</sup> an even broader alternative of qualified states, especially when the wording 'national activity' might incline to the claim of a second condition, besides that of the 'Jaunting state' – on the foundation of ethnic group and/or seat.

Thus, space dynamic nations should be supported to manage their own state legislation with the purpose of limiting possible friction. If wide-scale global synchronization may not be currently possible, some rules may be offered to be completed by states to ease the reduction of global friction, which is currently implemented by US national space policy and waiting for legislation. An example is the reducing of the extra-territorial operative of US domestic law by stimulating the need of a US permit to launch a space item when an accord has been completed under which another nation is to put into effect suitable directive power.

## 11. THE PROTECTION AND WELLBEING OF PRIVATE VENTURE

The protection of their lawful concerns in both domestic and global law shall be a precondition for their growing involvement and will establish the rate of the business development, as private venture in nations with a private financial system shall automatically turn out to be the driving force behind space marketing, and the development will in turn be essential to give reason for continuance.

Space-faring private financial system nations' governments ought to understand in their cooperation with other nations on completing global accords that private companies shall merely be concerned with investing in space actions when their private concerns are sufficiently handled.

The institution of a global administration to misuse the natural sources of the moon, as offered by the Moon Agreement<sup>178</sup>, may be a perfect example in this case.

What is more, debates handling legal accords ruling the imagined global collaboration amid the US and quite a few other nations in linked with US projects for a space station<sup>179</sup>, shall spot a lot of global insinuations. These will comprise of quite a few law elements surfacing in a later phase when matter-of-fact submissions shall be the outcome for private business investment.

The authentic use of a lasting space facility in the future and the ultimate sensible utilization of the same facilities in a business manner will entail ever rising unswerving private enterprise participation and shall need the guarantee of their specific lawful concerns on a global in addition to on a domestic basis, whereas in the beginning phases of development agreements amid governments and private industry universally will be completed on a domestic basis, and the consequence of the actions shall basically happen on earth.

Politicians in addition to legislators are now confronted to locate answers to the global conflicts innate to the sensible requests of space technologies, in which private law aspects are gaining relevance, even though the institution of global space law has currently been able to supply the global community with a fundamental structure to have space action in its beginning phase.

This test will be big amid the delegates of diverse private financial nations, except it shall be an even more difficult problem to come to accordance with states of socialist structures.

Nevertheless, the knowledge of INTELSAT and other global organizations set up to manage global administration and the utilization of space requests, already illustrate

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<sup>177</sup> See *infra* Chapter V.

<sup>178</sup> The Agreement Governing Activities of States on the Moon and Other Celestial Bodies (so called Moon Agreement) provides for the establishment of an international regime to govern the exploitation of the natural resources of the moon.

<sup>179</sup> See J.E. O'Brien, *The U.S./International Space Station*, in *Journal of Space Law*, Vol. XV, 1987. pp. 36 et seq.

some hints of global directive of private law facets.

Thus, the recent passed growth inside the former USSR<sup>180</sup> in the direction of the business of space activities<sup>181</sup>, in addition to the reality that more and more nations in diverse "parts of the globe are predisposed to exploit their space abilities in a business manner and on a global degree, will motivate the willpower needed for global collaboration, especially to protect private concerns inside a global structure.

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<sup>180</sup> Since 30 December 1991 an Agreement (the Minsk Space Agreement, on [www.princeton.edu/~ota/disk1/1995/9546/9546.PDF](http://www.princeton.edu/~ota/disk1/1995/9546/9546.PDF)) on joint activity in outer space was executed in Minsk among nine parties of the newly-formed Community of Independent States (CIS). The Agreement entered into force immediately upon signature on the same document by the Republics of Azerbaijan, Armenia, Belarus, Khazakstan, Kyrgystan, Tajitstan, Turkmenistan and Uzbekistan, and the Russian Federation. The Ukraine joined the Agreement in July 1992. The Minsk Agreement recognizes the efforts made by the former USSR and so reads: "...the need for the rigorous observation of international agreements and obligations in the sphere of space research and exploitation taken upon itself by the U.S.S.R".

<sup>181</sup> See *inter alia* Aviation Week and Space Technology March, 1988, p. 29 et seq.

## CHAPTER IV COMMUNICATIONS VIA SATELLITE

### 1. INTRODUCTION

The first documented space submission has been communication via satellite. The leading space authorities distinguished the advantage to be obtained from satellite technology, combining with growth in communication techniques and sciences, already in those early on in space exploration. Specifically in this branch of space requests, early space program were to a large degree intended at achieving rapid growth.

The prospective of communication via satellite put in an entire element of the present status of telecommunications, whereas communication was primarily of vital importance to space flight itself.

Soon this specified branch of space technology provided evidence to have the ability to turn out to be a business venture with nearly limitless possibilities.

Pursuing a period of four years in relation to low level space actions as a result from a series of accidents beginning with the space shuttle Challenger disaster that stopped virtually all launch systems, following a quarter of a century of steady growth and practice in space actions basically, and in particular space telecommunications.

Due to the basic deficiency in launch ability mixed with problems of covering space actions by indemnity and a provisional excess in transponder ability throughout this time, put the U.S. domestic communication satellite orders in a virtual standstill.

The space telecommunication market experienced a razor-sharp upswing giving good reason to predict that space telecommunications would exceed even its early expectations all the way through 1988 and 1989. It is definitely the most marketable field of space actions in terms of social in addition to economic worth with an expected sturdy growth in close proximity to future. Along with a study on international trends in space actions at the end of 1989<sup>182</sup>,

in the midst of 173 satellites forecasted amid 1989 and the year 2000, the position clearly points to a continuation of space telecommunications as the protagonist space request. There were nearly 1850 transponders in service in the world at the end of 1988 of which Intelsat stood for 33% of capacity, the U.S. 36%, Canada 6%, Europe 8%, Japan 4%, and the remaining part of the world (excluding the USSR and China) 13%. In 1992 the number of transponders worldwide is anticipated to arrive at 2500 with a brilliant shift in breakdown for Europe and Japan approximated close to 16% and 9%, even as Intelsat and U.S. ability are anticipated to diminish respectively 31% and 29%.

A superior class of satellites allows clients with smaller and less luxurious ground sets to utilize the systems, whereas newly presented technologies have the power for large development in a much wider foundation of clients than that given out with traditional transponders

Development of telecommunications in space relies moreover on the growth of new services such as broadcasting of direct TV, decentralized digital commerce communications and space communications with movable units.

Other important aspects contributing to an on going development in the market of world space telecommunications are expansion in ground station technology as well as regulations reductions.

Predictions for the duration of 1989-2000 plans a market of \$10.7-13.7 billion, that is

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<sup>182</sup> Reference is hereby made to the *World Space Industry Survey: Ten Year Outlook*, 1989/90 Edition, by Euroconsult ([www.euroconsult-ec.com](http://www.euroconsult-ec.com)).

nearly double that of the period preceding. This is about an anticipated market of 153 to 195 satellites with an typical price of \$70 million per telecommunications satellite<sup>183</sup>.

The social worth of satellite communications is even more problematic to guesstimate for it relies on more uneven factors of appreciation, since precise economic proceeds are very hard to review for the future and predictions such as those pointed out above must be referred to with necessary stipulation. Furthermore, it has to be innate that initial social advantages can produce favorable long-term financial prospects. The immense potential presented by the remarkable advances in telecommunications, related sciences and techniques can become a critical factor in bridging the present gradually growing gap amid the less developed and industrialized countries.

Amid financial and social goals with worldwide collaboration as its essential tool, the end result will rely upon the deeds of the world community entirely in seeking equilibrium amid worldwide and domestic interests.

## **2. COLLABORATING WORLDWIDE**

We have to switch to the worldwide authoritarian structure dominating this precise technical branch of space action, following this brief indication on the financial and social facets of space communications.

I would like to provide an idea of the progress in this branch of worldwide ruling by dealing both with lawful and technical inquiries that are specific to this novel branch of telecommunications, where global relations are ruled by both the law of telecommunications and the law of space, I do not wish to give an inclusive study of the organizational makeup concerned, for that is found in the plenty of textbooks on modern telecommunications. We will notice that by handling space communication rules from this standpoint, victorious worldwide conclusion relies not only on hi-tech progress other than has much to do with political realities.

Being the first recognized application of space endeavor, it is clear that the use of satellites for telecommunication purposes brings this human activity under the realm of international space law, and subjects it to the provisions of the international space conventions.

Its purpose however, providing telecommunications conveys it inside the worldwide telecommunication law administration.

A wide international regulation is the essential requirement for its technical purpose other than any other space or telecommunication action, space communications, are of a global nature.

Since the beginning of the Space Age, this status has been acquainted with a few nations while others followed suit once communication via satellite illustrated its sensible abilities for telecommunication systems for earth.

The 2 major international bodies, both being unique agencies of the United Nations Organization, handling the directive of telecommunications via satellite are 1) the International Telecommunication Union and 2) the UNCOPUOS.

## **3. THE UNION FOR WORLDWIDE TELECOMMUNICATION**

The Union for International Telecommunication<sup>184</sup>, whose existence and know-how in regards to worldwide communications dates back to 1885 when the one before was founded, the International Telegraph Union, which currently needs to be considered the most vital worldwide association for the directive of the modern branch of satellite

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<sup>183</sup> *Ibidem*.

<sup>184</sup> For an oversight of the history of the ITU, see, N.M. Matte, *Aerospace Law*, Telecommunications Satellites, 1982, Butterworths & Co.(Canada) Ltd.; N. Jasentuliyana, *Manual on Space Law*, 1979, Oceana Publications.

communications.

As one of the main purposes of 'The Union',<sup>185</sup> is to uphold and broaden worldwide collaboration for the development and lucid use of all kinds of telecommunications, it also has the authorization at its disposal for this reason to assign the radio frequencies range, and to record radio frequency tasks so as to steer clear of damaging intrusion amid the radio stations of diverse nations.

As of 1959 and beyond consecutive meetings held by this almost worldwide<sup>186</sup> organization have steadily distended its authority in the branch of satellite communications, which currently encompasses the allotment of radio frequencies in all the diverse parts of concern.

The preface of space telecommunication structures required in addition a considerable improvement of the authoritarian rule in the shape of methods, which must be inclusive before frequency tasks are documented in the Master Register to be sustained by the International Frequency Registration Board (IFRB).

It seems necessary to intricate in more detail on the influences and authorities of this organization and its major bodies alongside the history of its progress, to guesstimate the significance of the ITU as a worldwide authoritarian body in the branch of space communications and to review its sway on the systematic expansion of one of the most advantageous of space applications.

### 3.1. The Authoritarian Power of the ITU

ITU's highest appendage, the Plenipotentiary Conference (PC), meets every 6 to 8 years, decides ITU's basic policy and is authorized to amend the conference in addition to the currently established Constitutions<sup>187</sup>.

Throughout worldwide and regional managerial conferences (WARC and RARC's) conformity is being attained on the utilization of the radio band by the allotment of frequencies to be utilized by every service. In regard with Radio Directives that can be established or changed are annexed to the Convention and therefore have connecting treaty strength. The ongoing governing body, Administrative Council<sup>188</sup>, is separated into five areas for election reasons permitting geographic allocation. Created initially as a supervisory body, which meets annually, it is engaged in the authentic effort of the Union by virtue of executing the roles of the ITU under its Constitution, its Convention and under Administrative Regulations (Regulations of the Telegraph Regulations of the Telephone and - most vital for space communications - Regulations of the Radio).

The 5 lasting appendages of the ITU<sup>189</sup> are:

- the General Secretariat
- IFBR (the International Frequency Registration Board), CCIR (the International Radio Consultative Committee)
- CCITT (the International Telegraph and Telephone Consultative Committee)
- BDT (the Telecommunications Development Bureau)

As one of the two major technical appendages of the ITU concerned with inquiries in regards to radio communications<sup>190</sup>, the International Frequency Registration Board was

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<sup>185</sup> See Article 4, par. (1), Text of the International Telecommunication Convention, Malaga - Torremolinos, 1973, published by the General Secretariat of the ITU (Geneva) 1973.

<sup>186</sup> Currently ITU's membership includes 191 Member States and more than 700 Sector Members and Associates (<http://www.itu.int/net/about/index.aspx>).

<sup>187</sup> See Final Acts bringing a new Constitution and Convention (Art. 6,2, j), resolved in the Nice Plenipotentiary Conference: it was created a High Level Committee to carry out an in-depth review of the structure and functioning of the Union, 1989, entered into force on 2001.

<sup>188</sup> *Ibidem*, Article 8.

<sup>189</sup> *Ibidem*, Article 5, 4.

<sup>190</sup> The other organization is the International Radio Consultative Committee (CCIR), which, among others, has the task to provide the formulation of recommendations to protect radio frequencies against interferences.



founded in the Atlantic City conference of 1947<sup>191</sup>,

Its vital task is to influence a systematic recording of the radio frequency tasks created by the diverse nations. On a daily basis it applies a sequence of procedures laid down in the Radio Directives to allow organizations to fulfill their own nation's duties and permit the IFRB to warrant their rights.

The IFRB, while protecting its neutrality, consists of 5 people are voted on their personal worth from a World Conference of plenipotentiaries amid candidates of diverse areas. They are delegated with an worldwide consent and are 'custodians of public trust'<sup>192</sup>.

The rights assured by the IFRB are, as much as space communications are concerned, the right to utilize a frequency, and to take up an orbital location, under discussion to agreement with the Directives. These Directives take in, inter alia, the allotment of radio frequencies, which are now set up in all branches of space communications, in addition to the registration and synchronization process.

These rights are presumed to call upon global acknowledgment/defense depending on the recording (registration) by the IFRB in the Master Register.

Since 1947 the term 'international recognition' has been utilized in the International Telecommunication Convention, when space communications were yet to exist. The content and principle<sup>193</sup> of the term 'international recognition' and its background have been discussed widely linked with the idea of 'the right of priority', which has long been a contentious topic.

Maintaining in all later, International Telecommunication Conventions and Radio Regulations since its insertion in 1947, it originally at one time conciliated the protests of the adversaries of an 'unconditional priority right'<sup>194</sup> and with the intention of highlighting the 'utilization' of a frequency and its preference, the term 'international recognition'.

The exceedingly significant currently-developed three-step process of advance organization, publication, and notification<sup>195</sup>, which has to be go after to obtain worldwide defense/acknowledgment during recording in the Master Register, shapes a precious tool for an systematic directive of space telecommunications.

To defend the frequencies registered in the Master Register against 'harmful intrusion' from other services is the major purpose of this regulatory system. It recognizes the fact that the radio band is a bounded natural resource and that a rising number of space communication services have been extended, which depend on an intrusion-free reception. Nevertheless, it should be highlighted that the entire system is fundamentally based on 'full acknowledgment of the self-governing right of every nation to adjust its telecommunications'<sup>196</sup>, a awareness which has been verified by the authentic directive of the process in the Radio Regulations, making registration easier still when the above processes have not been finished<sup>197</sup> with success. Subsequently, a great mass of registered

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<sup>191</sup> The Atlantic City Convention (1947) is also attached as Annex 3 to the 1973 ITU Convention.

<sup>192</sup> See A. Berrada, *Space and Radio Communications*, in *Maintaining Outer Space for Peaceful Uses*, Proceedings of a symposium held in The Hague in 1984, the United Nations University.

<sup>193</sup> See D.M. Leive, *International Telecommunications and International Law*, the Regulations of the Radio Spectrum, 1970, p. 58.

<sup>194</sup> See final remarks of the President of the 1947 Conference as reported by R.S. Jakhu, *The Evolution of the ITU's regulatory regime governing space radio communication services and the geostationary satellite orbit*, in *Annals of Air and Space Law*, Vol. VIII, 1983, pp. 390 et seq.

<sup>195</sup> The regulatory process, as modified by the 1979 WARC, is controlled in ITU Radio Regulations, Articles XI and XIII. It provides a threhold procedure: (a) advanced publication of a proposed satellite system via the IFRB, (b) coordination of any identified problem involving third countries, and (c) notification of registry of the system in the International Frequency Register. See, *inter alia*, S.E. Doyle, *Regulating the Geostationary Orbit: ITU's WARC-ORB 85-88*, in *Journal of Space Law*, Vol. XV, 1987 pp. 1 et seq.; F. Lyall, *Law and Space Telecommunications*, Dartmouth Publishing Company Ltd, 1989, p. 380 et seq.

<sup>196</sup> The Preamble of the International Telecommunication Convention states: "While fully recognizing the sovereign right of each state to regulate its telecommunication ...".

<sup>197</sup> See N. Jasentuliyana, *Manual on Space Law*, Oceana, 1979, Vol. I, Chapter V.

tasks have obtained a small amount of protection only.

On the other hand, bear in mind that it has been the mutual concern of states that has in fact attained the efficiency that this authoritarian system does possess.

In regards to which the Member states have imagined a practical method with very trivial interest publicized to

legal principles<sup>198</sup>, it should be once again highlighted that the ITU traditionally has been more of a technical association.

Although the International Telecommunication Convention is a true international intergovernmental agreement, and the Convention of 1959 at Geneva was the first international agreement applicable to space activities, debatable ideas have played a tiny part in the controlling worldwide telecommunications.

A study made by Berrada<sup>199</sup>, which points out the practical technique, reads: 'the method used is mainly dictated by the need to take into account the rapid development of communications technologies, the extreme diversity of the various types of applications or services such as telephony, telegraphy, data transmission, broadcasting mobile communications, space operations, etc., each with its specific features and constraints, and finally the wide variety of users, including for instance governmental, civil or military bodies, telecommunications operators, broadcasters, industry, private individuals, activity social, political and economic constraints varying from country to country'.

The subsequent tips should be made a note of referring to the approach of directive and its execution. Technological and operational standards are put through a range of ITU devices. Standards are developed and laid down by the CCIR linked with actual use of radio frequencies. CCIR suggests certain scientific criteria, for instance a desired frequency band for a given check, the circumstances leading the allocation of a frequency band by quite a lot of services, etc.

Due to the fact private telecommunication systems or international operatives of satellite systems and the industry of electronics also contribute to the outcome are standard setting, consequently the fact that the effort of the CCIR is not limited to delegates of countries - They take the appearance of recommendations<sup>200</sup>.

State Members of the ITU, through their delegates, take on the needed authoritarian stipulations and scientific criteria all through World Administrative Radio Conferences (WARC). Choices adopted at these seminars include adjustments to the Radio Directives in addition to Declarations or Commendations, articulated in the Final Acts of the Meeting which furthermore contain the date of the admission of power to the tool in question. In this manner Revised Radio Directives area are attached to the International Telecommunication Convention, and thus comprise a vital element of the Meeting.

The main tool of the ITU which was The International Telecommunication Convention, (which did not possess a permanent charter), was abolished and restored at habitual distances by a new Meeting taken by the Plenipotentiary Conference.

Nevertheless, an amendment by the Plenipotentiary Conference in Nice in 1989<sup>201</sup> has shown the way to the invention of a new structure by the splitting up of the previous Convention<sup>202</sup> into two apparatuses:

- a Constitution including the stipulations which are of a basic quality,
- a Convention containing the other stipulations which by description may require review at sporadic times

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<sup>198</sup> *Ibidem*. See further N.M. Matte, *Institutional Arrangements for Space Activities: an Appraisal*, in *Annals of Air and Space Law*, 1981.

<sup>199</sup> See *supra* note 192.

<sup>200</sup> *Ibidem*.

<sup>201</sup> See Final Act, Nice, 1989, *supra* note 187.

<sup>202</sup> The International Telecommunications Convention (ITU Convention), Nairobi, 1982, ITU ([www.itu.int/net/about/basic-texts/constitution/chapterix.aspx](http://www.itu.int/net/about/basic-texts/constitution/chapterix.aspx)).

Diverse modification methods have been detailed for the Constitution and the Convention. A competent preponderance persisting of two thirds of the allocations authorized with a right to vote is needed for an adjustment of the Constitution. A straightforward preponderance is required, to adjust the Convention while non-participations are calculated, needing 50% plus one in favor of the adjustment.

- The Nice PC also has accepted a new method for the claim of Radio Regulations. The new Radio Directives will be temporarily functional as far as national law permits, for Members who have signed the Final Acts of the PC. Moreover, the code 'silence means consent' is applied, if they have neither agreed nor refused the new Radio Directives in three years time. If they have not responded negatively in this three year period, Members who do not sign the Final Acts will be tied by the new Radio Directives.

Providing a lucid and more even arrangement, these alterations restore to some degree the previous multifaceted construction of diverse accounts of appropriate existing directives amid the assortment of ITU Members.

Still based on the common willingness amid the Member nations to collaborate, the current directive is implemented.

### **3.2. Inclinations in the direction of new codes and directives**

By means of all the restrictions and insecurities linked with a structure mainly relying on seeking advice from and bringing countries together assuming in good faith, the Registration of tasks by the International Frequency Registration Board (IFRB) must be looked upon as the chief authoritarian administration for the communication of space which defends against damaging intrusion and the allotment of radio frequencies.

At a time when this new service had not yet achieved the operational stage, a less resilient and more compulsory structure was imagined for the Broadcasting Satellite Service. Even as the same predisposition has expanded to other branches of space communications utilizing the Geostationary orbit, for instance in the part of Fixed Satellite Services which will be discussed later, this move in the direction of rigid directives is proof by the current Plans for Broadcasting Services.

Many nations, particularly the developing states, at the Extraordinary Administrative Radio Conference (EARC) held in Geneva in 1963 to settle on the allotment of frequency bands vital for the variety of categories of space radio communication, had articulated their apprehension that the succeeding authoritarian structure may offer the scientifically progressed states with all the assigned radio frequencies. The restriction of the locations in the geostationary orbit lifted a related apprehension. Although no legal stipulations were assumed to defend the future concerns of the interested states, a Proposal was accepted by the Conference similar to those of the U.N.G.A. Resolution no. 1721 (XVI)<sup>203</sup> acknowledging that all Members of the ITU: 'have an interest in, and the right to an equitable and rational use of the frequency bands allocated for space communication'.

The 1963 Conference further recommended, '...that the utilization and exploitation of the frequency spectrum for space communications be subject to international agreements based on principles of justice and equity permitting the use and sharing of allocated frequency bands in the mutual interest of all nations'<sup>204</sup>.

Nevertheless, referring to the practical results of the Meeting, Evensen<sup>205</sup> states that the first come, first served basis which frequencies can be guaranteed at the proposal of the individual, does not promote the need for worldwide collaboration. Consequently, he proposes a more progressive method to space frequency allotment.

The World Administrative Radio Conference for Space Telecommunications (Space

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<sup>203</sup> U.N. General Assembly Resolution no. 1721 (XVI) – 1961, 20 December.

<sup>204</sup> See N.M. Matte, *Aerospace Law*, p. 95.

<sup>205</sup> J. Evensen, *Aspects of International Law Relating to Modern Radio Communications*, The Hague Academy of International Law, Recueil des Cours 1965, p. 117.

WARC) of 1971 in Geneva did not change the 'first come, first served' idea either although the detailed stipulations on dexterity, warning and listing accommodated a more well-organized use of the radio spectrum for space communications.

Moreover, one of its Resolutions (Res. SPA 2-1) declined any assertion to an enduring situation on the foundation of frequency task listing by the ITU.

Furthermore in order to stop illegal spill-over, review of Article 7, Radio Directives (428 A SPA 2), guaranteed that there would be collaboration amid shared states before the business a broadcasting satellite service.

Throughout the WARC of 1979, additional adjustments related to warning and listings have been attained by a review of the Radio Directives.

In agreement with the inclination mentioned above in the direction of rigid directives, the World Broadcasting Satellite Administrative Radio Conference of 1977 (WARC B.S.77) set up a compulsory authoritarian structure which was an exemption to the previous rather flexible two-sided method as much as a direct broadcasting satellite service was concerned.

Taking on a 'plan' for Direct Broadcasting in the regions 1 and 3, the WARC-B.S.77 gave considerably to the removal of the 'first come, first served' idea for this precise kind of services for space communication. The WARC Conference of 1979, which meant to modify the Radio Regulations and to complement the text entirely, brought ahead Resolution no. 2<sup>206</sup> of Radio Directives which believes that all nations that have equal rights utilizing both the geostationary orbit and radio frequency.

Even though there have been detailed alterations, Lyall<sup>207</sup> states that 'the 1979 Radio Directives remain the kernel of radio frequency use in general, and in particular are the cornerstone of radio within the sphere of space communications'.

In 1989 the Plenipotentiary Conference decided that a WARC should be held in 1992 to handling any issues raised by the previous specialized meetings of WARC in addition to quite a few other pressing allotment issues along with an agenda to be set up by the Administrative Council in 1990.

As of 1979, this program covers the widest range of band allotment matters.

Some of the most difficult technical and political issues at the Meeting, for instance new satellite arrangements for mobile communications and digital acoustic broadcasting will produce an allocation of frequency bands for all mobile services of satellites for example, Land Mobile Satellite Services (LMSS), Maritime Satellite Services (MSS) and Aeronautical Satellite Services (AMSS), in a common fashion is an act of kindness by the US so as to offer raising elasticity in the utilization of the bands allotted for these services. Combining fixed' satellite services (FSS) and mobile satellite services in definite frequency bands, in addition, numerous communication services from a single space stand as pictured for the future of a new class of common satellite communication services, would insist on common frequency allotments. The subject of common frequency allotment for Mobile Satellite Services is anticipated to increase debate amid those parties concerned with Aeronautical Mobile Services and the parties concerned with the other Mobile Satellite Services. Particularly in association with the safety of air navigation<sup>208</sup>, dilemmas in regards to the division of authority present amid the ITU regulatory power and the ICAO regarding Aeronautical Mobile Satellite Services regulation during frequency allocation.

### **3.3. A Matter of Concern: The GSO**

The specific concern amid the topics handled by the regulatory authority of the ITU is of the geostationary satellite orbit. This has to do with the common acknowledgment, for the need to set up a structure which consists of the ever-raising utilization of the

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<sup>206</sup> Which was for the larger part a restatement of the Resolution (Spa 2-1), presented at the 1971 Conference.

<sup>207</sup> See Lyall, F. *Law and Space, Telecommunications* Dartmouth Publishing Company Limited, 1989.

<sup>208</sup> See T. Masson-Zwaan, *International Telecommunications and ITU Developments*, Conference on the Law, Police and Commerce of International Airtransportation and Space Activity, Taipei, May 1991.

geostationary orbit for satellite communications, and on the other hand, a just and reasonable distribution of it by the diverse countries of the world.

Steering in the direction of a reconsideration of the geostationary orbit as a limited natural reserve on the foundation of reasonable use, the relationship amid locations in the geostationary orbit and related frequency range use have been highlighted by numerous specialists for many years. Since 1963, concern over this problem in many states influenced the 1971 Conference in Geneva significantly, during which a real change turned out to be evident towards the reasonable utilization of the geostationary orbit. The vital Resolution SPA 2-1<sup>209</sup> was the significant result.

The subsequent Malaga-Torremolinos Convention of 1973 was the next step in this development with the insertion of Article 33, provided that in part:

'In using frequency bands for space radio services Members shall bear in mind that radio frequencies and the geostationary satellite orbit are limited natural resources, that they must be used efficiently and economically so that countries or groups of countries may have equitable access to both in conformity with the provisions of the Radio Regulations according to their needs and the technical facilities at their disposal'.

Besides its duties to affect a methodical recording of frequency assignments, etc., included in Article 10, relating with this same Convention<sup>210</sup> and under the conditions of the directive of the IFRB, its directive is to result in the same condition and for the same purpose a methodical recording of the locations allocated by nations to geostationary satellites.

The relationship amid the placing of satellites in the geostationary orbit and using the frequencies on board these communication satellites was in fact recognized in these provisions. As stated in Resolution 2<sup>211</sup> of the 1979 WARC, they offered the foundation for a distinguished need for a methodical, efficient and reasonable rule of the geostationary orbit currently resulting more in the directives founded by the WARC-ORB 1985-88, that are dealt with below.

### 3.4. The 'Planning Device'

It is important to note that no prior allotment/task of orbital locations of any services or nations had been made, before the Direct Broadcasting Plan of WARC 1977 for Region 1 and 3, followed by the 1982 Plan of region 2. Regarding this, I am submitting to the main point cited above of reasonable admission stated by Article 33 of the Malaga-Torremolinos Convention and in regards to Resolution 2 of the Radio Directives accepted by WARC 79, refusing any enduring precedence right<sup>212</sup>. When the space station is transported into use orbital locations together with the related frequency tasks are registered by the IFRB in the Master Register following the synchronization processes in general.

The arrangements submitted above offer an allotment and task of orbital locations and channel frequencies to the respective nations, (The Plan for Region 2 also involves feeder

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<sup>209</sup> *Inter alia*, providing: 1. That the registration with the ITU of frequency assignments for space radio communication services and their use should not provide any permanent priority for any individual country or groups of countries and should not create an obstacle to the establishment of space systems by other countries. 2. That, accordingly, a country or group of countries having registered with the ITU frequencies for their space radio-communication services should take all practical measures to realise the possibility of the use of new space systems by other countries or groups of countries so desiring (from Final Acts of the first world telecommunication exhibition and forum — Telecom 71, Geneva, 1971).

<sup>210</sup> Reference is hereby made to the International Telecommunication Convention, Malaga-Torremolinos.

<sup>211</sup> WARC, 1979, Geneva, Resolution no. 2, Relating to the equitable use, by all countries, with equal rights, of the geostationary-satellite orbit and of frequency bands for space radio-communication services. See S. Gorove, *United States Space Law, National and International Regulation*, Oceana, Part II, p. 184, March 1982.

<sup>212</sup> *Ibidem*. The Resolution reads, moreover, that "a country or a group of countries having registered with the IFRB frequencies for their space radiocom unication services should take all practicable measures to realize the possibility of the use of new space systems by other countries or groups of countries so desiring".

links) as far as satellites that broadcast directly are concerned.

The inquiry as to whether such 'a precedence' to plan would be along the lines with the established code of reasonable access<sup>213</sup>) was still dramatic throughout the preparations for the following WARC ORB 1985-88.

Meanwhile, Article 33 of the Malaga-Torremolinos Convention was altered by the Nairobi Plenipotentiary Conference in 1982<sup>214</sup> by removing 'according to their needs and the technical facilities at their disposal' from the last phrase, and adding in its place, 'taking into account the special needs of the developing countries and the geographical situation of particular countries'. This new language may certainly be seen as a sign of a major change in the significance of the code of reasonable access. Reasonable access might not simply be calculated by effectiveness and economy<sup>215</sup>, when stressing the special needs of the developing countries.

Furthermore, the language 'and the geographical situation of particular countries', which is parallel to the wording taken in Resolution 3 of the 1979 WARC referring to the utilization of the geostationary-satellite orbit and to the diagramming of space services using it, mirrors the boosted accent on the concerns of the developing nations, which in its turn, marked the Plenipotentiary Conference in Nairobi in 1982.

All these changes of accent and progress show an inclination towards directives by means of planning. Regarding IFRB duties, the alteration to Article 10<sup>216</sup> might be looked upon by the Nairobi Convention, as a sign that the original directive system is being replaced.

Nevertheless, during the groundwork for the World Administrative Radio Conference on the Utilization of Geostationary-Satellite Orbit and the Planning of Using Space Services (WARC-ORB-85)<sup>217</sup>, it was still debatable if the execution of plans would produce the wished for best utilization of the orbit/range. The division of opinion on the efficiency of obtaining best possible utilization and supporting technological progress and lasting

advantage, was replicated in the agenda<sup>218</sup> of the First Session (WARC-ORB(1)), held in August/September 1985 with the function 'to guarantee in practice equitable access to the geostationary orbit and to the frequency bands allocated to space services'.

During the First Session, by restricting planning to the fixed satellite services (FSS), it was soon decided which space services and frequencies should be re-regulated. Not all frequency bands owed to these services have been adjusted by a priority allocation scheme within the FSS. Solely the alleged 'expansion bands' were influenced.

An Allocation Plan was created during the Second Session in 1988<sup>219</sup>, allowing each organization to satisfy necessities for domestic service from at least one orbital position

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<sup>213</sup> See, *inter alia*, S.K. Sarkar, *Criteria of Equitable Access to Geostationary Orbit and Frequency Spectrum*, Proceedings of the 26th Colloquium on the Law of Outer Space of the IISL, October 10-15, 1983, Budapest, Hungary, AIAA, 1984, pp. 39-43. See also from the same author, 'Effect of Fibre-Optic Communication on Space Radio Regulations', Proceedings of the 28th Colloquium on the Law of Outer Space of the IISL., Stockholm, Sweden, October 7-12, 1985, AIAA, pp. 110-113.

<sup>214</sup> The relevant 'Nairobi Declaration' can be found at [www.unep.org/Law/PDF/NairobiDeclaration1982.pdf](http://www.unep.org/Law/PDF/NairobiDeclaration1982.pdf).

<sup>215</sup> See R. Lauria-White, *Evolving Principles of Space Communication Regulation in the ITU: 1959-1985*, paper presented at the thirty-third Colloquium on the Law of Outer Space of the IISL., held in Bangalore, 1989.

<sup>216</sup> Article 10 of the 1973 Malaga-Torremolinos Convention read that the essential duties of the IFRB were to effect an orderly recording of frequency assignments made by the different countries so as to establish ... the date, purpose and technical characteristics of each of these assignments, with a view to ensuring formal international recognition thereof ...'.

<sup>217</sup> See S. E. Doyle, *Regulating the Geostationary Orbit: ITU's WARC-ORB 85-88*, in *Journal of Space Law*, 1987, pp. 1 et seq.

<sup>218</sup> The relevant agenda was composed of three points: A. the decision as to which space services and frequency bands shall be planned, B. the establishment of principles, technical parameters and criteria for the planning and provision of guidelines for associated regulatory procedures, and C. other possible approaches that can meet the objective of equitable access.

<sup>219</sup> See S.E. Doyle, *WARC-ORB 85-88 Concluded*, in *Journal of Space Law*, Volume XVII, 1989, p. 20, and M.L. Smith, *International Regulation of Satellite Communication*, Martinus Nijhoff Publishers, Dordrecht, 1990.

inside a programmed arc, supplying 800 MHz of functional bandwidth in the next programmed bands: 4 500-4 800 MHz (space to earth); 6 725-7 025 MHz (earth to space); 10.70-10.95 GHz (space to earth); 11.20---11.45 GHz (space to earth); and 12.75-13.25 GHz (earth to space).

A period of at least 20 years from the date of admission into power of these conditions is stipulated as being the extent of the Plan (i.e., from March 16, 1990 to March 16, 2010).

As decided on throughout the First Session, the Second Session assumed so-called 'improved procedures', as well as 'multilateral planning meetings' (MPMs)<sup>220</sup>. The improved methods simplify the previous administration in several ways, whereas holding a separate method that applies to definite frequency bands in 'exceptional cases', retaining the basic authoritarian scheme for the unplanned FSS bands of advance publication, announcement and registration<sup>221</sup>. The improved methods of planning procedures intends to promise all nations reasonable admission to the range/orbit source in the frequency bands assigned whereas defending present systems at the same time.

What the multilateral planning meetings (MPMs) offer is that, as suitable and if called for, distressed countries can call for MPMs to resolve local situations concerning several countries at the same time. Finally, mutual synchronization attempts are being supported in the beginning so as to provide newcomers' say to admission to the 'conventional bands of the FSS'.

The Report to the Second Session<sup>222</sup> urged that the MFM 'shall be the normal process for gaining access to the GSO/spectrum resources' and that it is inserted to the Radio Directives as a new and separate method. It wants to have a flexible directive throughout the interests of all authentic and potential users in an area that are to be held. It offers reasonable admission for all, therefore leaving behind the first come, first served code by putting all together proposed satellite structures for operation in the identical bands, for the identical service and for the identical time period.

In accordance with the Summary of the discussion of planning<sup>223</sup>, and bearing in mind that it offers definite guidelines for the formulation of future authoritarian methods to make sure reasonable access, 'no planning method is to provide a permanent priority to a space service allocation'.

The result of SPACE-WARC 85-88 has to be looked upon as resolution as a conciliation amid developing nations, planning for global development of the GSO as a restricted natural source, and the main space authorities, favoring a less severe authoritarian structure.

I choose to highlight that its achievement as a whole has revolved the theoretical notion of fairness into a practical purpose, by means of which interests derived from effectiveness and wealth are being resolved with sundry domestic concerns, therefore identifying political realities, that cannot be ignored whereas some may dispute that a new authoritarian structure was not necessary.

#### **4. THE LAWFUL ADMINISTRATION OF THE GSO**

Derived from opinions of effectiveness, finances or plain liberalism, other point of views move forward, derived from regulations of global space law regarding the lawful condition of the geostationary orbit, even as within the ITU a great deal of unwillingness is still kept by the space nations regarding geostationary orbit planning in general.

Articles I and II of the Outer Space Treaty, especially, might be construed as forbidding a precedence objective and occupation of a definite location in the

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<sup>220</sup> See ITU, Final Acts Adopted by the Second Session of the World Administrative Radio Conference of the Use of the Geostationary-Satellite Orbit and the Planning of the Space Services Utilizing (Geneva).

<sup>221</sup> See Lyall, *supra* note 207.

<sup>222</sup> See for the relevant provisions the Text of the Report to the Second Session. See further Lyall, *supra* note 207.

<sup>223</sup> See *supra* note 207.

geostationary orbit.

The most crucial standard of this code of international space law, understanding Article I, the freedom principle, has been highly developed by advocates in addition to opponents of geostationary orbit scheduling to sustain their point of view. Opponents also maintain their claim in reference to the misappropriation code written in Article II.

I prefer quoting Christol's<sup>224</sup> point of view on the topic of his observation 'no international institution exists having a locative powers with respect to orbital slots ...', 'the granting of such authority to an international body would require changes in the 1969 Treaty, which, as has been emphasized, seeks to free the space environment for peaceful and beneficial uses for states generally ...'.

Matte<sup>225</sup> nonetheless finds it hard to see eye to eye with Christol's point of view and states instead that the enlightenment of Buttler<sup>226</sup> highlighting that the allocation of orbital locations by the ITU does not make up a misappropriation from the ITU's opinion.

Gorove<sup>227</sup> elevates many reservations as to its application when handling the misappropriation ban in regards to the geostationary orbit. He argues that infringement of the ban on domestic misappropriation under Article II of the Outer Space Treaty in case of geostationary positioning, only happens in the case of 'continued exclusive occupation by a geostationary satellite of the same physical area', which may in principle not be possible. What is more, he highlights as an additional prerequisite the 'sense of permanence' as against occupation on a provisional basis.

In his opinion one more point of misgiving on the application of Article II of the Outer Space Treaty to the geostationary orbit is, the fact that the geostationary orbit is to be thought of as a natural source, an observation which conforms to the stipulations of the International Telecommunication Convention. Nevertheless, this Convention deems, as demonstrated above, the geostationary orbit not merely as a natural source, but as a 'limited' natural source which makes as a result the compulsion of an competent and financial use addition by because of the unique requirements of the developing countries, etc.

As mentioned earlier, it was precisely the restriction of radio frequencies and related locations in the geostationary orbit that advocated the developing countries to focus on precise space communication services to a priority planning.

A continuous appraisal of the legal standing of the geostationary orbit seems to be fitting so as to place the bond and compatibility of the various conditions of international law of space to the test, notwithstanding the fact of the newly expansion set up planning structure.

Consequently, continuing this assessment of the related codes set out in the Outer Space Treaty may help to settle on the legal administration of the geostationary orbit and as a result the legality of a scheduling structure. Article IX should be mentioned which advocates international collaboration in space issues with regarding the communication concerns of the numerous states. The identical debate becomes still more applicable when a structure such as that founded by SPACE-WARC 85-88 guarantees all countries reasonable admission to the geostationary satellite orbit, if this condition seems to sustain at least a scheduling structure.

In addition, the general advantage code also included in Article I of the Outer Space Treaty can be interpreted to favor a plan derived from reasonable admission for all

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<sup>224</sup> See C.Q. Christol, *National claims for the using/sharing of the orbit/spectrum resource*, at p. 301, Proceedings of the 25<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, 1982, Paris, France, AIAA., 1983;

<sup>225</sup> N.M. Matte, *Aerospace Law*, in Telecommunication Satellites, Butterworths 1982.

<sup>226</sup> R.E. Buttler, *World Administrative Radio Conference for Planning Broadcasting Satellite Service (1979)*, V Journal of Space Law, pp. 93-94.

<sup>227</sup> S. Gorove, *Major Legal Issues Arising from the Use of the Geostationary Orbit*, p. 34et seq., in Regulation of Tranational Communications, Michigan Yearbook of International Legal Studies, 1984.



nations founded on their precise wellbeing.

In compliance with international law, Article III of the Outer Space Treaty, conditions mentioned, inter alia, by Smith<sup>228</sup> as an argument sustaining the authoritarian structure founded by the ITU. While he challenges with precisely about satellite services in the unintentional bands, where the first come, first served idea still applies, the same would be still more legitimate for satellites operating according to allocation scheduling, established by the ITU in the Final Act of the SPACE WARC, and therefore approved by international treaty.

Sustaining the opinion of the present Article III of the Outer Space Treaty and aware of its vital worth for the development of international law in general, I have reached in the end, that the growth of the ITU's authoritarian administration prevailing space radio communication services and the geostationary orbit especially, is in compliance with the basic codes of the law of space.

## 5. DEFENDING AGAINST DAMAGE OF SATELLITES IN THE GSO

The danger of damage is yet another facet that happens linking space communication services offered by satellites located in the geostationary orbit. This structure does not foresee guard against physical damage due to the cause of a crash, even though guard against damage because of radio intrusion has been handled by the new authoritarian arrangement entirely. This peril has already been acknowledged by Sarkar in his observations<sup>229</sup> relating to the rights and duties linked with the actual execution of a scheduling structure and the decisive factor to be applied. Perek<sup>230</sup> appears to allocate this opinion when he conveys his apprehension for accidents in outer space. Confessing that:

'there is no regulation of space objects as material bodies, above the general provision of the well known instruments of space law, which apply to all space objects, whether they are in the GSO or in another orbit', he highlights that the major dilemma deals with:

'possible collision of space objects in the GSO and interference caused by close approaches'.

Therefore, he claims on a timely directive to conserve the function of the GSO in the first place for telecommunications, by the following means: eliminating of immobile satellites; - reducing the amount of fragments;

Implementation of policy and agreement for the allocation of a so-called location by a number of satellites that is active.

Then again, he highlights the fact that these areas of directive are currently ahead of the capability of the ITU and its Conferences, and consequently advocates the global community to take action to lengthen the conditions of orientation of the ITU to cover this issue.

The subsequent situation should be imagined regarding the above proposals.

It is obvious that the rising use of the geostationary orbit will speed up its infiltration and that overcapacity will improve the damaging features in this precise orbit.

Prospect estimates quoted by several authors in addition to the amount of close encounters experienced have given drive to the significance of the problem<sup>231</sup>.

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<sup>228</sup> See M. Smith, *The Space-WARC: Reflections on 1985, Prospects for 1988*, Proceedings of the 29<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, October 4-11, 1986, Innsbruck, Austria, AIAAV, 1987, p. 139 et seq. And from the same author, *Compliance of the POST-WARC ITU Regulatory Regimes with International Space Law*, in Proceedings of the 31<sup>st</sup> Colloquium on the Law of Outer Space of the IISL, 1988, Bangalore, India, AIAA, 1989.

<sup>229</sup> See *supra* note 207.

<sup>230</sup> See L. Perek, *Telecommunications and the Geostationary Orbit: The Missing Regulation*, pp. 33-37, in Proceedings of the 26<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, October 1983, Budapest, Hungary, AIAA, 1984. See further Perek, *Space Debris*, at the International Colloquium on Environmental Aspects of Activities in Outer Space, Cologne, 1988. See further N. Jasentuliyana, M. Smith cit., and C. Q. Christol.

<sup>231</sup> *Inter alia*, D.J. Kessler, *Predicting Debris*, p. 22, Aerospace America, June 1988.

It is in the branch of communication satellites that most worry is warranted, even though the problems identified have significance to all sorts of satellites positioned in the geostationary orbit. The motives are clear. Due to its specific properties, communication satellites mainly take up the geostationary orbit, supplying direct line of vision, which supplies a highly positive condition for a most efficient and financial application of space communication<sup>232</sup>.

On December 31<sup>st</sup> 1982<sup>233</sup>, of the total sum of 108 working, active space articles in the communication satellites of GSO, totaled to a sum of 74<sup>234</sup>; the other working active space articles were for doing experimental research, and climatic purposes, in addition a number being utilized as a national means of proof and/or early warning structures<sup>235</sup>. It must be said that a large quantity of the communication satellites stated above, also used for military purposes, whereas the latter type definitely indicates a category which is very sensitive in terms of keeping world peace. The likely dangerous results in case of an accident in this exact group might put international peace and security at risk and thus increase hard work to set up defensive measures.

Correlating this, a very well received calculation can be recognized in the number of growing practice of re-orbiting satellites that are inactive beyond the GSO. Actually, a lot of futile satellites have been intentionally eliminated to disposal orbits both beyond and below the GSO<sup>236</sup>.

Especially by articles which have outlived their use, the Report on the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (Unispace'82) had already stated the growing number of masses of the GSO, and identified the importance of future perils of accidents or damages physically to active satellites by these articles. It therefore suggested to the ITU assessment of the possibility of including in its future directives a condition for the elimination of futile satellites by their owner(s)<sup>237</sup> to furthermore avoid early infiltration of the GSO the same Report suggested that each nation and global association takes on a critical evaluation of its requirements to work GSO satellites and to discover paths which may help to put off or decrease masses of the GSO.

Scientifically speaking, the removal of articles near the GSO creates an even more complicated problem<sup>238</sup>, whereas the elimination of a satellite from the GSO after a lifetime of use may be possible. Perek indicates that a resolution to that dilemma can be found in the implementation of scavenging missions<sup>239</sup>.

Linking Article VIII of the Outer Space Treaty covering the jurisdiction and control over space articles kept by the State Registered, he stresses nonetheless, the fundamental legal question especially. This condition appears to involve at least the consent of the Registered State prior to any action that could be assumed.

Whereas the variety of space treaties talk, apparently without much prejudice, of space means of transport, space vessels, space articles, etc<sup>240</sup>, an additional obstacle is added by the fact that the Outer Space Treaty needs a description of the term 'space articles'.

Neither has the term 'wreckage' been clear in any of the space treaties. Diederiks-

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<sup>232</sup> See D.M. Leive, *The Role of INTELSAT in the Use of the Geostationary Orbit*, in Report for a Session of the Academy of Astronautics during the IAF Conference, October 10-17, 1987, Brighton, United Kingdom.

<sup>233</sup> Reference is hereby made to U.N. Doc. A/AC.105/203/Add 4, p. 3, 18 May 1983 ([www.gwu.edu/pdf](http://www.gwu.edu/pdf)).

<sup>234</sup> D.M. Leive, calculated that, already in 1987 over 150 commercial communications satellites were stationing upon the geostationary orbit, see *supra* note 232.

<sup>235</sup> Wiessner writes that "The number of geostationary satellites has increased by 18 percent over the last decade. A total of 330 space craft are expected to crowd this corridor by 1990", see p. 148 Proceedings of the 29th Colloquium on the Law of Outer Space of the IISL, Innsbruck, October 1986 AIAA.

<sup>236</sup> See *supra* note 231, U.N. Doc. p. 2 par. 8, 18 May 1983.

<sup>237</sup> (A/CONF.101/10 and Corr.1 and 2), para. 430, Vienna 9-21 August 1982, par. 283 at ([www.oosa.unvienna.org/pdf/reports/ac105/AC105\\_624E.pdf](http://www.oosa.unvienna.org/pdf/reports/ac105/AC105_624E.pdf)).

<sup>238</sup> See G. Leinberg, *Orbital Space Debris*, Journal of Law, 1989, Vol. IV, p. 113.

<sup>239</sup> See *supra* note 230.

<sup>240</sup> See Bing Cheng, *The Commercial Development of Space*, Journal of Space Law, Vol. IXX, pp. 17-44, at 30.

Verschoor<sup>241</sup> proposes the expression to cover (sections of) space articles which are worn out or no longer in operation, whereas other authors<sup>242</sup> press on comparable or slightly diverse ideas. Perek<sup>243</sup> here highlights delineation amid wreckage and non-working articles in the GSO. In his point of view both categories however, are to be deemed dangerous to active space vehicles and as a result merit contemplation for ultimate scavenging missions.

He states an additional class of articles that might jeopardize active space vehicles in the GSO, explicitly, articles in unusual orbits, besides the articles in the geostationary satellite belt. He suggests a precautionary method which might be attained either by the utilization of an orbit near the so-called vital preferences or, if this is not possible, to pick an unusual satellite orbit with a very short life span to reduce the chance of a damaging accident, to avoid their dangerous task. To this outcome he suggests 'an internationally agreed recommendation which would be a reminder to launching agencies, in particular the agencies newly coming into the field, to do everything to reduce the collision hazards in the GSO'<sup>244</sup>.

His attempts to assemble a safe and sound surrounding for the substance existence of operating satellites in the GSO particularly regarding communication satellites, is a directive for the allocation of nominal orbital positions<sup>245</sup>, and is the third way that is mentioned by Perek.

So as to comprehend the dilemma it must be kept in mind that the Radio Directives do not offer the least amount of division amid the satellites allocating the identical orbital location in the GSO. Observing their position regarding communication to geological areas on earth, are in great order, yet, the fact that quite a few orbital locations, which, as a result have been listed by the IFRB as being the identical nominal orbital location for a variety of space stations, adds an additional aspect to the likelihood of close encounters and ultimate accidents.

Demonstrating this distress, potential viewpoints of expected nominal positions seem to worsen the circumstances; tasks of up to 13 space stations at one nominal location have been approved, under the Plans assumed for Direct Broadcasting Satellites.

Alternatively, stressing that under the Radio Directives a 'station' does not denote 'satellite' and thus it is likely to find two or more space stations on a single satellite<sup>246</sup>.

To steer clear of the infiltration of the geostationary orbit regarding accident risk, expected technological development in station-keeping and a number of solutions<sup>247</sup> may help. However, precedence has to be given to a global directive relating to the allocation of nominal orbital locations in the most efficient way, currently with the accessible methods and knowledge<sup>248</sup>. The Organization does not yet have the authority required for execution<sup>249</sup>, even though the groundings for such a scientific directive could be dealt

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<sup>241</sup> LH.Ph. Diederiks-Verschoor, *Harm producing events by fragments of space objects (debris)*, pp. 1-4, in Proceedings of the 25<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, September 27-October 2, 1982, Paris, France, AIAA, 1983, pp. 1-4. See further LH.Ph. Diederiks-Verschoor, *Legal aspects of environmental protection in Outer Space regarding debris*, Proceedings of the 30<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, October 10-17, 1987, Brighton, United Kingdom, AIAA, 1988, p. 131 et seq.

<sup>242</sup> Refer to C.Q. Christol, *Protection of Space from Environmental Harms*, in *Annals of Air and Space Law*, Vol. IV, (1979), pp. 433-458 at p. 434.

<sup>243</sup> See *supra* note 230.

<sup>244</sup> *Ibidem*.

<sup>245</sup> *Ibidem*. According to Perek "…collisions or close encounters have to be avoided. With the progressive crowding of the G.S.O., the separation by the minimum station keeping range of 0.1 degree, may not be sufficient..".

<sup>246</sup> See U.N. Doc. A/AC.105/203/Add.4, 18 May, 1983 at ([www.gwu.edu](http://www.gwu.edu)).

<sup>247</sup> *Inter alia*, using the idea at the base of the antennae farms or using the slightly elliptical and inclined geosynchronous orbits.

<sup>248</sup> See Perek, *Telecommunication and the GSO: The Missing Regulation*.

<sup>249</sup> *Ibidem*. According to Perek: "Strictly speaking non-communication aspects of space objects are not within the province of the ITU and the WARC 1985...". See also Christol, *Protection of Outer Space from an inefficient use of the orbit/spectrum resources*, in

with effectively by the ITU.

The chance unfortunately, during the two sessions of WARC ORB in 1985 and 1988, which placed a great deal of effort into avoiding frequency intrusion, was not taken to issue at least suggesting to conserve the GSO in as good a state as possible for the future<sup>250</sup>.

There has been no competent global lawful act assumed by the worldwide community to defend satellites in the GSO opposing the growing risk of damages physically, since 1982 when the Second United Nations Conference voiced its distress. That which follows should be highlighted, demonstrating the circumstances in current years for communication satellites in the GSO and to evaluate the viewpoints for the direct future.

For instance, an ESA Report<sup>251</sup> illustrates amid 1977-1987, there was an increase of GSO satellites of 1000%. The number is doubling-up every five years, providing an increased rate of 60 satellites per year. Population gauges of the GSO in the same study place the total number of listed satellites at the start of 1988 at 296, which present a total sum of 100-130 working satellites on station opposing a sum of 150 non-working and discarded satellites. In the same period 30-35 satellites have been accounted as having been discarded from GSO at the conclusion of their life span.

The sum of satellites intended to be launched and informed to the IFRB has been accounted to be 484. Regarding the percentage of business communication satellites surrounded by the whole satellite population in GSO (excluding USSR), this is about 50% matched up to 5% for climatic, scientific and other non-military claims.

## 6. ITU AUTHORITARIAN ABILITIES REVIEWED

Being a feature of global directives normally under the ability of UNCOPUOS, and clearly interpreting the branch of ability of the ITU as a specialized UN Organization for telecommunication issues covering the utilization of outer space, a UNCOPUOS document<sup>252</sup> should be mentioned on reports imagined by UNCOPUOS on issues under the branch of ability of the ITU, in which ITU speaks about the following information. At the same time mentioning one of the main reasons of the ITU 'to maintain and extent international cooperation between all Members of the Union for the improvement and rational use of telecommunications of all kind ...', the ITU highlights its function in regards to 'coordinate efforts with a view to harmonizing the development of telecommunication facilities, notably those using space techniques with a view to full advantage being taken of their possibilities'. In correlation with this, ITU's point is cited:

'...as the authority responsible within the United Nations family for establishing in a timely manner technical and operational standards for all forms of telecommunication and for effecting the rational use of the radio frequency spectrum and of the geostationary satellite orbit'. This contemplation tracks the ITU Decree articulated right before throughout the Plenipotentiary Conference in Nairobi.

Furthermore the document verifies, that this Decree is in absolute agreement with Article I of the Agreement amid the UN and the ITU, in which 'the United Nations recognize the International Telecommunications Union as the specialized agency responsible for taking such action as may be appropriate under its basic instrument for the accomplishment of the purposes set forth therein'.

Additionally it examines, a pecking order of authoritarian importance fastened to ITU manuscripts, which have, on the one hand, accords in the shape of directives in addition

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Proceedings of the 27<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, October 7-13,1984, Lausanne, Switzerland, AIAA, 1985, pp. 382-387.

<sup>250</sup> See Perek, *Safety in the Geostationary Orbit after 1988*, paper presented at the IAF Conference, October 11-15, 1989, Torremolinos-Malaga, Spain.

<sup>251</sup> ESOC: *Focal point for ESA space debris activities* ([http://www.esa.int/SPECIALS/ESOC/SEMUCW4QWD\\_0.html](http://www.esa.int/SPECIALS/ESOC/SEMUCW4QWD_0.html)), 11 April 2008.

<sup>252</sup> U.N. Doc. A/AC.105/327, 19 October 1983.

to proposals for scheduling, directive utilization of the radio frequency band, and the geostationary orbit for space telecommunication reasons, plus on the other, accords in the shape of proposals on developing scientific norms.

While they are almost generally pursued, even as accords on directives, as consented by the Members of the Union and consequently comes to life in the Radio Directives- therefore becoming a component of the Convention - have global treaty power, suggestions are short of global treaty power.

## 7. THE GSO AND UNCOPUOS

Working in close collaboration with the Scientific and Technical Subcommittee to assess the lawful consequences, The United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), has been acquainted with for a long time the significance of the GSO in outer space issues in general and for space communications in particular. This has produced in many studies that have been assumed by the Outer Space Affairs Division and centered on the subject of 'physical nature and technical attributes of the geostationary orbit'.

A study commenced in 1983 by the UNCOPUOS Secretariat<sup>253</sup> on the corporeal character and scientific characteristics of the geostationary orbits stressed an increasingly alarm about the growing likelihood of crashes in the Geostationary Belt and the global risks involved.

Linking the study is referred to the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space<sup>254</sup>, which account assumed several suggestions and remarks about GSO and regarding the extent of its corporeal character and scientific characteristics. The information previously accessible in current UN documents on the geostationary orbit<sup>255</sup>; in addition to throughout annual statements by the ITU and INTELSAT, made by the Secretariat to identify their branch of assessment to a report about the following topics:

- the current and intended job of the GSO; -- options to the GSO;
- close encounters in the geostationary satellite belt.

In relation to the consequences of the report, the study articulates the opinion that the global community may wish 'to consider the adoption of measures to increase the safety of space operations as well as the protection of the environment.'

Such calculations might have to do with suggestions limiting the quantity of wreckage in outer space, to discard, whenever possible, non-working satellites from orbital lanes utilized for vital activities and to control the common utilization of an orbital location in the GSO<sup>256</sup>.

A revision of the report<sup>257</sup> asked for in 1987 repeats the 'exponential' growth in articles sent into the geostationary orbit.

Many authors who have urged and stressed facing the realistic dilemmas of awareness, the suggestions above appear to be in order with the calculations stated previously in this chapter. However, a definite summation of hope still appears to be reasonable.

Identifying as a problem not only worrying about crash dangers in the GSO, linking potential exploit to hamper the quantity of wreckage in outer space, but symptomatic of a

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<sup>253</sup> U.N. Doc. A/AC.105/203/Add 4, 18 May 1983 (dr.ntu.edu.sg/bitstream/10220/649/1/AMIC\_1984\_11\_12.pdf).

<sup>254</sup> Vienna 9-21, August 1982, (A/CONF.101/10 and Corr.1 and 2) at [www.oosa.unvienna.org/pdf/reports/unispace/viennadeclE.pdf](http://www.oosa.unvienna.org/pdf/reports/unispace/viennadeclE.pdf).

<sup>255</sup> See *supra* note 253, also U.N. Doc. AS/Conf.101/BP/716 January 1981. See also U.N. Doc. A/conf.101/BP/4, 30 January 1981.

<sup>256</sup> See *supra* note 254.

<sup>257</sup> U.N. DOC. A/AC 105/404.

more universal threat of an ecological nature<sup>258</sup> - several potential measures suggested by experts<sup>259</sup>, should be mentioned that merit more consideration on the fact of their low cost calculations. As stated previously, the elimination of non-working satellites to removal orbits clear of the geostationary ring compared to the cost of only a few kilograms of fuel appears likely to turn out to be of frequent practice<sup>260</sup>, even though there is distress about the fact that this explanation may cause a dilemma for the future<sup>261</sup>.

Amid the calculations proposed to reduce the growing aspects of wreckage growth, are the plan of litter-free satellites and the evasion of blast risks throughout an developed design of apogee-boost motors.

Clearly the above-mentioned precautionary calculations can radically reduce the original likelihood of calculations derived from this so-called 'space junk', since the crash danger is substantial due to the big population of little, time and again untraceable wreckage because of the expulsion of a variety of elements at each inoculation and start of a satellite in geostationary orbit, and from the sporadic blast of apogee-motors.

Especially in light of the increasingly cost-sensitivity encouraged by the business of space activities, the reasonably low costs involved, which are stressed by the professionals, will with any luck draw the attention of the parties concerned.

Starting appropriate acts to attain their execution in due time, the supporters of such calculations, claim they are a matter of urgency. Action should be taken to create an sufficient global directive before the likelihood of a crash raises to an intolerable level<sup>262</sup> considering of course the substantial amount of time needed for the recognition and claim of scientific developments of a design.

A follow-up study in 1988 on the Report on Environmental Effects<sup>263</sup>, completed by C06 PAR and the IAF for the Scientific and Technical Sub-committee of UNCOPUOS particularly stressing about space wreckage, on the one hand, stated, the precautionary calculations offered by a lot of scientists, however highlighted, on the other, that there is no global accord, universal claim, or suggestion of such calculation<sup>264</sup>.

Nevertheless, it is important to state that informal debates amid NASA, ESA and NASDA professionals have already shown the way to redesigning Ariane and H-1 missile upper stages to vent pressurants and propellants, in so doing preventing blasts and causing orbital wreckage, at the same time as wreckage co-coordinating assemblies have been held amid ESA and NASA on a regular basis since 1987<sup>265</sup>.

### **7.1. In the direction of a new lawful standing of the GSO**

To date, many dilemmas have been acknowledged regarding the utilization of the GSO, the part of outer space especially suitable for communication via satellite, thus covering the law of space in addition to satellite communications regulation.

Basically, the dilemmas start from the basis that the GSO has to be deemed as a

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<sup>258</sup> See N. Jasentuliyana, *Environmental impact of space activities: an international law perspective*, paper presented at the joint IAA and IISL Scientific Legal Round' Table on "Present and Expected Uses of Outer Space and Problems of Protecting the Space Environment", in Proceedings of the 27<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, Lausanne, Switzerland, 8-12 October 1984, AIAA.

<sup>259</sup> See E.A. Roth, *The Geostationary Ring, Physical Properties and Collision Probability*, see also J.P. Loftus Jr., E. Lee Tilton and L. Parker Temple III, *Decision Time on Orbital Debris*, Aerospace America, June 1988.

<sup>260</sup> See supra note 251.

<sup>261</sup> See G. Leinberg, *supra*.

<sup>262</sup> See also N. Jasentuliyana, *Priorities for International Protection of the Space Environment*, paper presented at the International Colloquium on Environmental Aspects of Activities in Outer Space - State of the Law and Measures kprotection - Cologne, May 17-19, 1988 and other participants at the Colloquium.

<sup>263</sup> COSPAR draft A/AC.105/334 at [www.unoosa.org/pdf/gadocs/A\\_42\\_20E.pdf](http://www.unoosa.org/pdf/gadocs/A_42_20E.pdf).

<sup>264</sup> United Nations, A/AC.105/420, 15 December 1988 <http://adsabs.harvard.edu/full/2001IAUS..196..185P>.

<sup>265</sup> According to the findings of the Orbital Debris Working Group co-chaired by NASA and the US Dep. See UN DOC, A/AC. 105/428 Add.1 p. 15, 16 January 1990.

restricted natural resource<sup>266</sup>. A variety of states are presenting concern in solving the dilemmas through global directives where their precise opinion is directed by political incentives, even though most of the dilemmas may be cured by technical developments and solutions. The ITU has demonstrated this.

Inquiries concerning the GSO have been under debate for many years inside UNCOPUOS and mutually its Sub-Committees under issues in regards to the description and/or restriction of outer space and of the geostationary orbit<sup>267</sup>, because of their relation to the law of space. Diverse points of view amid nations concerning the lawful standing of the GSO have come up throughout many meetings and are specifically mirrored in several studies collected by the Legal Sub-Committee.

As a result, some allocations still think the GSO as being of a particular nature, leading to the conclusion that this element of outer space is not essentially covered by the general administration overriding the outer space area under the Outer Space Treaty.

All the same, the majority of the nations that currently are using the GSO, are of the opinion that the GSO is ruled by the general stipulations set out in the Outer Space Treaty, specifying freedom for exploration and use by all states (Article 1, O.S.T.) and forbidding misappropriation by claims of sovereignty, etc. (Article 11, O.S.T.).

Making the 'first come, first served' idea possible, with the implementation of the freedom principle useful to the GSO which has been in practice for many years inside the ITU, the majority of states currently do identify the drawbacks of such a practice for the less industrial nations for the near future<sup>268</sup>. Resolution 2 of the 1979 WARC, clearly demonstrates by refusing any lasting right of precedence<sup>269</sup>. This turn about in attitude has been verified, even more so, by the amendment to Article 33 of the International Telecommunication Convention in 1982 by inserting to the phrase as long as an competent and financial utilization of radio frequencies and the GSO the situation that such should be completed 'taking into account the special needs of the developing countries and the geographical situation of particular countries'.

On the other hand, the delegates within UNCOPUOS who support the particular idea chiefly stand for central states, which maintained self-governing rights over the respective part of the GSO in the famous Bogotá Declaration of 1976<sup>270</sup>.

Worried about their wellbeing the Latin American Group, all associates of UNCOPUOS, formally asked for in 1983<sup>271</sup> the institution of a working group to think about the issues regarding the description and/or restriction of outer space and the geostationary orbit on a precedence basis, as well as the explanation of general codes to rule the lucid and inner use of the geostationary orbit. In so doing they were of the belief that explanation had to be done by the diverse legal administrations ruling air space and outer space respectively and the necessity for technological scheduling and lawful directive for using the geostationary orbit. The UN General Assembly chose to act therefore in a Resolution<sup>272</sup> accepted by majority vote.

Later in March 1984<sup>273</sup>, a working paper named Draft General Principles Governing the Geostationary Orbit was presented by Colombia, Ecuador, Indonesia and Kenya which preferred a specific administration pertinent to the geostationary orbit, wherein the

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<sup>266</sup> See *supra* section 3.

<sup>267</sup> See M. Benkoe, *UNCOPUOS – Works of U.N.*, ZLW, September 1985, p. 30.

<sup>268</sup> See, *inter alia*, Priyatna A., *Developing Countries and the Use of the Geo-Stationary Orbit*, p. 380, in Proceedings of the 30<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, Brighton, October 10-17, 1987, AIAA. See further H. Qizi, *The G.O. and the Developing Countries*, paper presented at the 31<sup>st</sup> Colloquium on the Law of Outer Space of the IISL, Bangalore, India, October 8-15, 1988.

<sup>269</sup> See *supra* section 3.4.

<sup>270</sup> For the full text of the Declaration of the Equatorial States signed at Bogota, Colombia on December 3, 1976, see [http://www.jaxa.jp/library/space\\_law/chapter\\_2/2-2-1-2\\_e.html](http://www.jaxa.jp/library/space_law/chapter_2/2-2-1-2_e.html).

<sup>271</sup> U.N. Doc. A/AC. (journals.cambridge.org/production/action/cjoGetFulltext?fulltextid=1506616).

<sup>272</sup> The full text of the U.N. Res.38/80, 15 December 1983 at [www.un.org/documents/ga/res/38/a38r080.htm](http://www.un.org/documents/ga/res/38/a38r080.htm).

<sup>273</sup> U.N. Doc. A/AC.105/C.2/L.147, 29 March 1984, working paper by Third world countries such as Colombia, Indonesia and Kenya.

central states would have a special right in grouping with a right of preceding approval regarding the placement of segments of space by others.

Additional draft proposals regarding the legal status of the geostationary orbit were submitted to UNCOPUOS in 1986

A draft proposed by Kenya<sup>274</sup>, replicated the identical point as stressed in the Bogotá Declaration, yet another, submitted right before by the German Democratic Republic<sup>275</sup>, refused any ownership right or preferred rights and expressed the point that the geostationary orbit shapes a vital part of the outer space administration. The identical stand has been chosen by all industrial Western nations, the socialist states and a number of developing nations that are not central states.

A third working paper offered a combination of these two positions, and it was issued by Indonesia<sup>276</sup>.

Even though the German paper refers to the special needs of the developing nations and the geographical condition of particular nations referred to above<sup>277</sup> inside the framework of the ITU Convention it does not recognize any privileged rights for central nations.

A suggestion by the central states to set up preferential rights through a structure of codes to be taken on by the ITU throughout the WARC-ORB was dismissed by the Conference which publicly stated it was not capable to handle the beginning of non-scientific criterion into ITU work.

The United Nations as well as UNCOPUOS has been advised of this decision, and it appears to verify that UNCOPUOS is the single worldwide body which has the authorization to handle issues dealing with the lawful standing of the geostationary orbit<sup>278</sup>. Only a re-describing of the capability of the ITU could change this conclusion.

Recently, no considerable progress has been attained on these issues and no major turn abouts of opinions have been reported inside UNCOPUOS.

## 8. CONCLUSION

The United Nations Organization has been handling a wide range of inquiries in the branch of satellite communications by means of, inter alia, its General Assembly, UNCOPUOS, ITU and UNESCO<sup>279</sup> in a universal situation.

The specialized agency of the U.N., UNESCO, has come across dilemmas in regards to telecommunications, mostly in the limited field of the progress of UNESCO's goals which are centered on financial, intellectual didactic and fitness issues. Together with this, its Resolutions regarding the free flow of information and the growth of television distribution for education<sup>280</sup> must be stressed.

Inside UNESCO relating with this, it must be stressed that, ideas have been created for attempts to be assumed to set up a 'New International Communication and Information Order'<sup>281</sup>.

As a specialized organization of the UN, the ITU is on the whole a technological

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<sup>274</sup> U.N. Doc. A/AC.105/C.2/L.155, 2 April 1986, presented by Kenya.

<sup>275</sup> U.N. Doc. A/AC.105/C.2/L.153, 24 March 1986, presented by the German Democratic Republic.

<sup>276</sup> Doc. WG/DEF-GSOJ -186 WP. 1, presented by Indonesia.

<sup>277</sup> See *supra* note 268.

<sup>278</sup> See *supra* note 268.

<sup>279</sup> The UNESCO - United Nations Educational, Scientific and Cultural Organization statutory site: [www.unesco.org](http://www.unesco.org).

<sup>280</sup> Declaration of Guiding Principles on the Use of Satellite Broadcasting for the Free Flow of Information, the Spread of Education and Greater Cultural Exchange ([portal.unesco.org/es/files/17518/10706175951dec15nov1972.pdf](http://portal.unesco.org/es/files/17518/10706175951dec15nov1972.pdf)), adopted by the UNESCO General Conference at its XVIIth Session in Paris, 15 November 1972. On the issue, see N.M. Matte, *Institutional Arrangements for Space Activities*.

<sup>281</sup> For details see 'Many Voices, One World', Report of the International Commission for Study of Communications Problems, UNESCO, Paris 1980; Records of the General Conference, 21st session, Belgrade, 23 September-28 October 1980, Vol. 1, UNESCO, Paris 1980.



association, that became involved in the branch of space communications as a reasonable result of its technical abilities being applied to hand out one of its main purposes- under its basic tool the International Telecommunications Convention - 'to maintain and extend international cooperation between all Members of the Union for the improvement and rational use of telecommunications of all kind ...'. Its significance has been shown in the previous pages collectively with similar problems relating to the restrictions of its ability in lawful issues.

In the promotion of its reasons to uphold worldwide peace and security, and to attain international collaboration in solving worldwide problems<sup>282</sup>, The United Nations Organization in its own right has aimed at the course of action in issues of space action in general.

The General Assembly, its main body, in the presentation of its as meaning expressed in Article 13 of the U.N. Charter, has given considerably to the amplification of codes and regulations recognized in the branch of international telecommunication in addition to in other branches of international law in the shape of suggestions and Decrees.

Bearing in mind that neither suggestions nor Decrees are attached to States except in those instances where they comprise customary global law. However I concur with Williams<sup>283</sup> when she examines in respect of the lawful standing of UN Resolutions:

'if we look at the circumstances in which they are adopted, the statements of the delegations and the explanation of votes, it is easy to conclude that all this is evidence of the practice of States and of the formation of rules of customary international law'.

This opinion appears even more persuasive when regarding the method of decision by agreement as practiced in UNCOPUOS, the UN body which aims to intensifying global collaboration and lawful refuge in the branch of outer space actions.

Regarding this, UNCOPUOS has shown to be the right tool to handle sufficiently with the worldwide lawful facets of space actions regarding the outer space situation and its demanding prospects<sup>284</sup>, especially in its now long-standing method of global directive of space law throughout global conformity by means of the compromise method. This technique in the past, has shown itself to be a precious tool to set up an international structure of global laws for the good of the world community concerned with space actions.

On the one hand, because of the common interest of the ITU and UNCOPUOS in space communication matters and related issues, the detail about lawful and technological issues are often consistent, dilemmas of capability have surfaced, as mentioned above. These are acute problems and should be resolved quickly.

The current conditions of reference of both associations should be examined alongside the backdrop of realities of today in which global relations are continuously changing and current ideas are due to be modified. Ultimately this may lead to modifications by means of remedial calculations. Only such method will have a possible likelihood to set up a logical structure of space law and satellite communications rule held up by the international community at large and able of reacting to the requirements of a world more and more unified by the power of modern communications where satellites play such an important part.

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<sup>282</sup> Please refer to the Charter of the United Nations, Article 1, par. 1 and 3 ([www.un.org/aboutun/charter/](http://www.un.org/aboutun/charter/)).

<sup>283</sup> M. Williams, *The Growing Momentum of Satellite Broadcasting and the Geostationary Orbit*, p. 50, in Proceedings of the 26th Colloquium on the Law of Outer Space of the IISL, Budapest, October 10-15, 1983, AIAA, 1984.

<sup>284</sup> See *supra*, Chapter I section 6.

## CHAPTER V SPACE TRANSPORTATION

### 1. INTRODUCTION

The commercial utilization of outer space is tightly linked to the chance of having a daily access to the space itself.

Thence, it is extremely suitable analyzing the legal implications coming from this advance field of space technology.

Space transportation has become a way to discover the outer space environment since the beginning of space attempts, and then has been easily utilized for many purposes. With regards to this, space transportation has been tightly linked to space activity and dealt with all the international space law regulations.

The result coming from many years of practicing and developing the operational performance of the space transportation is so different from the initial idea that it is essential now performing a critical review of the internal regulation. It is crucial identifying legal issues to be faced during the practical situation.

Space transportation has reached a level into a function in its own right<sup>285</sup>.

It must be pointed out that the characteristics of space transportation are many and different, and then multiple and complex are also the related legal consequences.

While states also have their internal laws, which might be applied to space activities, the international community has a specific responsibility towards this aspect, as the preeminently international features of space activity in general and space transportation in particular may easily lead to international conflicts in case of controversial issues. Moreover, the fact that a greater number of states are developing their own launching activities, or are sharing space ventures, has given the subject considerable momentum.

In order to describe relevant legal consequences of the technical and practical progress leading to operational space transportation, we have to be aware about the status of the current technological achievements and practical chances.

The UNCOPUOS<sup>286</sup> plays an essential role in the procurement of such information through its Scientific and Technical Subcommittee along with the Secretariat.

We should refer also to the IAF<sup>287</sup> in this connection due to its crucial contributions, i.e., by means of its annual reports and detailed studies on this subject, especially with regards to technological progress and future chances.

National reports of different countries give a whole picture of the status of worldwide space activities and give indications of anticipated developments<sup>288</sup>.

However, we need to point out that the information available within this format has been provided and utilized specifically to estimate scientific, technical, economic and social implications, while the legal implications have up to now received only minor attention.

Contrary to this, the ISSL recognized the essentiality of the matter by choosing 'legal implications of space transportation systems' as one of its subjects for its annual

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<sup>285</sup> See C.Q. Christol, *The Modern International Law of Outer Space*, Chapter XV, Pergamon Press, 1982.

<sup>286</sup> Among others, *Report of the Second United Nations Conference on the Exploration and Uses of Outer Space*, Vienna, August 1982 ([www.oosa.unvienna.org/pdf/gares/ARES\\_37\\_91E.pdf](http://www.oosa.unvienna.org/pdf/gares/ARES_37_91E.pdf)). For the last report on international development in space transportation systems, refer to the Report of the Scientific and Technical Subcommittee on its forty-fifth session, held in Vienna from 11 to 22 February 2008 (<http://www.oosa.unvienna.org/oosa/COPUOS>).

<sup>287</sup> Refer to International Astronautical Federation's Annual Report, 2008 (<http://www.iafastro.com/>).

<sup>288</sup> For instance Office of Technology Assessment Washington DC, *The National Space Transportation Policy: Issues for Congress*, at: <http://www.stormingmedia.us/28/2806/A280633.html>.

conference in 1981<sup>289</sup>.

## 2. MEANING OF SPACE TRANSPORTATION

Before approaching the legal implications of space transportation practice, it is essential clarifying the meaning of 'space transportation'. First of all, it should be remarked that we are dealing here with space transportation as space activity, which is not considered for transportation purposes from one point on earth to another (refer for this to the end of this chapter, the 'space plant matter'<sup>290</sup>).

For a linguistic point of view, the term space transportation in the former function of space activity is linked to two different concepts:

- I. Transportation within the outer space region, and
- II. Transportation to the outer space region and back.

If transportation within the outer space region is considered as an action in its own right, then its legal results will be covered only by the governing regime of outer space dictated by international space law.

The same conclusion if transportation within the outer space region has to be considered only as a phase in the activity of transportation to the outer space region and back.

The latest developments towards large space structures<sup>291</sup> and space stations<sup>292</sup> are considered to fall within the concept of space transportation within the outer space region and dealt with accordingly.

However, the second concept has a more complicated structure of legal implications, being a consequence of the differentiation of the legal regimes involved. It is a fact then that it is essential performing an examination of the legal implications of space transportation through a comprehensive approach, i.e., one covering both concepts by proceeding from the second concept, transportation to the outer space region and back. In practice the second concept will automatically include application of the first one.

Moreover, application of the first concept, transportation within the outer space environment, will in practice come prior to the second one, transportation to the outer space region. This will be the case at least for the next coming future.

In order to cover the whole potential legal consequences resulting from the progressive space transportation practice, I included in the second concept the option to return to earth by adding the words "and back", facilitating at the same time the comprehensive approach mentioned above. This return chance, moreover, enables the practice of manned space flight, thereby multiplying the legal implications substantially. Furthermore, the implied factor of space craft re-usability has provided the economic basis for a regular space transportation capability, resulting in an intensification of the legal consequences.

The whole picture of a regular space transportation between the earth and outer space as seen by national space policies<sup>293</sup> just as the expected development towards an augmented and prolonged human presence in outer space necessitates the examination of the whole scale of legal implications of space transportation based on the comprehensive

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<sup>289</sup> Refer to *Proceedings of the 24th Colloquium on the Law of Outer Space of the IISL*, September 6-12, 1981, Rome, Italy, AIAA (<http://www.iislweb.org/>).

<sup>290</sup> Refer to *infra* paragraph 7.1.1.

<sup>291</sup> See *Legal Aspects of Large Space Structures*, in *Proceedings of the 27th Colloquium on the Law of Outer Space of the IJSL*, October 7-13, 1984, Lausanne, Switzerland, AIAA.

<sup>292</sup> See IISL/ECSL, *Reinforcing the Registration Convention*, in *Proceedings of the Space Law Symposium 2003*, Wien 2003, and also *Legal and Technical Implications of Space Stations*, in *Proceedings of the 28th Colloquium on the Law of Outer Space of the IISL*, October 7-12, 1985, Stockholm, Sweden, AIAA both at: <http://www.iislweb.org/publications.html>.

<sup>293</sup> Among others see *United States Space Transportation Policy Fact Sheet*, January 6, 2005 at ([www.hq.nasa.gov/osf/downloads/Space\\_Transportation\\_Policy.pdf](http://www.hq.nasa.gov/osf/downloads/Space_Transportation_Policy.pdf)).

concept approach.

### 3. SPACE TRANSPORTATION SYSTEMS

In order to clarify the many potential legal implications, we have to draw the legal consequences against the background of present and anticipated space transportation systems.

An inventory of the available systems<sup>294</sup> shows that they can roughly be divided into three different groups:

- expendable launching systems,
- the Salyut-Soyuz-Progress concept<sup>295</sup>, and
- The Space Shuttle transportation system.

The basic difference between the three groups is in the measure of return/reuse capability, rating from none ('expendable') to virtually 100% in the case of the Space Shuttle system<sup>296</sup>. However, transportation as expendable launching systems creates different legal consequences during their activity. To identify the legal implications of each individual mission we need to follow that particular system while is in place.

In order to analyze the legal implications of space transportation based on the comprehensive approach we need to follow a space transportation activity during the whole sequence of the flight, in other words, the most complete transportation activity. In this way we can deal systematically with the whole range of potential legal consequences, seen against the background of the respective legal systems that dominate the relevant regions during each particular phase of the mission consecutively from launch to touchdown.

According to this procedure we will concentrate on the ultimate question:

Which legal regime(s) govern(s) space transportation in the course of the mission?

### 4. THE LEGAL REGIME ON THE EARTH'S SURFACE

The surface of the earth is the first environment that space transportation is required to deal with, and it has to be divided once again into territory belonging to the different states and the region of the high seas.

In respect of the territory of a state, space transportation has to comply with the internationally-accepted principle of state sovereignty, according to which each state sets its own rules applicable in that territory.

Territorial space transportation activities cover in general pre-launch activities as well as launching and touchdown procedures.

However, the international regulations on space law contain a number of provisions for the restriction of the execution of the state sovereignty principle. This is because, although the greater part of international space law regulation deals with activities and their implications in the outer space region, it does also provide stipulations which affect legal implications outside the actual space region, being either earth or air space.

Therefore, the modern international framework of space law provides rules to be observed by States Parties, even when these are against other rules of international law,

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<sup>294</sup> Refer to R. Finch and A. Lee, Moore, *Astrobusiness, A Guide to the Commerce and Law of Outer Space*, Chapter IV, , Praeger Publishers, 1985. U.S. Library of Congress, Congressional Research Service., Y. Chen, *China's Space Policy - a Historical Review*, pp. 120 et seq., Space Policy, May 1991, Butterworths-Heinemann Ltd., Shogu Kurachi, *Update on Japan's Space Policy*, p. 100, in Space Policy, 1991, Butterworths-Heinemann Ltd.

<sup>295</sup> Refer M. Smith *The commercial exploitation* cit.

<sup>296</sup> See S. Gorove, *The Space Shuttle: Some of its Features and Legal Implications*, Annals of Air and Space Law, Vol. VI, 1981; p. 390 et seq. and, *The Space Shuttle and the Law*, 1981. I.H.Ph. Diederiks-Verschoor, *The Legal Aspects of the Space Shuttle*, in Annals of Air and Space Law, Vol.I, 1976, p. 199 et seq. ([www.mcgill.ca/iasl/annals/contents/1976/](http://www.mcgill.ca/iasl/annals/contents/1976/)).

such as the principle of state sovereignty.

Examples here below can be remarked as follows:

Article V<sup>297</sup> and Article VIII<sup>298</sup> of the Outer Space Treaty recognize the authority of the State of Registry over spacecraft and objects launched into outer space respectively, by stipulating specific rights in connection with emergency landings and the return of astronauts and space objects landed on third state territory. The Rescue Agreement specifically drafted to elaborate on this subject, mentions in this connection the 'launching authority' and designates as such the state or international organization responsible for launching<sup>299</sup>. Whilst providing for rescue and return of astronauts and the return of space objects landed on foreign territory and the high seas<sup>300</sup>, the Rescue Agreement, like Article V of the Outer Space Treaty, seems to be focused on distress and emergency situations in which the landing is unintentional. The conclusion is that intentional landings, with a specific accent on landings on foreign territory, will probably fall outside its scope of application, in which case the principle of state sovereignty will prevail leaving it to the discretion of the territorial state how it should act in such a situation.

Article VI of the Outer Space Treaty calls upon the 'appropriate state' to require authorization and continuing supervision in case of activities by non-governmental entities in outer space. This provision, along with the obligations provided for in the first part of the same article, concerning international responsibility for national activities in outer space (to which we will refer later on in this chapter<sup>301</sup>), seems to be another example of restricted state sovereignty.

Even though the provision says 'activities in outer space', the term authorization means, in my opinion, specifically the pre-launch and launch situation.

Article IX of the Outer Space Treaty obliges to undertake international consultations when harmful interference may occur from space activities planned by a state or its nationals with the space activities of another state.

The Registration Convention<sup>302</sup> imposes on the launching state the obligation to register each space object and to provide specified data to the Secretary General of the United Nations. This procedure allows, first of all, to identify the launching state, thereby strengthening the feasibility of the Liability Convention (to which we will refer later).

The importance of the Registration Convention in relation to what has been said about Articles V and VIII of the Outer Space Treaty will be clear.

Returning to the Article VI on the state's obligation for authorization and concerning the vision and the vague terminology used by the expression 'appropriate state', the Registration Convention also in this instance might provide a solution by using of the 'launching state' determination.

Even though Boeckstiegel<sup>303</sup> prefers in relation to non-governmental entities, i.e., private enterprise: to define the appropriate state in Article VI of the Outer Space Treaty in conformity with Article IX, as the state whose nationality the private enterprise has', I don't agree with this view. It is rather the state on whose territory the pre-launch and launch activities are taking place, which should qualify for the term 'appropriate state'.

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<sup>297</sup> Art. 5 of the Outer Space Treaty, provides that when astronauts land on Earth, they shall be returned to the State of Registry of their space vehicle, safely and promptly.

<sup>298</sup> Art. 8 of the Outer Space Treaty provides, *inter alia*, that the objects or component parts fallen beyond the burdens of the State Party to the Treaty shall be returned to that State Party.

<sup>299</sup> Refer to the Rescue Agreement, Art. 6 at <http://www.oosa.unvienna.org/oosa/SpaceLaw/rescue.html>.

<sup>300</sup> Refer Articles 2 and 3 of the Rescue Agreement.

<sup>301</sup> Refer to Section 7.3, State Responsibility.

<sup>302</sup> Convention on Registration of Objects Launched into Outer Space (hereinafter Registration Convention), January 14, 1975 (entered into force September 15, 1976), at <http://www.oosa.unvienna.org/oosa/en/SORRegister/index.html>.

<sup>303</sup> See K.H. Boeckstiegel, *Present and Future Regulation of Space Activities by Private Industry*, pp. 12-13, Montreal Symposium on *Space Activities and Implications - Where and From and Where To at the Threshold of the 1980's*?, October 16-17, 1980 ([www.openlibrary.org/b/OI.22118182M](http://www.openlibrary.org/b/OI.22118182M)).

This conclusion may be that only that state can exercise effective control over authorization.

The definition in the Registration Convention<sup>304</sup> may support my point of view, ray applying different qualification criteria, when stipulating that the term launching state' means:

- The state which launches or procures the launching of a space object
- The state from whose territory or facility a space object is being launched

Hence, in case of space activities performed by non-governmental entities, it is the state from which territory the space activities take place which will automatically qualify as the 'launching state'. Therefore, it would be logical to conclude that the criterion to be applied for the 'appropriate state', which has to fulfill the authorization requirement preceding the actual launch, will have to follow the same line of qualification.

Although one could object that the Outer Space Treaty itself does not refer to the launching state criterion, the Liability Convention does so explicitly, whilst Article VII of the Outer Space Treaty uses the same concept by referring to the two different qualification criteria mentioned above.

When examining Article VII<sup>305</sup> of the Outer Space Treaty on state liability we found out that this provision offers another example of potential legal consequences from space activities also to be experienced outside the outer space region. Article VII mentions explicitly the regions where liability for damage can be perceived, being the earth, air space and outer space.

The Liability Convention<sup>306</sup>, which elaborates on this principle, shows a slightly different picture of applicability, by using the words 'the surface of the earth' and 'aircraft in flight' in Article II. Subsequently, it provides for liability in outer space through a separate provision to be found in Article III, which reads:

In the event of damage being caused elsewhere than on the surface of the earth to a space object of one launching state or

to persons or property on board such a space object by a space object of another launching State, the latter shall be liable only

if the damage is due to its fault or the fault of persons for whom it is responsible.

The distinction resulting from the separate handling of the liability issue in Article II and III of the Liability Convention serves to distinguish between liability based on fault and absolute liability.

In contrast with the concept of fault liability in outer space (as referred above in Article III and to be further approached in this chapter), Article II induces absolute liability for damage on the surface or to aircraft in flight, with the result that in these cases liability for damage is much easier to establish.

Nevertheless, it should be pointed out that a general instance has been done by Article VII of the Liability Convention, barring from application of the Convention two groups of persons who in fact run the highest risks of being affected by damage caused by space flight accidents in particular on the ground. These groups are:

1. Nationals of that launching state;
2. Foreign nationals sharing the operation of a space object or being present in a planned launching or recovery area at the invitation of that launching state.

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<sup>304</sup> *Ibidem* Article 1(c).

<sup>305</sup> Article VII reads "Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air or in outer space, including the moon and other celestial bodies."

<sup>306</sup> Convention on International Liability for Damage Caused by Space objects (the "Liability Convention"), September 1, 1972 (<http://www.unoosa.org/oosa/SpaceLaw/liability.html>).

As a result, the application of the Liability Convention is rarely successful if damage has been caused during the high risks connected with launching activities. This is at least the case when the launching takes place from the territory of the state which launches or procures the launching of a space object.

However, when the state which launches or procures the launching does so from the territory of another state, creating thereby two 'launching states', as a result of the definition criteria mentioned in Article I(c) of the Liability Convention being the same as provided for in the Registration Convention<sup>307</sup>, the state which launches or procures the launching has far more chances of being held liable than the state from whose territory the launching takes place<sup>308</sup>. This will result from the fact that in such an event the inhabitants of the state where such a launching occurs are generally not the nationals of the state which launches or procures the launching.

This consequence seems to be possible when a launching is done or procured on the area of a foreign country against the will of the latter. Any how, the law implies also that in case of a launching from foreign territory against the will of that state by a private party only inhabitants who are non-nationals can evoke liability claims against the territorial state on the basis of Article VII Outer Space Treaty in conjunction with Articles I, II and VII Liability Convention. Since there is in such a case no state which launches or procures the launching, liability based upon such a qualification cannot be invoked by nationals of the territorial state.

Contrary to this, if a launching comes from a foreign territory resulting of a mutual agreement, nationals of the territorial state are covered for liability on the part of the state which launches or procures the launching. This event seems, however, to impose an unfair load over the state which launches or procures the launching compared to the state from whose territory the launching takes place as a result of the exemption to be invoked by the latter in respect of nationals.

However, the provisions of Article V of the Liability Convention on joint launchings could offer a solution for such a load in the form of a claim for indemnity by one launching state against another. The fact that Article V(3) defines 'A state from whose territory or facility a space object is launched shall be regarded as a participant in a joint launching', facilitates such a possibility for state launchings from foreign territory.

Moreover, the stipulation that 'the participants in a joint launching may conclude agreements concerning the apportioning among themselves of the financial obligation in respect of which they are jointly and severally liable', accommodates a fair solution in such case.

The practice of joint launchings in the sense of state launchings from the area of another state has been followed by NASA by means of bilateral agreements with many foreign states<sup>309</sup>. These agreements normally provide for indemnity by the foreign state as well as holding the US government exempt from any claim for personal injuries, death or damage to or loss of property, or for other liability, arising out of the operation of a satellite, or from its failure to operate. However, they may add exceptions to this rule through provisions in the related launch services contract, thereby offering an instrument to apportion liability claims between the States resulting from launch failures<sup>310</sup>.

The Registration Convention, as referred above, contributes substantially to the effective execution of the Liability Convention playing its role in the identification of the liable state. It obliges to register the space object upon the launching state, while using for the qualification of the 'launching state' the same criteria as the Liability Convention, i.e.: (1) the state which launches or procures the launching and (2) the state from whose territory or facility a space object is being launched.

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<sup>307</sup> See *supra* note 302.

<sup>308</sup> It is the case of NASA launches on behalf of third States, within the burdens of the same State.

<sup>309</sup> See Gorove, *United States Space Law*, in National and International Regulation, Oceana Publications Inc., 1982.

<sup>310</sup> *Ibidem*.

Nevertheless, in case there is more than one country considered as a launching state in respect of these criteria, the states establishes among themselves which one will register the space object.

As a result, it is acceptable that the state of registry will turn out to be the state from whose territory or facility the launching takes place, while it is precisely this state that has far more chance to be exempted from liability claims on the basis of the provisions set out in Article VII of the Liability Convention, as we emphasized above.

In such case, identification through the Registration Convention will not imply any positive effect for the part who claims damages, thereby frustrating the prime aim of the Registration Convention: the enhancement of legal security.

Any how, it has to be considered that the choice of states parties, as per Article 11(2) of the Registration Convention, can never have any influence on international state liability as such, which has to be determined and implemented in accordance with the the Liability Convention law. Nevertheless, as said above, it could happen that such liability claims may be dismissed by the launching state in those cases provided for.

Following our discussion of the legal implications of space transportation on the earth surface in respect of state territory, we have consequently to approach the legal implications to be generated when space transportation involves the region of the high seas<sup>311</sup>.

## 5. THE LEGAL AUTHORITY OF THE HIGH SEAS

The international regulation of the sea normally provide the basic legal rules for that specific part of the earth's surface. Accordingly, launchings and splash-downs on the high seas will be ruled by a legal authority based on the freedom principle.

Meantime the competing regime of international space law governing space activities in general establishes from the same principle of freedom as applied in outer space.

However, Article V of the Outer Space Treaty as well as the different provisions of the Rescue Agreement provide for specific regulations for the launching and landing of space craft at sea.

Article V Outer Space Treaty focuses on helping to and return of astronauts to their state of registry after an emergency landing on foreign state territory or on the high seas.

The Rescue Agreement elaborates on the rescue and the return of astronauts ,and the return of objects launched into outer space after emergency or unintended launchings on foreign territory or the high seas.

we should, however, note that the above provisions are focused their attention on landings unwittingly occurred or on dangerous situations, leaving a question mark for intentional landings without the element of distress or emergency.

Referring to the international law of the sea and the governing authority, it is essential pointing out that the Geneva Treaties of 1958<sup>312</sup> bounded the application of the freedom principle by the advantage of that of state sovereignty through the concept of the territorial sea. The Convention actually distinguishes the seas into the territorial and the high seas, thereby establishing different legal authorities to be applied in those parts, based respectively on the opposing principles of state sovereignty and freedom. Applying this separation to space activities occurring at sea, we can state that launchings and landings taking place in the area of the territorial sea will be rules by the legal authority of the related coastal state. Even if the Geneva Treaties confirmed the principle of state

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<sup>311</sup> Hereby it is not made reference to the area of Antarctica as long as there are no material space activities currently planned within this; however, I would like to bring to your attention an interesting report with regards to such extreme environments like Antarctica and Outer Space: Noonan R.J., *Outer Space and Antarctica - Sexuality Factors in Extreme Environments* at (<http://www.iub.edu/~kinsey/ccies/aq.php>).

<sup>312</sup> The United Nations Conference on the Law of Sea, 1958, at (<http://www.un.org/law/ilc/>).



sovereignty for the territorial sea - with the exception of innocent passage of ships under foreign flag - no agreement could be found on delimitation<sup>313</sup>.

The third UN Conference on the Law of the Sea, having the result of the Convention established in 1982, resolved the delimitation question by creating a 12 miles zone<sup>314</sup>.

In contrast to this and in accordance with the same Convention, the exclusive economic zones (EEZ)<sup>315</sup>, which are borned to two hundred nautical miles, respond to the general authority of the high seas, in spite of the fact that the establishment of these zones provide their coastal states with a number of precious prerogatives<sup>316</sup> directed towards exploration as well as exploitation activities for economic purposes, such as the jurisdiction related to the construction and use of artificial islands (to which reference will be made later).

Comparable with the specific rights of coastal states over their EEZs are the specific rights of coastal states over their part of the Continental Shelf<sup>317</sup> consisting of the seabed and the subsoil. Although it is opinable if such rights may include prerogatives linked with possible space launching activities, the rational for their existence will definitely be founded on the concept of state territorial sovereignty.

The above complication of different legal authorities may create problems for the practice of space transportation if they are applied along with launchings or landings. In addition to this, the governing authorities of the area where the launching takes place will cause the liability of the launching state as a result of the launching state qualification.

With reference to this qualification (please refer to the Article 1(c) of the Liability Convention) it is known that by including the word 'facility' in the definition of the second criterion quasi-territoriality can provide a basis for liability of the launching state. As a result, when a vessel on the high seas is used as a launching base for a space object, the flag country of that vessel has to be considered a launching state resulting in international liability on the part of that state.

Following the international state liability for space objects to the EEZs, it is a logical deduction that in case of a launching taking place from an artificial island therein, the related coastal state will have to be considered a launching state, due to the above-mentioned rights attributed to coastal states.

The same logical deduction can be applied to a launching from the Continental Shelf.

Moreover, international space law deals with the rescue and return of astronauts and their space objects after an emergency landing on the high seas. This regulation focuses, first on the persons aboard the space object, with respect of Article V of the Outer Space Treaty and the related provisions elaborated by the Rescue Agreement; and then the Article 5 of the Rescue Agreement provides regulations about procedures concerning space objects.

With reference to the question resulting from the discrepancy between the State of Registry and the launching authority, as said respectively in Article V of the Outer Space Treaty and the related Articles of the Rescue Agreement, we can refer to the same problem mentioned along with landings on-state territory.

We are trying to give a overall view of the wide scope of the legal implications accompanying the practical active of space transportation in relation to the earth's environment, without being complete. Meantime, questions and views have been raised which, would require further clarification. This is only as a starting point for further discussion on the issues.

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<sup>314</sup> Part XI, Sec.2, At the start of the Conference, the States that maintained the traditional claims to a 3-mile territorial sea had numbered a mere twenty-five. Sixty-six countries had by then claimed a 12-mile territorial sea limit. Fifteen others claimed between 4 and 10 miles, and one remaining major group of eight States claimed 200 nautical miles. The complete text can be found at: <http://ec.europa.eu/world/agreements/prepareCreateTreatiesWorkspace/>.

<sup>315</sup> *Ibidem* Part V, Art. 55

<sup>316</sup> *Ibidem* Art. 56.

<sup>317</sup> *Ibidem* Artt. 76 and 77.

## 6. THE LEGAL AUTHORITY OF AIRSPACE

Airspace, being the subsequent region through which space transportation makes the course of its mission, is the next subject to be approached.

All countries in the world consider the airspace above their territory as an extension of their territory and as a result, subject to their sovereignty<sup>318</sup>. Following this logical theory they set their own regulations governing that region and the use accordingly. The question is, however, if the international air law can be applied to borne the freedom of space activities during the necessary passage through airspace above foreign state territory.

The current application of the state sovereignty principle to space transportation systems moving through airspace can dramatically oppose the development of regular space transportation, compromising the general developing process of space utilization

Raising this issue, it would be useful to go back to the inception of international space law, as long as the entire question dates from the history of space law itself and is strongly linked to the definition/delimitation problem of outer space.

### 6.1. Definition/Delimitation of Outer Space

Due to its political cruciality, we cannot find a solution to the definition/delimitation problem on an international level and the issue is still under discussion<sup>319</sup>.

At the same time, the space shuttle arrival, with its hybrid characteristics, on the space transportation scene has developed new views on the entire matter<sup>320</sup>.

Both supporters and opponents of an extended applicability of the air law principle of state sovereignty to such transportation systems are making an effort to justify their opinion using the interpretation of the provisions and annexes of the Chicago Convention<sup>321</sup>. It seems unsuitable providing a description of all these considerations and opinions.

In addition to this, considering the fact that any interpretation would deny the aims and purposes of international space law, looking for a solution of the issues linked to the definition /delimitation question by the interpretation of the Chicago Convention, would not follow the aim and purposes of this Convention.

It must be noted that the aims of air and space law rules are irreconcilable, due to the contrast of the respective underlying principles of state sovereignty and freedom of outer space. Therefore, other ways should be studied in order to reach a solution.

Only one theory may be capable to satisfy this condition, while reconciling the two conflicting principles, i.e., the recognition of an international right of passage through foreign airspace to enjoy the right of free exploration and use of outer space, which right would naturally be subject to certain bornes, but could be generally acceptable.

Proposals in this field have been presented previously in combination with the institution of a boundary between air and outer space<sup>322</sup>. A right of passage on airspace may be established through an international agreement on behalf of space flight even though the perspective of the delimitation of outer space seems hardly effective due to fundamentally diverging points of view amongst negotiating parties.

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<sup>318</sup> The ninth edition (2006, amended in 2007) of the Convention on International Civil Aviation, also known as the Chicago Convention, can be found at <http://www.icao.int/icao/net/dcs/7300.html>.

<sup>319</sup> The UN General Assembly, in its XXXIX Session resolved in the Res. 39/96, that the UNCOPUOS-Legal Subcommittee should set up and maintain a workshop in consideration of matters, *inter alia*, concerning the definition and delimitation of outer space.

<sup>320</sup> L.I. Kuskovelis, *The Aerospace Plane: in the Direction of an Aerospace*, p. 177, Innsbruck, 1986, AIAA.

<sup>321</sup> See *supra* note 318. Annex VII of the Convention on International Civil Aviation, where the definition of aircraft is: "any machinery that can derive support in the atmosphere from the reactions of the air".

<sup>322</sup> E. Vasilevskaya, *Outer Space Politics and Law*, Progress Publishers, Moscow, 1987.

Moreover, such an international right of passage<sup>323</sup> should be carefully formulated and should be in accordance with the existing international space regulations.

Therefore, its exclusive peaceful purposes appears to be a primary requirement, along with its compliance with other general principles of space regulations

International spaceregulations already provides a few instances in which provisions have been set out, applying to the region of airspace which affect legal implications for actions performed during the passage through airspace.

Article VII of the Outer Space Treaty states that international country liability remains on the launching state for damage caused in outer space as well as in airspace including liability for damage caused in the passage through any airspace.

The Liability Convention establishes this principle, that it is different from the original concept, as we said above. In relation herewith Article II says: 'A launching state shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight'.

First of all, it is evident that this definition offers an absolute liability for damage caused by a space object to aircraft in flight. On the other hand, the expression 'aircraft in flight' appears to borne this liability to damage in airspace to aircraft, while environmental damage in airspace appears uncovered.

Furthermore, the Liability Convention provides two different kinds of liability; absolute liability as noted above, inter alia, vis-à-vis aircraft in flight, and liability based on fault to be applied vis-à vis a space object of another launching state.

A damage forinstance can be caused elsewhere than on the surface on the earth, which includes the region of airspace.

Respecting the qualification and the identification of the liable state, I suggest referring to my comments above in relation to the provisions of the Liability Convention and the Registration Convention.

Moreover, an additional comment should be reported: in the case of launchings of space,objects from aircraft in flight<sup>324</sup>, the country of registry of that aircraft might be considered a launching state as a result of the word 'facility', which is used in parallel with the word 'territory' in the definition of the launching state.

Where the country of registry of the relevant aircraft is be different from the country in which airspace the launching into outer space takes place, there are two states which qualify for the function 'launching state', with all the legal connections thereby involved.

## **7. THE LEGAL REGIME OF OUTER SPACE**

The next region to be approached by space transportation is the outer space environment. Reminding to our definition of space transportation at the beginning of this chapter, it is clear that the first kind of space transportation, described as being transportation within the outer space environment, is ruled by the authority of that region.

Howeve, being transportation from earth to outer space and back, the legal regime of outer space can be considered as a most important regime to be analyzed along with the legal consequences resulting from space transportation activities, as a species of space activity in general. In relation herewith, it is appropriate to research the rules pertaining to the outer space region and assess whether they are adequate to facilitate those space transportation activities which take place during the course of the mission in outer space.

The rules that this region have are to be searched in the provisions of the international space law conventions, which is the body of international space law.

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<sup>323</sup> Refer to D. Goedhuis, *The Problems of the Frontiers of Outer Space and Airspace*, 174 HR, 1982.

<sup>324</sup> See C. Covault, *Commercial Winged Booster to Launch Satellites From B-52*, in *Aviation Week and Space Technology* (ISSN 0005-2175), June 6, 1988, p. 14-16.

The Outer Space Treaty, whose essential aim is to promote the exploration and use of outer space for the support of all mankind, has created a legal framework for space activities, whilst it established at the same time a regime for the outer space region.

This dualistic approach, creating divergent views among scholars and politicians about the field of law to be covered by international space law, and prompted the polarization of theories advanced in relation to the definition/delimitation issue, can be studied throughout the whole Outer Space Treaty.

I have already mentioned the framework of regulations provided by the *Corpus Iuris Spatialis*, which is linked to the function space activity to be performed outside the space environment.

My attention now will be focused on the provisions pertaining to the outer space region, whilst regulations provided along with the function space activity will also be seen as far as they apply to activities performed in the outer space region.

Considering the extreme importance of the Outer Space Treaty as the basis of international codification in the novel field of space law, it is appropriate to report a number of its Articles:

#### *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, and shall be the province of all mankind.*

*Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.*

*There shall be freedom of scientific investigation in outer space, including the Moon and other celestial bodies, and States shall facilitate and encourage international cooperation in such investigation.*

#### *Article II*

*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.*

#### *Article III*

*States, Parties to the Treaty, shall carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding.*

The provisions stipulated by these Articles, together with the provisions of Article IV, the peaceful aim of the outer space environment and its protection against the hazards of nuclear weapons and other weapons of mass-destruction, point out the extraordinary character of the legal regime of outer space.

The most important characteristic of this regime are the applicability of the freedom principle and the scope as stated in the Preamble of the Outer Space Treaty by the words, 'Recognizing the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes'.

Clearly recognizing the international law and the promotion of international cooperation<sup>325</sup> are generally essential to establish a true international legal format for the use of outer space for the benefit of all mankind.

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<sup>325</sup> Art. IX of the Outer Space Treaty reads: "In the exploration and use of outer space, including the moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and shall conduct all their activities in outer space, including the moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty. States Parties to the Treaty shall pursue studies of outer space, including the moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose. If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the moon and other celestial

However, with regards to the practical side of the established legal regime, we need to admit that the Outer Space Treaty don't find a solution for all the issue, but leave many aspects open to discussion. The Outer Space Treaty decides the legal regime of outer space through the above provisions, but it does not mention the legal status of the Geostationary Orbit to which several equatorial states claim particular rights in relation to their terrestrial position<sup>326</sup>. Furthermore, the regulation of orbital positions and radio frequencies of satellites in the Geostationary Orbit, normally seen as limited natural resources and crucial for interference free satellite communications, still raises questions linked varying interpretations of treaty provisions.

The Outer Space Treaty does already provide a number of provisions which define specific regulations to be followed in outer space.

### 7.1. Jurisdiction and Control

We previously seen the legal connections of space transportation according to the course of the mission, and to the application of different legal regimes.

However, many provisions of the Outer Space Treaty appear to emanate from a functional approach.

One of the most crucial rules for the exercise of space activity is due in Article VIII of the Outer Space Treaty, on jurisdiction and control, stating:

A State Party to the Treaty, on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body.

The provision establishes a relationship between the state which registers a launched space object and its legal authority over the space object and its personnel while in outer space<sup>327</sup>, the idea of the expression 'jurisdiction and control' is subject to different interpretations, varying from a limited concept of jurisdiction, in connection with a more practical authority concerning a real control, to a comprehensive notion of the expression as a whole to be compared with the doctrine of state sovereignty.

In general the provision can be considered as an effort to fill the legal vacuum in outer space to accommodate legally-organized space environment, and will in practice lead to the applicability of national regulations. To the extent that national regulation contains principles of private international law, those principles will decide the choice of law in many conditions.

However, it has to be pointed out that in all conditions the mandatory rules of international space law will have to be followed

The link-up with the state of registry seems to be complaint to the concept of air and sea law, which links jurisdiction and control on board vessels and aircraft with the area of the state of registration. The approach aimed at minimizing legal conflicts, which may otherwise accumulate when more than one state claims jurisdictional power based on varying relationship factors.

The stress on the domination by one state, the state of registry, to rule the legal regime in outer space relating to a space object and its personnel launched intalouter space, used to be considered as a logical and effective solution in the past. Furthermore, the the notion

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*bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the moon and other celestial bodies, may request consultation concerning the activity or experiment".*

<sup>326</sup> Refer to C. Christol, *The Modern International Law of Outer Space*, Pergamon Press, 1982, and S. Gorove, *Studies in Space Law: Its Challenges and Prospects*, Sijthoff, Leiden 1977, p. 65 et seq.

<sup>327</sup> See V.S. Vereshchetin, *Interaction of International Space Law and Domestic Law in Space and Time* and E. Kamenetskaya, *Large Space Systems belonging to International Organizations: Certain Problems of Registration, Jurisdiction and Control*, in Proceedings of the 23<sup>rd</sup> Colloquium on the Law of Outer Space of the IISL, AIAA, 1981, p. 181-186.

of one ruling state is strengthened by the law of the Registration Convention<sup>328</sup> stipulating that in case of two or more launching States, only one of them will register the space object, being the choice the result of a joint determination.

However, in the near future, many developments may occur to challenge the pertinence of the existing regulation on jurisdiction and control in terms of a conflict solving concept.

For instance, the reference to personnel appears to overlook the chance of passengers on board space transportation systems.

Another issue calling for rules is the legal status of space crews visiting another nation's objects in outer space. As we can read in the provision of Article VIII of the Outer Space Treaty, which offers a generally acceptable solution to this topic, personnel is covered both on board and outside their space object in outer space,.

Stressing on the authoritative and disciplinary role played by the spacecraft commander, who carries out an essential part of the State of Registry task, and controls the spacecraft, will be fundamental for safety conditions on board as well as in outer space.

Both developments towards international space flight programmes and evolution of main multinational space structures, for instance the space station<sup>329</sup> (that will be mentioned later), have led to a reassessment of the above said general principle of jurisdiction and control. The application of this principle, which, as stated in the Article VIII of the Outer Space Treaty, implies a link with the state of registry, might seem too strict to be accepted by the international community. For this reason, all the parties involved are allowed implementing options to the existing international system or even domination by a more flexible system.

Due to the extensive cooperation between various countries in ambitious space programmes, and the increasing pressure among different countries regarding their internal interests in the commercialization of outer space, a critical reassessment of the applicability of the jurisdiction and control principle is necessary. This will adapt the practical requirements of multinational cooperation in outer space.

Although the pressure on national space legislation<sup>330</sup> outlines the commitment of states to meet the requirements of international space law, in the meantime it shows a growing focus on internal interests, thus necessitating even more a review of the legal concept provided by Article VIII, particularly when international topics will be in conflict with the practical application of the concept.

Some of international space flight events have already requested the establishment of specific agreements regarding the legal regime covering the duration of an enterprise. For example the Apollo-Soyuz events and the Space Lab flight on board the Space Shuttle.

Concerning the the Apollo-Soyuz events, the issue of jurisdiction and control, as previously mentioned, was one of the more important raised by an agreement pointing out the fact both of the two participating states would keep jurisdiction and control over its space craft and personnel.

The Space Lab-Space Shuttle flight is another example of what became a crucial issue in international space flight practice. Although it is clear that the practical jurisdiction and control during the first flight<sup>331</sup> was to be taken by the commander of the Shuttle, other legal implications were unclear. The issues raised from this experience have led to finding an appropriate international regulation in the future, when different national interests are in conflict with multinational projects in outer space. We should refer to the International

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<sup>328</sup> The complete text can be found at: <http://www.oosa.unvienna.org/oosa/SORegister/regist.html>.

<sup>329</sup> See I.H.Ph. Diederiks-Verschoor, 'Space Stations and Their Legal Implications', paper presented at the 31st Colloquium on the Law of Outer Space of the IISL, Bangalore, October 1988.

<sup>330</sup> Refer to the above Chapter III.

<sup>331</sup> The first Space Shuttle-Spacelab was completed in 9 days on November 1983. See [www.nasa.gov/mission\\_pages/shuttle/shuttlemissions/archives/sts-9.html](http://www.nasa.gov/mission_pages/shuttle/shuttlemissions/archives/sts-9.html). Refer further to M.G. Bourelly, *Legal Issues Relating to Flights of the Spacelab*, in Proceedings of the 21st Colloquium on the Law of Outer Space of the IISL, Ed. Schwartz, USA, 1979, p. 110 - 114.

Space Station Agreement, and the issue of jurisdiction and control of which will be approached later. Treatment of a much wider scale of aspects of international space flight will follow later in this chapter<sup>332</sup> where the Draft Convention on Manned Space Flight will be given major attention.

### 7.1.1 The International Space Station

The International Space Station Project has expressed the need for the Partner States, (the US, the Member States of ESA contributing to its Columbus Programme, Canada and Japan) to share a common regulation in an International Government Agreement (IGA)<sup>333</sup> for the issue of, *inter alia*, jurisdiction and control in respect of different flight elements provided by the respective partners.

In accordance with Article 1 of this IGA, this is the aim:

*to establish a long-term international framework among the Partners, on the basis of genuine partnership, for the detailed design, development, operation, and utilization of a permanently manned civil Space Station for peaceful purposes, in accordance with international law.*

As to the applicable law Article 2 clearly states that:

*The Space Station shall be developed, operated and utilized in accordance with international law, including the Outer Space*

*Treaty, the Rescue Agreement, the Liability Convention, and the Registration Convention.*

Article 5 on Registration, Jurisdiction and Control states:

*1. In accordance with Article II of the Registration Convention, each Partner shall register as space object the flight elements listed in the Annex which it provides, the European Partner having delegated this responsibility to ESA, acting in its name and on its behalf.*

*2 Pursuant to Article VIII of the Outer Space Treaty and Article II of the Registration Convention, each Partner shall retain jurisdiction and control over the elements it registers in accordance with paragraph 1 above and over personnel in or on the Space Station who are its nationals.*

So far, the law follows the international space regulation provided by the respective space law conventions, including provisions linked to jurisdiction and control.

However, the following part of Article 5 says:

*The exercise of such jurisdiction and control shall be subject to any relevant provisions of this Agreement, the MOUs<sup>334</sup>, and implementing arrangements, including relevant procedural mechanisms established therein.*

Article 11 says in its second paragraph that a Code of Conduct for the Space Station Crew will be created by all the Partners, in line with the MOUs.

Furthermore, Article 22 of the IGA has specific provisions on criminal jurisdiction, that may be taken by the specific states over personnel in or on the respective flight elements provided. The rule in its second paragraph offers to the US the additional option to take criminal jurisdiction over misconduct pursued by a non-US national in or on a non-US element of the manned base or attached to the manned base which reduce the safety of the manned base or the crew members thereon.

## **7.2. Unaffected Ownership**

In addition to the law of jurisdiction and control as given by Article VII of the Space Treaty, previously approached, the solution chosen aims at the concept of unaffected ownership, as emphasized by the stipulation that:

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<sup>332</sup> Refer to *infra* section 9.

<sup>333</sup> For the complete text of the so called IGA (1989) and an overview of the history of the ISS see the JAXA (Japan Space Agency) official site: [http://iss.jaxa.jp/iss/history/index\\_e.html](http://iss.jaxa.jp/iss/history/index_e.html).

<sup>334</sup> The text of the ESA-NASA MOU on the Permanently Manned Civil Space Station ISS can be found at: [http://www.jaxa.jp/library/space\\_law/chapter\\_3/3-2-2-10\\_e.html](http://www.jaxa.jp/library/space_law/chapter_3/3-2-2-10_e.html).

Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth.

This provision respects the first provision to keep jurisdiction and control over an object launched into outer space and any personnel thereof while in outer space or on a celestial body. Moreover, it meets an additional requirement by extending unaffected ownership to the whole mission including its return to earth in case it happens, thereby outlining the continuous authoritative power and control of the State of Registry.

Furthermore, the last provision of the same Article establishes the authoritative power and jurisdiction of the State of Registry over its space object found beyond the limit of its area by stipulating the return of such a space object to its State of Registry, which State, however, will have to provide its data upon request, prior to return.

Same provision has been embodied in the latest issued Rescue Agreement, which refers to the launching authority instead of the State of Registry<sup>335</sup>. However, as a consequence of the Registration Convention, the launching authority will register the space object, thus solving this discrepancy in practice.

Moreover, Article 4 of the Rescue Agreement and Article V of the Outer Space Treaty provides the return of personnel of a space object and astronauts to the launching state and state of registry of the space vehicle respectively.

### 7.3. State Responsibility

Article VI of the Outer Space Treaty defines the crucial principle of state responsibility for national activities in outer space, forcing this responsibility equally upon governmental activities as well as on activities carried on by non-governmental entities.

Even though the concept of state responsibility has already been dealt together with the need of authorization and continuing supervision in order to indicate the limit of state sovereignty *vis-à-vis* launching activities, the topic of state responsibility needs a deeper study in order to describe its whole legal connection.

When trying to find the main signification of this principle, each word of the provision has to be deeply analysed:

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty.

With reference to the current terms used in the above provision, it is important focusing the attention on this: the word 'international' along with responsibility should mean a responsibility on one state *vis-à-vis* another, leaving national responsibility to the judgement of the individual state.

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<sup>335</sup> Rescue Agreement Article 5 reads: "1. Each Contracting Party which receives information or discovers that a space object or its component parts has returned to Earth in territory under its jurisdiction or on the high seas or in any other place not under the jurisdiction of any State, shall notify the launching authority and the Secretary-General of the United Nations. 2. Each Contracting Party having jurisdiction over the territory on which a space object or its component parts has been discovered shall, upon the request of the launching authority and with assistance from that authority if requested, take such steps as it finds practicable to recover the object or component parts. 3. Upon request of the launching authority, objects launched into outer space or their component parts found beyond the territorial limits of the launching authority shall be returned to or held at the disposal of representatives of the launching authority, which shall, upon request, furnish identifying data prior to their return. 4. Notwithstanding paragraphs 2 and 3 of this article, a Contracting Party which has reason to believe that a space object or its component parts discovered in territory under its jurisdiction, or recovered by it elsewhere, is of a hazardous or deleterious nature may so notify the launching authority, which shall immediately take effective steps, under the direction and control of the said Contracting Party, to eliminate possible danger of harm. 5. Expenses incurred in fulfilling obligations to recover and return a space object or its component parts under paragraphs 2 and 3 of this article shall be borne by the launching authority".



The concept of the word responsibility seems to express a superficial moral and legal state responsibility that one can appeal to for any activity in outer space, and considered as a internal attempt, whether performed by a governmental agency or a private entity.

This is the opinion of Lachs<sup>336</sup>, who describes this provision in Article VI as a stipulation 'to ensure that any outer space activity, no matter conducted by whom, shall be carried on in accordance with relevant rules of international law and to bring the consequences of such activity within its ambit'.

The inclusion of the sentence 'and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty', places in my opinion an complex form of this general responsibility accepted by a state guarantee that all national activities will comply with the provisions of the Outer Space Treaty in particular.

The conclusion coming from this interpretation is that every state sharing the Treaty should take proper measures to reach this guarantee obligation.

The next stipulation of Article VI states:

*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.*

This seems to be totally complaint to this idea, as it requires 'authorization and continuing supervision by the appropriate State', thus setting the minimum characteristics to be met so that the guarantee obligation is satisfied in case of non-governmental activities in outer space.

The crucial question to be arised now is:

*What are the national activities in outer space to which the basic state responsibility applies?*<sup>337</sup>

The provision itself includes, as mentioned before, activities by governmental agencies as well as non-governmental entities.

With regard to the former, there is no doubt that they are covered by the term national activities, the issue will be that of non-governmental entities.

The need of solving this question has become urgent because so far a great number of private corporations and other forms of less explicitly government-dominated enterprises sharing actual space ventures. It is essential then focusing on the dramatic growth in the number of private companies which plan or are already engaged space transportation services, as well as in other fields of applied space technology for commercial purposes.

A note issued for circulation within the UNCOPUOS on 'private enterprise and the exploration of outer space', shows already in 1983<sup>338</sup> the general direction towards increasing privatization in the field of space activities. The publication pointed out, inter alia, the potential legal issue in terms of responsibility and regulation. Returning to the important topic of the determination of 'national activities' in case of non-governmental entities, it is clear that the sentence of Article VI does not provide a solution.

The same Article in case of participation by private entities, it does not clearly express the term 'national activity', nor, by using the neutral description 'appropriate state', does it lay down any criterion for the relationship between the private entity involved in space activity and the authorizing state.

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<sup>336</sup> See M. Lachs, *The Law of Outer Space*, p. 122, Sijthoff, 1972.

<sup>337</sup> See H.L. van Traa-Engelman, *Problems of State Responsibility in International Space Law*, in Proceedings of the 26<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, AIAA, 1984, p. 139 et seq.

<sup>338</sup> See International Relations, Vol. 7, No. 6, 2476-2492 (1983) ([http://ire.sagepub.com/cgi/pdf\\_extract/7/6/2476](http://ire.sagepub.com/cgi/pdf_extract/7/6/2476)).

Two different ways can be indicated to find a solution:

The first, which comes from the idea of state sovereignty, makes the individual state to define the qualification rules for 'national activities in outer space'. Of those criteria which might be considered as such (i) activities in outer space carried out by the nationals of a certain state; (ii) activities in outer space performed by those entities which have a seat within the territory of a certain state; (iii) activities in outer space originated from the territory of a certain state.

Furthermore, the individual state can combine the criteria to qualify a space activity as a 'national activity'.

If any expectations might be forthcoming from such a national approach to serving the purposes of international law, especially those of space regulations, it is obvious that we can succeed in creating international legal security only through deep research in the field of comparative law and a progressive development towards the uniformization of international conflict law on a worldwide basis, or at least among spacefaring nations.

The second way to arrive at a solution to the coverage of the term 'national activities' in outer space derives from international law. And then the entire issue will be brought back to the Outer Space Treaty or other relevant instruments of international space law.

Trying to imagine the implications from the Outer Space Treaty, or to proceed even further by referring to regulations of international space law conventions, a review of relevant provisions provides many criteria, which may be referred to for establishing state responsibility.

The Outer Space Treaty, in Article IX, for instance, promotes nationality as a condition to invoke a State's responsibility to undertake international consultation if any interference occurs with the activities of other states parties, and also if those are caused by state activities.

Article VII of the same Outer Space Treaty on liability, along with the Liability Convention itself, chooses the launching state to be liable for damage, thereby focusing on the territory or facility from which the launching starts, particularly when neither actual launching nor procurement is done by the state itself.

Any how, we need to outline that both provisions refer to a particular responsibility - and in the latter instance even in the form of a liability - which might not be used to establish the general idea of state responsibility, as long as that is included in Article VI of the Outer Space Treaty.

An additional relationship between a state and activities in outer space which might eventually call for state responsibility, comes from national registration of space objects expressed by Article V and in particular Article VIII of the Outer Space Treaty, as already seen above

In addition to this, in both Conventions on these matters, i.e., the Rescue Agreement and the Registration Convention, the launching state again seems to be the more important reference.

We don't find the expression 'launching state' as such in the Outer Space Treaty, although Article VII, but its description. In the Rescue Agreement we find the terms 'launching authority'.

The Liability Convention brings the expression 'launching state' and provides the same description as the one provided for in the Registration Convention. There is only one exception: the expression 'launching' in the Liability Convention includes attempted launching, while the Registration Convention does not mention it.

In accordance with the above definition the expression 'launching state' describes:

(a) a State which launches or procures the launching of a space object; (b) a State from whose territory or facility a space object is launched.

As a result, at least for those countries which are Parties to these Conventions, the implications coming from a characterisation based on the above description are sufficiently clear in those cases falling within these specific instruments of space law.

These States Parties should all accept the interpretation of the expression 'appropriate state' in Article VI of the Outer Space Treaty by following the same qualification, namely, that of the 'launching state' as provided for in the Liability Convention.

Hence, the obligation to exercise authorization and continuing supervision for non-governmental activities in outer space would be placed upon 'the state from whose territory or facility a space object is launched'.

The application of this notion is in line with the practice of effective control by a state over its own territory. The same idea could be applied to explain the term 'national activities' in outer space to invoke 'international responsibility' provided for by the first sentence of Article VI of the Outer Space Treaty.

The use of the 'launching state' criterion to establish the responsible state, which has the clear obligation to authorize and supervise any activity in outer space, will cover all cases of space involvement, excluding only those cases in which private organizations launch space objects from a place other than a state's territory or facility, for instance, directly from the high seas.

The lack created by these cases could be solved by applying the second criterion based on the nationality and/or seat of the persons or organizations respectively which launch the space object.

Furthermore, the applicability of this second criterion may solve those cases where application of the launching state criterion would evidently lead to a 'flag of convenience' practice intended to escape international responsibilities.

As long as the use of this second criterion may cause differences of application among different states, it would be useful reaching a kind of unification of national law in this matter.

Even though it seems hardly applicable, due to the rather poor record of such undertakings, the common interest of the international community in an adequate rule of space activities may stimulate the progressive development of unification of law.

Regarding this effort in the field of space law, its justification is becoming more obvious as national space legislation gains considerable momentum in the wake of space commercialization.

Any how, it is essential solve the most crucial issues first.

As long as the criterion of the launching state would be put in place in practice, the current unclear environment may be solved. Article VI and expresses the signification of achieving the aims of the state responsibility principle previously mentioned, especially in those cases where private enterprise may otherwise render international interstate regulations ineffective.

#### **7.4. International Organizations**

The last part of Article VI deals with the responsibility coming in case of international organizations.

While the existence of international law is based on the idea of state, being only states subjects of international law, the real establishment of the provision of Article VI of the Outer Space Treaty concerning international organizations and their responsibility for compliance with the Treaty, might be considered even more difficult to be reached than the contents of the provision itself and even go beyond the limited field of space law to have implication on international law.

However, the bearing of the relevant provision of Article VI on the space law and its potential to be fundamental for practical aims, appeared very unclear since its creation. This impression is the same even in front of the Article XIII of the Treaty approaching the international intergovernmental organizations, which was built only in order to applying the provisions of the Treaty to space activities carried out by the States Parties to the Treaty, also when they act within the framework of international intergovernmental organizations.

Nonetheless, it should be noted that there is a propensity in subsequent international space law legislation towards a more clear status of international organizations comparable with States Parties, as subjects of international space law.

While it is possible mentioning the Article 6 of the Rescue Agreement as an evidence of this propensity, the Liability Convention confirms the existence of this development through Article XXII, followed by similar provisions in the Registration Convention<sup>339</sup> and the Moon Agreement<sup>340</sup>.

#### **7.5. State Liability**

Contrary to the issue of responsibility, the liability, which covers a particular field of responsibility in international space law, has been approached with a great attention.

The result of these studies is the elaboration of the Liability Convention on the basis of the ideat of state liability as stated in Article VII of the Outer Space Treaty.

Emanating from this Article, and linked to the corresponding articles of the Liability Convention, we find that, apart from liability for damage inflicted on the earth and in airspace, the launching state also bears liability for damage inflicted in the outer space region. Nevertheless, in the latter instance, the provision of Article III of the Liability Convention clearly provides liability based on fault, in contrast with the absolute liability provided for by Article II of that Convention for the appropriate fields.

I will not approach in detail the responsibility issue, as long as most of the provisions of the Liability Convention speak for themselves.

This, however, it does not mean that the Convention is properly approaching the settlement of claims.

The Liability Convention's aim seems still not entirely clear, as expressed in its Preamble.

Especially the nature of the decision taken by the Claims Commission, which shall be final and binding only if the parties have so agreed<sup>341</sup>, expresses a great deal of doubt in this respect.

Morover, other questions also requests attention, as long as they concern the liability issue as applied in the outer space region.

Even if the Liability Convention in accordance with the Article III, covers damage occured in outer space, the terms of the provision appears to deny damages caused upon outer space itself, leaving the environmental damages in this region without application.

A similar inappropriate conclusion had to be drawn above with regards to damage occured in airspace. As a result, it seems even further essential that the efforts undertaken

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<sup>339</sup> Article VII of Registration Convention.

<sup>340</sup> Article XVI of the Moon Agreement.

<sup>341</sup> Article XIX of the Liability Convention.

by the international community to prevent environmental damage<sup>342</sup> from space activity will soon be extended and materialize in practical form.

An example that we should mention regarding this, is the extensive effort done within UNCOPUOS about the use of nuclear power in space. Researches are studying the assessment of risks linked the use of nuclear power sources in outer space, in case of culminating in the establishment of an international legal framework of directives composed to minimize the dangerous effects. This will reduce considerably part of the risk of environmental damage, which might not be covered by space liability, as contended above, or would be irreparable from a practical point of view.

The liability stipulated by Article III of the Liability Convention for damage suffered in outer space by persons or property on board a space object, is, apparently, as mentioned above, a third party liability based on fault, entailing all the difficulties inherent in the burden of proof upon the inflicted party.

Moreover, this liability will grown due to the conditions of the outer space environment itself, making substantial evidence of fault even less obtainable.

The fact that the related liability is a state liability enlarges in general the chance of effective compensation for damage from a financial point of view, which carries even more weight when one considers the increased participation of private enterprise in space activity and the large investment involved.

In this regard, the requirement of an proper state authorization and control, as mentioned above, is an advantage to third parties, and also to the liable/responsible state itself as long as it limits the risks linked with the commercialization of outer space.

Article XI of the Outer Space Treaty imposes upon states conducting space activities a general obligation to furnish information.

The Registration Convention established on this obligation by its directive to the State of Registration concerning the contents of information to be provided to the Secretary General of the United Nations concerning a space object which is launched into earth orbit or beyond<sup>343</sup>.

The related information is essential due to the need of determination of a space object's position in outer space and its identification.

#### 7.5.1 The International Space Station

With reference to the International Government Agreement on the Space Station<sup>344</sup> (IGA) this Agreement offers in Article XVI, par. III(a) a cross-waiver of liability in relation to claims based on damages, whatever the legal basis (including negligence of every degree and kind and contract) arising out of the Protected Space Operations against persons or entities. Nevertheless, liability for claims based on wilful misconduct cannot be waived<sup>345</sup>.

Among the entities said above., the one listed as 'related entity' is defined as being:

- (1) a contractor or subcontractor of a Partner State at any tier;
- (2) a user or customer of a Partner State at any tier; or
- (3) a contractor or subcontractor customer of a user or customer of a Partner State at any tier.

The term 'contractors' and 'subcontractors' include suppliers of any kind.

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<sup>342</sup> See, *inter alia*, H.L. van Traa-Engelman, *Environmental Hazards from Space Activities: Status and Prospects of International Control*, in Proceedings of the 25<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, 1982, Paris, AIAA, 1983, p. 55 et seq.; see further, N. Jasentuliyana, *Environmental Impact of Space Activities: an International Law Perspective*, paper presented at the joint AIAA and IISL Scientific Legal Round Table on 'Present and Expected Uses of Outer Space and Problems of Protecting the Space Environment', Lausanne, Switzerland 8-13 October 1984.

<sup>343</sup> See Art II and IV of the Registration Convention.

<sup>344</sup> See *supra* note 333.

<sup>345</sup> Article 16 (2.f). *Ibidem*.

The Article XVI states<sup>346</sup>, an argumentation of the cross-waiver of liability to the related entities of the Partner State by requiring agreement either expressly by contract or otherwise waiving all claims against the entities identified.

The above rules facilitates Partner States, by taking themselves as well as their contractors, subcontractors, users or customers, outside the reach of third party state liability based on the Liability Convention. Nevertheless, the effectiveness of such a liability waiver as offered for in the IGA will depend on the status of the IGA as a provision of international law as well as on the actual chance to depart from the provisions of the Liability Convention by agreement.

It should be outlined that the Liability Convention itself clearly excludes some persons from its applicability, such as nationals of the launching state, indicating thereby the only exception possible.

Returning to the provisions of the IGA, it should be noted as well, that the liability cross-waiver should not apply to:

1. claims between a Partner State and its own related entities or between its own related entities;
2. claims made by a natural person, his/her estate, survivors or subrogees for injury or death of such natural person;
3. claims for damages provoked by wilful misconduct<sup>347</sup>; and intellectual property claims.

## 8. CONCLUSIONS

In analyzing the legal implications of space transportation, we searched the legal regime governing space transportation activities during the course of a mission.

Three different kinds of legal regimes can be found.

Different questions arose from our research, especially because of problems of interpretation. The lack of precision and uniformity of the provisions and the expressions creates difficulties in applying them properly.

An international space rule would be useful, if a formula could be found to prevent these problems.

We can propose:

- the Memorandum of Understanding as applied in the Moon Agreement;
- the option for future amendments provided for in all space law conventions<sup>348</sup>;
- the option of reviewing conferences as provided for by the Liability Convention, the Registration Convention and the Moon Agreement.

In this way, legal lacks could be filled up without creating a whole new convention with all the consequences and disadvantages.

## 9. FUTURE PERSPECTIVE

In dealing with space transportation, we have found many legal issues, which do not refer only the legal regime in outer space, but also stress the practical aspect of the Outer Space Treaty approach, involving conflicts of law with other legal regimes.

These results require the definition of the particular aspects of space transportation, or space activities, where the conclusion of an international agreement could help to avoid conflict.

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<sup>346</sup> Article XVI (d.3).

<sup>347</sup> *Ibidem*.

<sup>348</sup> Outer Space Treaty, Article XV; Rescue Agreement, Article VIII; Liability Convention, Article XXV; Registration Convention, Article IX; Moon Agreement, Article XVII.

Currently, some attempts have been undertaken by Space Law institutes in Germany, the USSR and the US<sup>349</sup> whose aim is reaching common research project for a Draft Convention on Manned Space Flight. This Draft Convention<sup>350</sup>, consisting of nine articles. These below are the topics:

- Article I explains the description for, *inter alia*, manned spaceflight, which encompasses an extension to the embarkation, launch, in orbit, de-orbit, landing and disembarkation phases. Expression like space flight elements, crew and the Director of Manned Space Flight Operations are also approached.
- Registration and Jurisdiction and Control are approached in Article 2 and 3 in relation to the related provisions of the Outer Space Treaty and the Registration Convention, including two express provisions. First, that registration and information to the UN Secretary will be effected 'in the shortest possible time after the launch of a manned space object'. Second, that jurisdiction and control will be subject to any agreement between the States Parties involved.
- Article IV on Rights and Obligations of Persons on Manned Space Flights approaches this topic in a general way, by referring to the state exercising jurisdiction and control and, to the related agreement between participating states. It explains the obligations and authority of the Commander and the persons sharing the space flights. It states that under regular flight conditions the Commander is responsible to the Director of the manned space flight, while the crew members also remain accountable to the latter during space flight.
- Article V on Ensurance of Safety is focused on safety conditions for the persons involved. Moreover, it imposes State Parties to put in place plans and to convey to the UN Secretary information connected with the avoidance of environmental risks, including debris, to manned space flight. When a State Party deems that the activities of another State or its nationals interfere with its manned space flight, the other State is asked to provide explanations upon the request of the first State. The aim of this provision is implementing the regulation offered by Article IX of the Outer Space Treaty, which does not provides any mandatory rule.
- Article VI on Mutual Assistance in Space refers to Article V of the Outer Space Treaty as well as to the respective provisions of the Rescue Agreement focusing on crew and manned space objects. It states the importance of having available and uninterrupted means of communication and provides instructions about the financial implications of helping a manned space object in case of need. Moreover, it is to be known by any person in outer space as an astronaut within the meaning of Article V of the Outer Space Treaty and as part of the personnel of a spacecraft within the meaning of Article VIII of the Outer Space Treaty and the Rescue Agreement.
- Article VII on Responsibility and Liability concerns the Article VI of the Outer Space Treaty as well as to the Liability Convention. Thus, in approaching those implications it points to the State of Registry with the exception 'unless otherwise agreed by States sharing an international space flight'.
- Article VIII on Intellectual Property (this part will be analyzed in a more comprehensive way in Chapter VIII), offers the conditions for the regulation of intellectual property rights in outer space, starting from the fiction of territoriality and the possibility of separate space flight elements.
- Article IX approaches the Consultation and Settlement of Disputes<sup>351</sup>. It states that States Parties have to meet without delay when another State Party retains that the

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<sup>349</sup> Academy of Sciences of the USSR, (Prof. V. Vereshchetin); the Research and Study of Space Law and Policy Center, University of Mississippi, (Prof. S. Gorove); the Institute of Air and Space Law, Cologne University (Prof. K.H. Boeckstiegel).

<sup>350</sup> See for text, *Journal of Space Law*, Vol, 18, Number 2, 1990, pp. 210-216.

<sup>351</sup> For dispute resolution see A.A. Cocca, *The Settlement of Disputes in International Space Law* p. 97 et seq.; and K.H. Boeckstiegel, *Progress Report on Research regarding the Settlement of Space Law Disputes*; see also H. Boeckstiegel, *Settlement of*

obligations of the Agreement are not fulfilled or a Partner State is interfering with the manned space flight of the requesting State.

If consultations have not brought a common and accepted settlement after three-months period, and issues have not been settled by other peaceful means, the dispute will be undertaken by an Arbitral Tribunal, to be appointed in the same manner as the Claims Commission provided for by the Liability Convention in Articles XV to XVII. However, if the decision of the Tribunal will not only be final, it will bind the States Parties concerned to carry it out promptly.

Failing any specific agreement, States Parties would keep adding pending decisions on issues arising under the Agreement.

- Article X decides which Agreement is applicable to the international intergovernmental organizations following a declaration of acceptance by the related organizations. This provision follows the example of the comparable Article XXII of the Liability Convention.
- Article XI, entitled Concluding Provisions and expected to deal with issues like signature, ratification, entry into force, etc., will be elaborated at a later stage.

A crucial topic that the above Draft Convention does not approach on Manned Space Flight, is the definition/delimitation one. This may happen because of the conflicting behaviour that different countries have on the issue. Moreover, the issue is extremely general and is linked to space flight by manned as well as unmanned spacecraft. In addition to this, the spaceplanes (to be discussed in the following section) have created more problems. Therefore, as the international agreement on the delimitation/definition issue appears quite difficult to happen, it should be more suitable finding a solution through an international agreement concerning an authorized passage through airspace for space objects<sup>352</sup>, within tight and specific conditions. This could be considered as minimal international legal requirement for juridically-feasible space transportation<sup>353</sup>.

Considering that a proper international law does not exist, we can refer to bilateral or multilateral agreements between countries sharing space transportation flights and countries whose nationals and/or properties could be affected.

Nevertheless, a worldwide international legal system has to be seen as the main purpose, and can be reached only in case it carried out under condition of firm international cooperation.

Furthermore, a constant dialogue among space-venturing countries concerning the practical status of space transportation, its essence, performance and aims, will help the prevision of legal issues and implications in finding solutions for practical questions of which the above Convention on Manned Space Flight can be considered as an example. As long as regular space transportation is not only a chance but rather an necessary factor to make man's implication in space economically viable and as a result developing the commercialization of outer space in general, the consolidation of its legal basis against the background of evolutionary practice will require permanent focus at the United Nations Committee on the Peaceful Uses of Outer Space, and especially within the Legal Subcommittee.

In hindsight, the successful record of international space law conventions, created during the first decades of our space age, offers grounds for relying on this legislative procedure in order to secure an univocally accepted juridical system to support space transportation and its peaceful enhance.

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*Disputes on International Regimes Applicable to Space Activities*, paper presented to the 23<sup>rd</sup> Colloquium on the Law of Outer Space of the IISL, September 21-28, 1980, Tokyo, Japan.

<sup>352</sup> As an example: the right of innocent passage provided by the law of the sea.

<sup>353</sup> H.L. van Traa-Engelman, *International Legal Requirements as a Basis for Juridically Feasible Space Transportation*, in Proceedings of the 24<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, AIAA, 1982, pp. 140 et seq.



However, the practical characteristics of space transportation, such as the cooperation among nations in space transportation issues and the coordination of different space programmes in this environment, may be consigned either to an International Organization, to be purpose made created, or to a more general International Space Agency<sup>354</sup>.

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<sup>354</sup> Refer to L.H.Ph. Diederiks-Verschoor, *Some Observations on the International Civil Aviation Organization and an International Space Agency*, in the Proceedings of the 20<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, AIAA 1978.

## CHAPTER VI INTELLECTUAL PROPERTY RIGHTS AND OUTER SPACE ACTIVITIES

The creativity of the human mind throughout the centuries has driven mankind to discoveries of all sorts and has elevated him to new and exciting frontiers.

An example of this is the quest to travel in outer space. Only through clear cut motivation, hard work and intellect was this feat possible. This method of working toward achieving success in the space venture has potential opportunities for man.

Clearly from the perspective of how important the human potential is in the development process, it is imperative to encourage the individual with a purpose or motive to have them reach their full creative potential.

At the beginning of the quest for space, government companies were the only ones involved due to the fact that no other institutions would risk their reputation nor could afford funding for all the research activities involved. There were also no or little rights for the individual.

Things began to change when non government companies began to get involved. They soon realized that space functions were beginning to (and still are today) mix with everyday living on the earth.

The individual's creative importance is increasing and soon will be protected.

The World Intellectual Property Organization was founded to award creativity and stimulate innovation to the individual or individuals who contribute economic development in the interest of the people.

Laws in many countries have discussed about this on a national scale. The first patent law was established in Venice in 1474. National patent law regulation happened in 1628 with the English Statute of Monopolies, and all of Europe soon followed at the beginning of the 19th century right after France founded their patent law to protect its citizens in 1791. The United States declared its Patent Act in 1790. Almost all the countries in the world have a legal outline for intellectual property rights, which may differ from country to country. However there is a difference between industrial property rights and intellectual property rights.

Patent law clearly belongs to industrial property regulation and copyright pertains to intellectual property.

In the meantime, other forms of both intellectual and industrial property rights have come forth, dealing with of course and to all respect each nation and their individual laws.

Also known as neighboring rights in the intellectual property field, the author or original copyright owner should also be mentioned.

As a result of the many different systems that exist, the question arises when it comes to international aspects which might be the case when it involves the procedure of space activities now and in the future.

The past clearly shows us with all the international travel and trade that occurred, there was a need to create a legal system to handle intellectual and industrial property rights protection on an international scale.

Alongside national rules the following international laws were instated concerning intellectual property rights:

- The Berne Convention for the Protection of Literary and Artistic Works 1886<sup>355</sup>

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<sup>355</sup> See *Guide to the Berne Convention for the protection of literary and artistic works*, Paris, 1971, Ed.WIPO.

- The Geneva Universal Copyright Convention<sup>356</sup>
- The Rome Convention for the Protection of Performers, and producers of Phonogram and Broadcasting Organizations 1961. Also known as the convention on neighboring rights;
- Convention for the Protection of Producers of Phonograms against Unauthorized Duplication of Their Phonograms, Geneva, 1971.

When it comes to industrial property rights, the following are also mentioned:

- The 1883 Paris Convention for the Protection of Industrial Property<sup>357</sup>
- The Patent Cooperation Treaty, Washington, 1979<sup>358</sup>

Furthermore, there are a number of European patent law conventions emulating the need for unity in Europe not only for protection but to increase economic strength.

International protection of intellectual and industrial property was created to handle entanglements on an international basis.

Nevertheless, with the generation of the space movement and with private companies becoming more and more interested, the question arises if it is necessary to have more measures taken to ensure protection on an international basis regarding both property rights when it come to space achievements.

Since it is a very complex subject, only a few issues will be mentioned.

## **1. TELECOMMUNICATIONS IN SPACE AND COPYRIGHTS**

One of the biggest problems since the 1960's that have faced the space program in the realm of intellectual property rights is applying satellite communication technology.

As technology has improved throughout the years concerning satellites the question remains if there is adequate protection in space transmissions.

Therefore, the international community has already established a number of problems which must be dealt with and resolved on an international basis.

Protecting work that is copyrighted and sent by satellite from an unauthorized signal or use of one, has been stressed by many international experts.

The World International Property Organization (WIPO), its predecessor, The United International Bureau for Protection of Intellectual Property (BIRPI), and UNESCO have all been handling this issue for quite some time.

Classifying ownership rights which could be affected by satellite transmissions took place in a working group of BIRPI in 1968.

Artists and authors, program producers, broadcasting companies, news agencies and sports events organizers were all recorded as interested parties.

Many measures were taken to protect copyright and neighboring rights from violations of satellite transmissions, some through national laws, and others by international conventions.

### **1.1. Convention Relating to the Distribution of Program-Carrying Signals Transmitted by Satellite**

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<sup>356</sup> The Universal Copyright Convention was adopted at Geneva in 1952. As of 31 October 2006, accession by Albania brings to 99 the total number of States that have deposited an International Instrument of ratification, acceptance or, accession, to the Universal Copyright Convention.

<sup>357</sup> Adopted on March 20, 1883, as revised at Brussels on December 14, 1900, at Washington on June 2, 1911, at The Hague on November 6, 1925, at London on June 2, 1934, at Lisbon on October 31, 1958, and at Stockholm on July 14, 1967, and as amended on September 28, 1979.

<sup>358</sup> The Patent Cooperation Treaty, Done at Washington on June 19, 1970, amended on September 28, 1979, modified on February 3, 1984, and October 3, 2001 (as in force from April 1, 2002) <http://www.wipo.int/pct/en/texts/articles/atoc.htm>.

The end result of the discussion can be found in the Convention Relating to the Distribution of Program Carrying Signals Transmitted by Satellite<sup>359</sup>. Also known as the Brussels Satellite Convention of 1974, this convention is the only one in existence that has an international agreement and deals directly with intellectual property rights regarding satellite telecommunications.

To understand clearly how it is related it is important to elaborate on its history.

As was clearly stated above, it is clear that satellite telecommunications was bound to have all sorts of complex problems and it was therefore necessary to ensure protection for a variety of categories of owners of intellectual property.

Since the geographical area is so great and broadcasting throughout the region needed authorization, it required international cooperation to make sure that protective measures were taken for the variety of categories of owners of intellectual property.

The idea originally was meant to balance the interests of these interested parties; however this goal was not met.

Instead of expanding the idea of the copyright and neighboring rights convention to satellite transmission, which would have meant in the expansion of the international private law regulation, the draft of the convention instead moved to international public law, and focused on the protection of the interests of broadcasting organizations by way of national protection measures.

Article 2(1) of the Brussels Satellite Convention clearly states the main aim of the regulation:

‘Each Contracting State undertakes to take adequate measures to prevent the distribution on, or from its territory, of any program-carrying signal by any distributor for whom the signal emitted to or passing through the satellite, is not intended.’

According to the Article, the law deals with the protection of the rights. It should be emphasized that preventive measures are mandatory against unauthorized broadcasting and is specifically left to the discretion of the intended state to decide what measures are to be taken.

Moreover, one should take into account that the protection is the signal, since it is the means of transmitting programs. Contrary the programs themselves, i.e. the message being broadcast by the signals are not covered in the Article.

Further research of the Brussels Satellite Convention demonstrates important restrictions that have excluded specific fields from its scope of application.

The conditions under Article 2(3) wants to maintain re-broadcasting apart from its scope of application when at least one authorized transmission to a terrestrial channel on up the chain has happened. Nonetheless, the Rome Convention on neighboring rights will be applied to cases of terrestrial broadcasting.

A more serious exemption is expressed in Article 3 of the Brussels Satellite Convention and appears in the field of direct broadcasting satellites.<sup>360</sup>

During the early work of this Convention the legal matters involved with broadcasting directly and the many facets and difficulties that came with it, made it almost impossible to adopt a direct approach.

Furthermore, simple applications were not immediate since at the time, satellite

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<sup>359</sup> Entered into in Brussels on May 21, 1974, entered into force August 25, 1979; for comments see Szilagi I., *International Copyright Questions of Indirect Broadcasting Satellites*, p.125 et seq, in Proceedings of the 22<sup>nd</sup> Colloquium on the Law of Outer Space of the IISL, AIAA, 1980.

<sup>360</sup> Article 3 of the Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite, done at Brussels on May 21, 1974 states that the Convention shall not apply where the signals emitted by or on behalf of the originating organization are intended for direct reception from the satellite by the general public.

technology for broadcasting directly was in its early phase. However, in 1979 Mora<sup>361</sup> delivered his paper in Munich at the ISSL Colloquium in which he emphasized his worry with DBS operations linked with owner rights from the author's view and the severity of the legal gap.

### 1.2. Broadcasting Directly via Satellite

Clearly the legal interests of the rightful owner, the author are very much at risk when a direct transmission occurs without the need of a terrestrial station, due to the fact that the public is so vast and the uncontrollability of the broadcaster.

Diederiks-Verschoor<sup>362</sup> best described the legal interests with this question: 'Who can be made responsible for the payment of royalties in an effective manner?'

To furnish an answer to this question and draw up a conclusion, one needs to look at the existing international law.

The wording of Article 11 *bis* of the Berne Convention<sup>363</sup> combined with having to do with the definition of the diffusion of Radio according to Section 20 of Article 1 of the Regulations of Radio added to the International Convention of Telecommunications, seem to protect in regards to the author in case of the practice of broadcasting directly, the need to protect it with the help of an international alliance. Especially the method of permitting copyright material when used in other countries, a new and innovative method such as broadcasting by satellite directly, and the consequential responsibility of allotment and royalties bestowed to the original owner of the copyright, must be talked about vastly and still needs to be researched, since it is a very difficult matter.

An example would be the idea set forth by Mora<sup>364</sup> which was to start an intelligent body which imposed taxes on authors for broadcasts or transmissions via televisions from space, very similar to another institution created for small performing rights.

Some suggestions by the same author regarding the matter deal with the possibility of the standard consensus between companies who have the interest of the owners of the copyright or television broadcasting companies to pay fees in addition, when broadcasting directly by satellite occurs.

A resolution which has already served national purposes for cable television was the mandatory license obtainable against a statutory fee.

### 1.3. Broadcasting Indirectly via Satellite

Regarding broadcasting indirectly via satellite, the majority of opinion disclaims that the

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<sup>361</sup> I. Mora, *The Future of Direct Transmission Via Satellite from the Aspect of the Author*, p. 57, in the Proceedings of the 22<sup>nd</sup> Colloquium on the Law of Outer Space, Munich, AIAA, 1980.

<sup>362</sup> Reference is hereby made to I.H.Ph. Diederiks-Verschoor, *Responsibility for Space Activities*, p. 120 et seq., in Proceedings of the 26<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, Budapest, AIAA, 1984.

<sup>363</sup> Art. 11 bis of the Berne Convention reads:

(1) Authors of literary and artistic works shall enjoy the exclusive right of authorizing: (i) the broadcasting of their works or the communication thereof to the public by any other means of wireless diffusion of signs, sounds or images; (ii) any communication to the public by wire or by rebroadcasting of the broadcast of the work, when this communication is made by an organization other than the original one; (iii) the public communication by loudspeaker or any other analogous instrument transmitting, by signs, sounds or images, the broadcast of the work.

(2) It shall be a matter for legislation in the countries of the Union to determine the conditions under which the rights mentioned in the preceding paragraph may be exercised, but these conditions shall apply only in the countries where they have been prescribed. They shall not in any circumstances be prejudicial to the moral rights of the author, nor to his right to obtain equitable remuneration which, in the absence of agreement, shall be fixed by competent authority.

(3) In the absence of any contrary stipulation, permission granted in accordance with paragraph (1) of this Article shall not imply permission to record, by means of instruments recording sounds or images, the work broadcast. It shall, however, be a matter for legislation in the countries of the Union to determine the regulations for ephemeral recordings made by a broadcasting organization by means of its own facilities and used for its own broadcasts. The preservation of these recordings in official archives may, on the ground of their exceptional documentary character, be authorized by such legislation.

<sup>364</sup> *Supra* note 361.

quality of the broadcast transmission of program-carrying signals through Fixed Satellite Services (FSS) on the basis the broadcasting only starts at the receiving end of the transmission by FSS, and results in no copyright liability of the originating organization arising<sup>365</sup>

Article 11 and 11 anew of the Berne Convention reinforces this view furnishing authors with the sole right to permit telecommunication of their work to the public.

Nonetheless the same condition may result in liability on behalf of the cable distributors of FSS transmitted signals in the direction of the author, a possibility challenged by cable distributors. When there is no agreement on this issue between the parties that are interested, no coherence can be found on an international basis due to the foremost of national treatment written in Article 5 of the Berne Convention claiming the obligations and rights of authors and the users of their product might differ according to the nation in which the broadcasted signals are being received. Based on the question of the distribution by cable of satellite-transmitted program-carrying signals, Pichler<sup>366</sup> shows an assortment of views, when estimating the position of different European states.

This is from the results of the studies researched by the Committee of Legal Experts of The Council of Europe, which has a large position in the middle, and I would like to emphasize the quote: ‘some countries take the view that distribution of a broadcast by cable within the area in which the broadcast is intended to be receivable<sup>367</sup> does not mean a divided or new message to the public, and thus should be allowed to occur without the permission of rights. According to this opinion, owner rights are paid with respect to the cable audience inside this zone when rights are permitted for the broadcast itself.<sup>368</sup>

On the contrary, where the stressed is placed is on the restrictions of rights of cable distribution in favor of the sole right of the author to permit ‘any message to the public by transmission or rebroadcast of the broadcast of the product, when this message is done by a company that is different than the original one’ stipulated in Article 11 anew (ii) of the Berne Convention.

#### **1.4. Applying of Mandatory Licensing to DBS**

Besides the differences of views on copyrights regarding cable distribution of broadcasting by satellite directly, more problems come up for the author rights of broadcasting directly by satellite as a whole due to applying the principle of national treatment.

Article 11 anew of the Berne Convention, which demonstrates the sole right of the author in part (1) that the provisions for such rights are to be intended by the individual nations of the Union, is stipulated in part (2) however that these provisions will only pertain to the nations where they have been specified.

Relating the conditions of this Article, this introduces the mandatory licensing with ease, for broadcasting by satellite directly; its strength will be greatly thwarted by the restrictions of its outcome to the country and its territory that allowed such a license, having third state territories that are reached by the transmissions farther than its goal of use.

#### **1.5. The European Setting**

When it comes to the exact interest that Europe has regarding copyright questions that were presented by the creation of television by satellite mixed with its labors in regards to regional regulation requires that special attention needs to be paid on the continuous developments in the region.

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<sup>365</sup> Refer to M.-H. Pichler, *Copyright Problems of Satellite and Cable Television in Europe*, p. 30 et seq., Graham & Trotman Nijhoff Ed. 1987.

<sup>366</sup> *Ibidem*, p. 65 and p. 31.

<sup>367</sup> *Ibidem*.

<sup>368</sup> This is commonly referred to as ‘Service Area Theory’.

The Council of the European Committee of Ministers took up a Recommendation on Principles dealing with copyright questions in the field of television by satellite and cable<sup>369</sup> in 1986.

Principle 5 advises that cable distribution of DBS broadcasting is handled as:

- (a) allocation by cable of a broadcast, if it is real-time, complete and not changed; (Article 11 anew (1)(ii) Berne Convention);
- (b) a cable-originated program, if any of those criteria are not met<sup>370</sup>.

The CEC (Commission of the European Communities) printed 'Television without Frontiers, a Green Paper on the Establishment of the Common Market for Broadcasting, especially by Satellite and Cable'<sup>371</sup>, wherein the copyright part was highlighted, especially since it regards cable television.

According to the view of the Commission cross border broadcasting may block the application of such rights since copyright is ruled by domestic law.

Combining this with the labors of the Commission, bringing forth the law of broadcasting in a suitable structure built to ease a Single European Market forced them to unify the rules wherein would ease the swap of cross border broadcasts.

The Commission was obviously in favor of a judicial system of mandatory license, by doing so reduced the sole right of the author to a mere right of adequate remuneration<sup>372</sup>, in relation to applying copyright in regards to the allocation by cable of foreign programs.

Consequently, the projected Decree would force Member States to adjust their legislation in this reverence. Moreover, unity would consist of setting up the level of such remuneration founded on certain elements including the introduction of a system of enforcement through collecting societies<sup>373</sup>.

Taking into consideration that 'copyright proprietors and their marketing companies have not demonstrated any real interest in concluding consensus with Member States in which cable broadcasting has not been created for the interest of an economical factor', it suggested that the Decree of the Commission should consist of particular measures to provoke the negotiation of such agreements<sup>374</sup>.

The last suggestion of the Commission parallels with the following solution.

It assures that under Article 18, all television shows can be transmitted crossing the borders of the Community forcing Member States to present a judicial system for licensing. A mandatory license however should be used only if there is no agreement and following a period of two years because warning a Member State by a cable distributor of an additional Member State protesting that the real-time, untouched and integral via cable of a transmission is being hindered by the engagement of a copyright or similar right.

However the resolution suggested by the European Commission has been out rightly but not surprisingly, refused by involved parties for example as authors, movie producers, performers, record producers, trade unions of audio-visual workers and broadcasters, all who are in favor of a contract licensing system<sup>375</sup>, the case of Belgium which seems to satisfy yet cable distributors<sup>376</sup>.

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<sup>369</sup> *Principles relating to copyright questions in the field of television by satellite and cable*, Recommendation No. R (86) 2 adopted by the Committee of Ministers of the Council of Europe on 14 February, 1986 and explanatory memorandum, at: [https://www.ebu.ch/CMSImages/en/leg\\_ref\\_coe\\_r86\\_2\\_copyright\\_satellite\\_cable\\_140286\\_tcm6-4262.pdf](https://www.ebu.ch/CMSImages/en/leg_ref_coe_r86_2_copyright_satellite_cable_140286_tcm6-4262.pdf).

<sup>370</sup> *Ibidem*, principles 5 and 6, and the relevant explanatory notes.

<sup>371</sup> *Television without Frontiers. Green Paper on the Establishment of the Common Market for Broadcasting, especially by Satellite and Cable*. COM (84) 300 final/Part 2, 14 June 1984, at <http://aei.pitt.edu/1151/>.

<sup>372</sup> *Ibidem*.

<sup>373</sup> *Ibidem*.

<sup>374</sup> See Menter *infra* note 379, p. 113.

<sup>375</sup> *Ibidem*, pp. 136 and 156.

<sup>376</sup> *Ibidem*, pp. 143-145.

## 2. INVENTION RIGHTS AND COMMERCIALIZATION OF SPACE MOVEMENT

An additional point of commercializing space movement and the rights of intellectual property rights can also be revealed in invention rights, as well as products and data.

The United States on a domestic level, especially due to US policy<sup>377</sup> has been very concerned with the ruling of commercializing space movement.

Even though at the start NASA'S policy<sup>378</sup> was in favor of commercializing technology created under NASA funding, more owner right protection is being promised for private companies who have a contract with NASA.

Many Joint Endeavour Agreements can also be seen as an example of this approach<sup>379</sup>.

The US space station, which has been and still is going to be built and used internationally, has raised some new questions in regards to the interests of owner right protection amid the many parties. Intellectual property points have been handled with different conditions of the IGA (International Government Agreement) regarding the Space Station.

Furnishing for a cross-waiver of legal responsibility, Article XVI stipulates in paragraph 3(d)(4) that the interests of intellectual property are not within reach of exercising the Agreement.

Intellectual property is dealt with exclusively in Article XXI. In the first paragraph it describes intellectual property referring to the wording applied in Article II of the Convention Establishing the World Intellectual Property Organization<sup>380</sup>. Paragraph 2 of Article XXI makes up territorial status over actions occurring on or in a space station aspect, since intellectual property rights are on a whole founded on territorial status and as a result their claim to situations in space may create tribulations.

Furthermore adding that for ESA registered essentials any European Partner State might believe the action to have happened within its territory. Thus combining the principle of jurisdiction and control of the state that registered dealing with the individual flight factor, the state concerned can use the territorial status concept while in regards to registered factors of ESA; the directive eases every individual domestic law on intellectual property.

Moreover, knowing that domestic laws on intellectual property are diverse from one state to the next and especially in regards to the founding of invention rights, which may be based either on filing or the invention itself<sup>381</sup>, Article XXI proposes an answer when applying for a patent in regards to inventions created by non nationals or non-residents by limiting the use of domestic laws regarding privacy of invention to avoid filing for a patent. Article 21 forbids the event of intellectual property protection in an additional European Partner State, throughout the terms of paragraph 4; breach of intellectual property which happens in or on an ESA registered factor for recuperation in an addition to one of those states for the exact rights. Consequently in paragraph 5 European Partner States are banned from neglecting the identification of an intellectual property license, if

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<sup>377</sup> See *Fact Sheet - National Space Policy*, The White House, National Science and Technology Council, Sep. 19, 1996 at <http://www.fas.org/spp/military/docops/national/nstc-8.htm>.

<sup>378</sup> Refer to B. Luxenberg, *Protecting Intellectual Property in Space*, p. 173, in Proceedings of the 27<sup>th</sup> Colloquium on the Law of Outer Space of the IISL, Lausanne, AIAA, 1985, and G. Mossinghoff, *Protecting Intellectual Property in Space Activities*, Paris, 1983. Section 305 of the 1958 NASA Act (<http://history.nasa.gov/spaceact.html>) set out the rules related to the Property Rights in Inventions.

<sup>379</sup> Refer to M. Menter, *Legal Aspects of Commercial Space Activities*, in Aviation Litigation and Space Law, Washington, 1983.

<sup>380</sup> Convention Establishing the World Intellectual Property Organization, adopted at Stockholm on July 14, 1967 and as amended on September 28, 1979, can be found at <http://www.wipo.int/clea/en/details.jsp?id=4046>.

<sup>381</sup> The United States Legislation (US Patent Act 35 USC 102(g)), at <http://www.bitlaw.com/source/35usc/102.html> provides that an invention is not made until it has been reduced to practice either by realizing the model, practicing the method or recordering an application for a patent in the US, describing the invention as well as the realizing method and the ways of using it.



the license is implemented under any European Partner State laws.

Falling in line with the requirements of the parallel license, will also in any European Partner State, bar recuperation for violation.

The short-term presence in the territory of a Partner State of any articles, as well as the machinery of a flight aspect, in route amid any place on the planet and any flight aspect of the registered space station by an additional Partner State or ESA will not outline any proceedings in regards to the first Partner State for patent violation. The condition articulated in paragraph 6, averts, for example the hauling of non US flight aspects by way of a US launching system might be cause for patent violation.

Going back to invention rights as founded and used by numerous domestic law systems, the sole countries in the entire planet to use a first-to invent system are the US, Canada, and the Philippines, the remaining part of the world uses the first-to-file system to demonstrate the first inventor ensuing the right to protection.

### **3. THE COMMERCIALIZATION OF DISTANT SENSING FROM SPACE**

Regarding intellectual property rights, a special category of space actions estimating far-reaching problems can be established in the use of distant sensing technology.

Current remote sensing actions in a commercial structure accepted by numerous countries demonstrate interest especially in the protection of intellectual property rights as a result of remote sensing activities.

In regards to thereto, a lot of new growth is going on in these countries, whereas equally a number of questions are asked not only on an international but also domestic level.

In order to offer motivation for further growth in that trend; primarily, commercialization itself needs a certain defense of commercial welfare and remote sensing actions are no exclusion to this regulation.

Alongside this backdrop, those countries that created a remote Tensing aptitude and that are private economic countries and unwavering to protect the rights of intellectual property linked with doing commerce in the division of satellite remote sensing is patently obvious.

The United States, in this bond, has demonstrated itself to be firm to propose business establishments a certain level of defense of their commerce interests through proprietary rights insurance, and is in the course of commercializing its remote sensing ability through a phased changeover to the private division, for example those linked with facts earned from the actions of remote sensing.

The US government did not maintain any sort of owner rights in the information produced; beforehand, only if the United States Administration through NASA itself was engaged in any remote satellite sensing process and broadcasting of the resulting facts. In contrast, the Landsat Act<sup>382</sup>, which eases the changeover of public land remote sensing system as well as the allocation of information to the private division, demonstrates clear-cut signs of a pledge to warrant certain owner rights to the service provider whom will promote the non-modified information of the remote sensing system of Landsat.

Even though the requirements of the Landsat Act offer an open fair-minded

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<sup>382</sup> The Land Remote- Sensing Commercialization Act of 17 July, 1984 can be found at: [http://www.ixaa.jp/library/space\\_law/chapter\\_3/3-1-2-3/index\\_e.html](http://www.ixaa.jp/library/space_law/chapter_3/3-1-2-3/index_e.html).

information procedure of unenhanced information<sup>383</sup>, its words disclose that remote sensing information customers will have to shell out a price basically laid down by the private marketing company<sup>384</sup> that has an agreement with the US Government.

The Landsat Act in addition offers that it will have the sole right to market the entire unenhanced information for the length of the selling contract with the Government, in regards to the private selling company's right, and not more than ten years from the date the information are sensed. Information goes into the public domain<sup>385</sup> following that duration.

The United States Government, due to the legal essence of such an elite right, have seem to currently change its opinions from a right parallel to a copyright, to a right being depicted as one parallel to a trade secret.

Only its shape of statement, would this method definitely resolve the difficulty linked with information copyright however only if the traditional form of copyright would not defend the information itself.

The difference drawn amid unenhanced information and enhanced information, linked with the words utilized in the Landsat Act asks the question if on the base of which the advertising company's right to market the past information on an elite base is founded.

The Landsat Act<sup>386</sup> describes unenhanced information as the following: 'unprocessed or minimally processed signals or film products collected from civil remote sensing space systems'.

Moreover, 'minimal processing' is described as well as: 'rectification of distortions, registration with respect to features of the Earth; and calibration of spectral response'.

Furthermore, it leaves out from the phrase 'minimal processing': 'conclusions, manipulations, or calculations derived from such signals or film products with other' data or information'.

The unenhanced information belonging to the private business company that has a contract with the Government and which will have to be dealt with in a diverse method, are to be differentiated from enhanced information that are the field of worth added to companies.

Currently, copyright defense rules would seem to pertain in general, however it is still doubtful as to what sort of defense these enhanced facts will receive.

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<sup>383</sup> *Ibidem*, at section 103(b): "It shall be the policy of the United States that civilian unenhanced remote-sensing data be made available to all potential users on a nondiscriminatory basis and in a manner consistent with applicable anti-trust laws".

<sup>384</sup> *Ibidem*, at section 202(a) par. 1: "In accordance with the requirements of this title, the Secretary, by means of a competitive process and to the extent provided in advance by appropriation Acts, shall contract with a United States private sector party (as defined by the Secretary) for the marketing of unenhanced data collected by the Landsat system. Any such contract- (1) shall provide that the contractor set the prices of unenhanced data;

(2) may provide for financial arrangements between the Secretary and the contractor including fees for operating the system, payments by the contractor as an initial fee or as a percentage of sales receipts, or other such considerations;

(3) shall provide that the contractor will offer to sell and deliver unenhanced data to all potential buyers on a nondiscriminatory basis;

(4) shall provide that the contractor pay to the U.S. Government the full purchase price of any unenhanced data that the contractor elects to utilize for purposes other than sale;

(5) shall be entered into by the Secretary only if the Secretary has determined that such contract is likely to result in net cost savings for the U.S. Government; and

(6) may be reawarded competitively after the practical demise of the space segment of the Landsat system, as determined by the Secretary."

<sup>385</sup> *Ibidem*, at section 204(a): After the date of the commencement of the contract described in section 202(a), the contractor shall be entitled to revenues from sales of copies of data from the Landsat system, subject to the conditions specified in sections 601 and 602.

<sup>386</sup> *Ibidem*, Section 104(4): the term "unenhanced data" means unprocessed or minimally processed signals or film products collected from civil remote sensing space systems. Such minimal processing may include rectification of distortions, registration with respect to features of the Earth, and calibration of spectral response. Such minimal processing does not include conclusions, manipulations, or calculations derived from such signals or film products or combination of the signals or film products with other data or information.

The above description of unenhanced information by remote sensing, the characteristic drawn between unenhanced information, on the one hand, and enhanced information, on the other, nonetheless appears to lack sufficient clarity to differentiate in carrying out amid the elite rights of the business company in unenhanced information and the rights belonging to the importance added to industry to enhanced information through intellectual procedures<sup>387</sup>.

A licensing system meanwhile is expected that in order for the value added to companies to advertise specific enhanced information, as perceived by the marketing company of unenhanced information, will most likely be worked out to defend the interests of all parties, within the limits of accessible US legislation on defending proprietary rights.

New lawmaking activity in this field is likely to start, as will be the case in any other branch of up-and-coming technology, if existing laws should show to be insufficient to defend the numerous forms of intellectual property on behalf of all interested parties. The French government and its procedure on the defense of the rights of intellectual property linked with remote sensing ability in France, the Spot system, the subsequent noteworthy traits should be made a note of.

What motivated the French Government to create a rule that links an owner right defense system with a suitable salts/allotment company was function and growth of the Spot system by the French space agency, CNES<sup>388</sup>, linked with an information allocation system directed by a private company, Spot Images<sup>389</sup>.

Theoretically, CNES holds the rights of the author, and the fees of the copyright of the base information and received goods are relocated to CNES by means of a whole company made of representatives and wholesalers in numerous nations.

Labor is done by the wholesaler, and the copyright is divided by both the wholesaler and CNES, in reference of received goods. Furthermore, with the purpose of motivating the wholesaler to market the most information of similar kind as feasible, a system of cost demarcation in copyright allocated to CNES has been put into practice, which is the wholesaler approves of.

The example of the Spot system, the recognized notion of copyright is being sustained for remote sensing information. The result, if pertaining to the copyright concept for the defense of remote sensing information in the shape of a consequent good, can be contrasted to the method used for translating publications, and when copyright is also divided amid the publisher of the labor in the original tongue and the publisher of the translated work.

It is obvious, that international connotations, fueled by business expansion in remote sensing, are anticipated to increase issues on intellectual property, even though the above mentioned illustrations exemplify a variety of domestic approaches to defending intellectual property rights in the satellite remote sensing activities field.

When international issues have to be assessed, the following observations will explain clearly that domestic rules will remain dominant.

International law for space does not offer the defense of private rights and still less especially for the defense of the rights of intellectual property, primarily.

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<sup>387</sup> See G. T. Mossinghoff, *Intellectual Property and Space Activities*, Journal of Space Law, Vol. XIII, 1985, pp. 8 et seq.

<sup>388</sup> The *Centre National d'Etudes Spatiales* (CNES), founded in 1961 is the government agency responsible for shaping and implementing France's space policy in Europe.

<sup>389</sup> Spot Image is a corporation whose shareholders are the major shareholders of Spot Image are: (i) the EADS group including Astrium (ii) Swedish Space Corporation (SSC) (iii) the Alcatel group, (iv) the Institut Géographique National (IGN) and (v) the France's Survey and Mapping Agency, and (vi) the Belgium State.

Nevertheless, when searching for an indication between intellectual property rights and the international law for space, inter alia, pertaining to remote sensing actions of satellites, by high merit of Article VIII of the Outer Space Treaty, space law does offer some links with aspects concerning private law, for example intellectual property rights, in view of the fact that it provides the withholding of authority and power by the Registered State over its space personnel and items in outer space. Therefore, the likelihood to lengthen the domestic law to space actions executed in outer space is offered to such a State.

Relating to space actions, it will depend only on the feat of the one state whether it will take action to defend the intellectual property interests of its nationals and others.

Since the private law systems, as well as private international law, of the diverse countries are far from equal, it can create various problems.

While the proprietors of the rights are also positioned on the earth, being citizens of numerous states, a lot of inquiries will be asked due to the fact that remote sensing is projected towards the earth, when applying this concept of remote sensing actions.

As depicted above, to show the complicity of the troubles one may bring up an inquiry currently asked in the international relations field as to the use of domestic law regarding intellectual proprietary defense in the satellite remote sensing activities field. The system operative is forced to apply for an working license to be given by t14' Department of Commerce since U.S. action to warrant by means of its Landsat Act both an unbiased rule as well as the rule of the owner rights of the system operative.

A question that has remained unsolved is that of the Spot system, which was under the conditions of the stipulations of the Landsat Act, also used a US-based information allocation company. Nonetheless, in this case the US could not claim its dominion and make the Spot system reliant on the terms of the US Landsat Act since the truth is that the Spot system was launched by the Ariane launcher from French Guiana clearly outside US territory and did not utilize the US space shuttle or any other U.S. launching system.

In the eminent future, additional international repercussions will certainly come up and will insist on solid international collaboration, regarding space actions which are more straightforwardly linked with the ruling of the defense of intellectual property.

#### **4. COLLABORATING INTERNATIONALLY**

If issues in the defense of the intellectual property field are to be avoided, international collaboration will be tremendously imperative especially in the standpoint of international space actions.

When ideas must be found to equal out the numerous interests, the knowledge of INTELSAT, INMARSAT, EUTELSAT and ESA<sup>390</sup> will outline a base to be highly structured upon.

It might be wise to modify our technique in the way of establishing consistency amid domestic law systems in view of the fact that earlier attempts to invent legal tools for the defense of intellectual property rights belonging to individuals on an international basis have had little success.

New fields of space activity, and consequently still being in the course of becoming under domestic ruling, the zones of broadcasting directly and remote sensing, should be primarily eligible for such a method. Prior to numerous domestic legal rulings on intellectual property issues have been established, action is called for at once, which may if not result in overwhelming problems searching to obtain agreement on an international

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<sup>390</sup> See G. van Reeth, R. Oosterlinck, *Exploitation of Data and Product, Experience of the European Space Agency*, Proceedings of the The 23rd AMSAT-UK International Space Colloquium.

basis.

It could be opportune that the WIPO, reserve a vital role for which, may act as a harmonizing and stimulating body while symbolizing the opinions and views of the world community and if at all possible be sustained by the International Academy of Comparative Law.

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## CHAPTER VII COMMERCIALIZATION OF OUTER SPACE AND INSURANCES

### 1. PERSPECTIVES

The commercial implications and the topic “insurance” linked to space activities itself justify a deep and exhaustive discussion of the matter.

Nowadays insurance arrangements are also employed to cover financial risks and responsibilities involved in space endeavor, under current budgetary restrictions and in view of economic recession: no government is in the condition to take up financial risks and legal responsibilities, which derive from space activities<sup>391</sup>.

Omitting the aspect related to the wide risks of space endeavor, space insurance has become a basic issue, in consideration of the recent tendency of commercialization in the space sector. The commercialization of space endeavor is actually wide influenced by space insurance. The evolution of space insurance market also defines the trends and the characteristics of civil interests in the peaceful employment of outer space.

A new section in the insurance market was born in order to face the wide range of risks provided by space activities, just like other issues and activities in contemporary world. Insurance has actually become the extreme solution to the high-risk character of space activities.

We see proof of this particular situation in the purchase of insurance solutions by international organizations involved in space communication activities, in order to escape loss of revenue<sup>392</sup>.

An inclination to resort insurance solutions in order to face and minimize risk factors can be also noticed in private industry, which is getting more and more involved in direct space participation.

The terms registered in the insurance policy are even the facts, which the underwriters infer the real financial liability from.

There is no doubt about the importance of the role of the present aviation insurers, who have distinctly interests in expanding their markets.

The broker, the underwriter and the client are the main participants in space insurance.

The first one, the broker, is in charge of ‘placing’ the contract, dealing and negotiating with the underwriters and the party asking for insurance.

International consortia, several governments and American telecommunication firms have been the main space insurance clients, in consideration of their involvement in the sector of telecommunication satellites. The sector of remote sensing and materials processing in outer space will also seek insurance cover, like many other fields.

Writing about space insurance obliges to illustrate the differences among the various policies. There is, without any doubt, a wide gamut of possibilities and for each one there is a corresponding insurance cover, in order to satisfy every exigency of satellite telecommunication firms. The policies conform to the specific payload, its particular characteristics, its transportation and the risk to be covered.

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<sup>391</sup> To have an overview of the ESA insurance policy refer to A.L. Moore, *A Guide to the Commerce and Law of Outer Space*, Praeger Publishers, 1985 and to H. Schimrock, *Current Difficulties of Buying Insurance for Space Ventures*, ESA Bulletin 43, August 1985, p. 64 et seq. (at <http://www.esa.int/esapub/pi/bulletinPI.htm>).

<sup>392</sup> Reference is hereby made, with reference to european scenario, to P.B., Larsen, *Future Protocol on Security Interests in Space Assets*, in *Journal of Air Law and Commerce*, 2002 and to K.J. Madders, *Space Insurance: European Perspectives*, *Journal of Space Law*, Vol. XIX, 1991, pp. 171 et seq.

## 2. PROPERTY INSURANCE

Pre-launch insurance, launch failure and initial operation insurance and satellite life insurance are very important categories to be considered, if the payload will be launched<sup>393</sup>.

The pre-launch insurance carries very low rates in the order of 0.01-0.05 cents per \$100,000 of satellite value: it involves even the slightest risk and it is designed in order to cover the payload before it is launched.

The client could decide to include covers related to the risk of delay in delivery as well as potential damage associated with the manufacture of the satellite - insurance is indeed often included in the price of the construction contract with the satellite manufacturer - , apart from the possible risks deriving from the transportation of the satellite to the launching site.

Covering the risk of delay is not combinable with cover for damage occurring on the ground and the risk is only difficult to insure: any delay in delivery may even be a reason for immediate cancellation of the launch cover. A delay actually provokes a reorganisation with the possibility of accumulation of risks in the case that the new launch would be a multiple one.

The second category, the launch insurance, is the most expensive of the three types. It generally extends for 180 days beyond the launch date and it is designed to cover the risk of placing the satellite in a wrong orbit. This kind of insurance may be obtained to cover the replacement value of the lost satellite, the costs associated with the launch of a substitute satellite and the lost revenues due to launch failure.

Before three major losses had to be covered in 1984, rates were about 10% for Ariane, 5% for the Space Shuttle and 5-7.5% for the Delta and Atlas Centaur launchings<sup>394</sup>.

The satellite life insurance covers the shortening of the operational life of satellites caused by a loss of fuel, power or transponder: it compensates the client for loss of earnings associated with the replacement cost of a satellite or a malfunctioning satellite.

This type of insurance typically extends for three years.

The premium rate of an "in orbit" insurance is about 1-2% of the insured value per year.<sup>395</sup>

All these different policies can be separated or combined to cover insured in total. To separate them, in order to avoid gaps in the insurance cover, it is preferable to use the same terminology in those parts of the policy describing the ending of one stage and the beginning of the next.

This kind of insurance may also be chosen to cover damage to a property which is very important for the insured's business.

Another category of space insurance cover is represented by financial loss insurance from events which do not necessarily involve injury to persons or physical loss or damage to property. It is generally used by small companies, which want to minimize risks, and is

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<sup>393</sup> See *inter alia* L. Plochinger, *Insurance of Space Risks*, ESA Bulletin 2/88, 53 and S. Tucker, *Communications Satellites and Insurance*, ABC Newsletter of Products Liability, Vol. VII, 1984.

<sup>394</sup> See the proceedings of the 14th International Space Insurance Conference - *Space Activities and Relevant Insurance Implications*, held on Milan, 2007, where Mr Paganelli (Paganelli Risk Solution Ltd.) pointed out that: "...the space insurance market, in its current feature, remains fragile and extremely volatile, which means that it is not self founding yet. It needs to find new ways to create continuity of its business. In January of this year, a total loss occurred. The NSS-8 satellite failure will cost some US\$ 250M to space insurers and, in addition to that, the damages suffered by the launch pad will probably indefinitely post-pone 5-6 insured launches. Against this loss scenario, the expected total premium for the year is estimated to be in the region of US\$ 500-550M. A second loss would be disastrous and the profits of 2004 to 2006 might be at risk of erosion. Here is the need to extend the basis of space insurance. The next debates will probably suggest how, for example, the increasing phenomenon of self-insurance can be faced and reduced: although the tendency of the launch numbers is on the increase, the number of insured satellites stagnates since long at an average of 20 per year. In-orbit risk covers show a similar trend. In this context, what is the impact of the industry consolidation on the insurance demands? This and many other questions are expected to be debated."

<sup>395</sup> See V. Kayser, *Launching Space Objects: Issues of Liability and Future Prospects*, Kluwer Academic Publisher, 2001.

a category often sought in the provision of financing<sup>396</sup>.

### 3. LIABILITY INSURANCE

The provisions of international law play an important role in this category: according to Article VII of the Outer Space Treaty and the elaborated provisions of the Liability Convention, all States Parties to these international agreements assume liability for damage<sup>397</sup> caused by a space object in relation to which such State is a launching State. However, these States have to be indemnified by the organizations responsible for the space object causing the damage and third-party liability cover is taken up by the persons or the organizations owning or using the space objects involved.

Observing a basic principle of international law, which regards the regulation between a State and its nationals as a prerogative of the State itself, in the occurrence of damage inflicted to nationals of the launching State, the provisions above mentioned exempt launching States from the operation of the Liability Convention.

### 4. THE NASA

The United States introduced in 1979 an important new component to space transportation system (STS) operations: they add the 308<sup>th</sup> section<sup>398</sup> to the NASA Act, entitled Insurance and Indemnification, which authorizes NASA to provide liability insurance for any user of a spacecraft in order to indemnify such user for third-party liability claims “but only to the extent that such claims are not compensated by the liability insurance of the user”; provided “such indemnification may be limited to claims resulting from other than the actual negligence or willful misconduct of the user”. Each user seems to have the possibility to gain the maximum amount of insurance available<sup>399</sup>.

The mentioned practice will be equivalent to the imposition of coercive third-party liability insurance by any user of a spacecraft.

This condition leaves it to the sole discretion of NASA to determine the extent of indemnification. It should be noted that NASA has a flexible and various system to face different circumstances.

According to the regulations, the so-called “Getaway Specials”, small self-contained

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<sup>396</sup> *Ibidem*.

<sup>397</sup> According to article I of the Liability Convention: “For the purposes of this Convention: (a) The term “damage” means loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organisations”.

<sup>398</sup> Section 308, entitled INSURANCE AND INDEMNIFICATION reads: “(a) The Administration is authorized on such terms and to the extent it may deem appropriate to provide liability insurance for any user of a space vehicle to compensate all or a portion of claims by third parties for death, bodily injury, or loss of or damage to property resulting from activities carried on in connection with the launch, operations or recovery of the space vehicle. Appropriations available to the Administration may be used to acquire such insurance, but such appropriations shall be reimbursed to the maximum extent practicable by the users under reimbursement policies established pursuant to section 203(c) of this Act (42 USC §2473(c)). (b) Under such regulations in conformity with this section as the Administrator shall prescribe taking into account the availability, cost and terms of liability insurance, any agreement between the Administration and a user of a space vehicle may provide that the United States will indemnify the user against claims (including reasonable expenses of litigation or settlement) by third parties for death, bodily injury, or loss of or damage to property resulting from activities carried on in connection with the launch, operations or recovery of the space vehicle, but only to the extent that such claims are not compensated by liability insurance of the user: Provided, That such indemnification may be limited to claims resulting from other than the actual negligence or willful misconduct of the user. (c) An agreement made under subsection (b) that provides indemnification must also provide for- (1) notice to the United States of any claim or suit against the user for the death, bodily injury, or loss of or damage to the property; and (2) control of or assistance in the defense by the United States, at its election, of that suit or claim. (d) No payment may be made under subsection (b) unless the Administrator or his designee certifies that the amount is just and reasonable. (e) Upon the approval by the Administrator, payments under subsection (b) may be made, at the Administrator's election, either from funds available for research and development not otherwise obligated or from funds appropriated for such payments. (f) As used in this section- (1) the term “space vehicle” means an object intended for launch, launched or assembled in outer space, including the Space Shuttle and other components of a space transportation system, together with related equipment, devices, components and parts;

(2) the term “user” includes anyone who enters into an agreement with the Administration for use of all or a portion of a space vehicle, who owns or provides property to be flown on a space vehicle, or who employs a person to be flown on a space vehicle; and (3) the term “third party” means any person who may institute a claim against a user for death, bodily injury or loss of or damage to property.”

<sup>399</sup> See J.L. Magdelenat, “Space Craft Insurance”, *Annals of Air and Space Law*, Volume VII, 1982, p. 363 et seq.



payloads, are exempted from the above practice.

The terminology employed in the Act does not exclude the protection of the US Government from liability.

A specific paragraph is devoted to the definition of such parties as user, space vehicle and third part.

The term “user” is defined as: “any-one who enters into an agreement with the Administration for use of all or a portion of a space vehicle, who owns or provides property to be flown on a space vehicle”.

The description of “space vehicle” reads: “an object intended for launch, launched or assembled in outer space, including the Space Shuttle and other components of a space transportation system, together with related equipment, devices, components and parts”.

This definition is so wide that it covers space structures assembled in outer space - a practice to be expected in the near future -, space shuttle as well as all launch vehicles and it also includes unsuccessful launches.

The last one, the term “third party”, is laid down as: “any person who may institute a claim against a user for death, bodily injury or loss of or damage to property” (this definition let assume that it does not necessarily include parties negotiating with NASA).

## **5. COMMERCIAL SATELLITES**

In 1983 NASA and the International Technology Underwriters Inc. (currently AXA Space Inc.)<sup>400</sup> signed a Memorandum of Understanding because Space Shuttle launches of multiple payloads would require at least US \$1 billion in insurance cover: leaving the launch vehicle involved aside, a payload launched in the US actually requires third-party liability insurance amounting to \$500 million<sup>401</sup>. For each shuttle launch INTEC assures a third-party liability facility and it covers US \$750 million for each mission.

The premium of the policy would be about US \$100-150,000 for a communication satellite firm, which occupies one quarter to one third of the payload bay of the space shuttle.

In the policy could be included all of the commercial participants in the mission and it let NASA, the US government and payload owners to be covered for third-party liability.

## **6. THE COMMERCIAL SPACE LAUNCH ACT**

The Commercial Space Launch Act<sup>402</sup> was established in 1984, as a result of the expansion of the commercial expendable launch vehicle (ELV) industry: it is a regulation, designed to encourage the respect of launch services by the private sector and in particular to ensure compliance with its international obligations. The Commercial Space Launch act was further amended in 2004 by the Commercial Space Launch Amendment Act of 2004, aimed to establish the Federal Aviation Administration's Office of Commercial Space Transportation, in charge of the supervision on the space launchers, whether designed for suborbital or orbital altitudes. The Amendment also introduced a definition of suborbital launch vehicle (“a craft that requires thrust as opposed to lift during powered phases of flight”). If a vehicle needs thrust to operate, no matter what it looks like, it is considered a spacecraft and falls under the less-stringent regulations of FAA's commercial space office, which is authorized to regulate the industry, not certify

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<sup>400</sup> An acronym for International Technology Underwriters, until 1981 INTEC and currently AXA Space Inc.; AXA Space is an underwriting manager for space and telecommunications insurance. The company, which provides property and business interruption coverages for launchers and satellites, was founded on the premise that space insurance could only be underwritten profitably by using technical and engineering information to discriminate against unacceptable risks. AXA Space was the first company to be devoted exclusively to technical space underwriting.

<sup>401</sup> *Ibidem*, page 4.

<sup>402</sup> The Commercial Space Launch Act, Publ. Law 98-575, 98th Congress, October 1984 (HR3942)49 United States Code 2601-23 (Supp. 1984).

vehicles as space-worthy or air-worthy<sup>403</sup>.

This Act applied coercive insurance to cover third-party liability based on the provisions of the international Liability Convention on the part of the liable State. In addition to this, if it was the case the US would be held liable under municipal law together with private commercial activities<sup>404</sup>, the cover would protect them.

In relation herewith, the Act includes the following section on liability insurance:

“Each person who launches a launch vehicle or operates a launch site under a license issued or transferred under this Act shall have in effect liability insurance at least in such amount as is considered by the Secretary to be necessary for such launch or operation, considering the international obligations of the United States. The Secretary shall prescribe such amount after consultation with the Attorney General and of the appropriate agencies”.

US politicians and legislators expressed their worry that there could be a too extensive burden of risk for private enterprise if private affairs would be held liable to provide indemnity according to the act, because the Liability Convention does not decide to limit the amount of indemnity to be paid by the State. The Liability Convention covers only States and that is why it is their duty to ensure the insurance cover, if such a “launching State” runs the risk of being held responsible to provide indemnity for damage caused by a space object.

A limit of compensation was confirmed at US \$500 million in 1988, through the Amendments to the Commercial Space Launch Act. This was also combined with the alternative compensation consisting in the maximum liability insurance available on the world market at a reasonable cost in connection with a government liability for claims, which could be above this level to a limit of \$ 1.5 billion.

The clause is focused on the principle of risk sharing between the US government and private industry, in relation to third-party liability deriving from space operations. This clause stimulates the progressive commercialization of ELVs and to avoid or limit the risk of catastrophic accidents. It also restricts the amount of third-party liability insurance in the occurrence of government property damage by setting a limit of \$100 million or the maximum insurance available at reasonable rates.

Furthermore, the provision makes each party involved responsible for any damage: it requires reciprocal waivers of claims between all contractors as well as the United States.

The insurance required covers the United States, its agencies, personnel, contractors and sub-contractors at no cost to the United States. The Secretary of Transport with the Administrator of NASA, the Secretary of the Air Force and other agencies determine the maximum probable loss.

From 1975 onwards the European Space Agency (ESA) obtained cover against third-party liability in connection with their launching activities. After some time, Arianespace, as ESA's commercial successor, has assured liability insurance covering French francs 400,000,000.00 million per launching. On the other hand the French government has taken up responsibility for damages exceeding the amount of money covered by Arianespace.

## **7. PRODUCT LIABILITY**

Product liability pertains in general to the liability of the components of a space object or its manufacturer. Insurance cover can also be obtained for product liability, which has

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<sup>403</sup> See I.M. Klotz, *Promising? Commercial Space Launch Act - Amendment – FAA*, at <http://www.spacefuture.com>.

<sup>404</sup> Refer to F.J. Steptoe, *Regulation of private commercial space transportation by the United States Department of Transportation*, pp. 240 et seq., in Proceedings of the 28th Colloquium on the Law of Outer Space of the IISL, AAIA, 1986.

evolved in recent years and which has disclosed itself in many aviation cases<sup>405</sup>.

However, product liability is not specifically regulated by international space law. The implementation of product liability is substantially different from one national law to another, in spite of movements towards uniformization.

In the field of product liability, mention should be made of the Hague Convention of 1973: it is an international convention dealing with “choice-of-law” questions and it proceeds from the principle of applicability of the private international law of each country. It is necessary to analyze the different systems of applicable national law when examining the legal implications of product liability for space objects and its consequences in the field of insurance. The Convention focuses indeed on the principle of applicability of the *lex loci delicti*, but it allows derogation in favor of the residence of the person suffering damage.

However, one should consider that some organizations and/or agencies could influence the risk of product liability through contractual arrangements, especially in the occurrence of space objects manufacture.

There are further complications to be considered due to differences in the policies of various launching States and regarding the question who shall take up the risk of any third-party damage which might arise in relation to defectively products. This differentiation is related to the respective contract clauses between the various Organizations and Agencies and their contractors.

Some policies range to exclusive government liability, and they are supported by ESA and NASA, while INTELSAT supports policies which apply to exclusive manufacturers liability.

A basic clause on Insurance Liability to Third Persons is usually included in the NASA cost-reimbursement type contracts: this section provides for a reimbursement for reasonable cost of insurance which can be applied to the particular contract and has been required or approved by NASA; a reimbursement for liabilities to third persons for damage or loss of property, bodily injury or death, not included in the field of application of the contract. However, reimbursement, shall not be granted in the occurrence of voluntary misbehavior of the contractor and it is dispensed for up to a limited amount of money.

It is also possible to get contracts in which NASA leaves third-party liability with the contractor, who has to count on product liability insurance.

ESA does not require any insurance and it is indemnified in the occurrence of negligence of the contractor. However, ESA indemnifies the contractor respecting third-party claims for damages which result from the use of the product after acceptance. A clause enclosed in the contract limits the amount of compensation to be paid.

INTELSAT does not ask for insurance, but the contractor is obliged to bear expenses due to any proceeding brought against it, and to pay all expenses and satisfy all judgments incurred or issued against it.<sup>406</sup>

It depends on the national law and its rules regarding product liability in general how product liability in connection with space objects - produced by private companies and launched by private enterprise launching companies - will be effectuated<sup>407</sup>.

It should be also reminded that the European Convention on Products Liability - adopted by the Council of Europe - in regard to personal injury and death took place in

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<sup>405</sup> In relation herewith one may cite Matte where he observes that: “*the notion of product liability can be delimited as the liability of the manufacturer of a finished product, of a component part, or of the producer of a natural product, and of the persons engaged in their supply and distribution, for damages which arise from the use of defective products*”.

<sup>406</sup> See INTELSAT “Principal Contracts Terms and Conditions” at: <http://www.intelsat.com/>.

<sup>407</sup> See for the US scenario, P.G. Dembling & Arons, *Liability Problems, Insurance and Indemnification*, in proceeding of the International Conference on Doing Business in Space: Legal Issues and Practical Problems, 1981, Ali-Aba Conference Materials, p. 217.

1976 and was opened for signature from January 27, 1977. The field of application of the Convention seems to apply to space objects, since it suits to all movables - whether raw or manufactured - even though incorporated into an immovable or into another movable.

Article I states that each Contracting State shall ensure that its national laws are conformed to the provisions of the Convention.

The terms “defect” and “producer” are defined in Article 2 and Article 3 confirms the liability of the producer, who shall have to pay indemnity if his product causes death or personal injuries.

Furthermore, Article 8 stipulates that the liability of the producer may be assumed by States, even though the liability of the producer cannot be excluded or limited by any exemption clause. The Convention shall not apply to damage related to nuclear activities.

A Directive has been issued by the Council of the European Communities concerning the laws, administrative provisions and regulations of the Member States associated with liability for defective products.

States can also have reservations about the maximum amount of indemnity to be paid, which shall not be less than 70 million Drawing Rights for the damage caused by the same products having the same effect.

While discussing about emerging international law on product liability, it is necessary to realize that the first regulation mentioned and the last one deal with the uniformization of national laws only within the regional limits of certain European States.

## **8. SPACE PERSONNEL INSURANCE**

Not long ago, institutional underwriters offered space personnel accident insurance: on January 28, 1986 Space Shuttle mission 51 L was a tragically unsuccessful one, since all seven astronauts perished. One of the surviving astronaut, a woman teacher, was covered by a policy to the value of US \$1 million<sup>408</sup>. Since no insurance cover was taken apart from the personal accident policy on the life of the only non-professional astronaut involved in the mission, the tragic loss of the Space Shuttle did not directly involve the space insurance market.

By the way, the accident affected the image of the Space Shuttle as the man-rated most reliable launching vehicle and had negative consequences for the space insurance market.

Personal accident insurance of space crews does not seem to be a complicated feature to discuss.

The space agency covers the crew members it employs, while payload specialists will be covered by their employer.

## **9. PROPERTY INSURANCE AND PRIVATE ENTERPRISE**

Today the role of private sector in space activities is increasing more and more: private enterprise generated space insurance market and let it develop, because it has immediately been aware of the need of covering such ventures, in the event of damage or loss.

In 1956 Comsat took out the first satellite insurance in order to cover its Early Bird satellite against property damage, in association with third-party liability.

The sector of communication satellites is the most important element of commercial space applications, since financial risk incentives in this area call for suitable insurance cover, especially in the sector of property damage.

The spreading of space activities generates the pressure on the insurance market, which

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<sup>408</sup> For the legal aspects of the Challenger accident see P.G. Dembling and C. Walters, *The 1986 Challenger Disaster; Legal Ramifications*, in *Journal of Space Law*, Vol. XIX, 1991.

is also caused by consecutive property insurance claims and has already shown hesitation on the availability of insurance cover and the cost level of future premiums<sup>409</sup>.

Furthermore, more and more expensive payloads will be another decisive factor of the practicability of future insurance, also considering the general lack of experience in the field of space insurance, which could be better understood getting informed about and aware of the history of space insurance claims and the reactions of the space insurance market.

In 1977 the loss of ESA's OTS-1 satellite, launched with a Thor-Delta mediocre launcher, requiring a payment of US \$29 million absorbed a large amount of the space insurance premiums saved in previous years and for the following Delta launch of the OTS-2 indemnification amount only rose from 7.2 to 7.9%<sup>410</sup>. Up to 1979 US \$77 million were paid to compensate the loss of RCA's Satcom-3 and US \$14 million was the compensation amount paid for the Japanese ECS-1.

The risk of failure was rising and this situation let expect premiums to rise exponentially: this was partly due to uncertainties about the new launchers - Ariane and Space Shuttle - and partly due to the condition of the underwriters, who were worried about the amount of losses and failures, the major part of which were not covered by insurance.

A new spreading of concern in the insurance market was caused by the loss of Marecs-B and the loss of Insat-1-A, which were followed by a total claim of US \$85 million. Insat-1-A failed in orbit six months after launching: this new aspect provoked a feeling of unsureness and let questions rise in relation to the problem of information in space insurance practice<sup>411</sup>.

However, because of 1983's favorable weighing, premiums maintained normal levels ranging from 5-7%, although a higher premium burdened Ariane.

1984 was an year of record losses, which aggravated the concern of the underwriters: Indonesia's Palapa-2-13 and Western Union's WeststarVI, for instance, launched from the Space Shuttle's multiple payload bay, caused claims to a total of US \$180 million.

The failure of the upper stages concerned stressed the phenomenon of product failure, a fact beyond the attention and supervision of NASA, the supplier of the Space Shuttle, which had been assessed as a reliable space transportation system. Fortunately, a successful occurrence required a reassessment of insurance contract clauses regarding salvage, abandonment, etc.

However, the widely divulged recovery of both satellites by a later Space Shuttle mission eased underwriters' worry

In the first half-year for 1984 the total, Ips was brought to excess of US \$280 after the US \$102 million loss of Intelsat V-F-9, launched by an Atlas-Centaur vehicle. However, the loss of the Intelsat V-F-9 has a relatively limited impact thanks to the terms of the insurance policy: the premium on a package of five satellites was to rise from US \$24 million to US \$44 million and INTELSAT had to pay an extra premium.

It is sure that the events of 1984 largely influenced the space insurance market, leading to the retreat of firms from the space insurance business and provoking a decrease in

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<sup>409</sup> See, *inter alia*, C. Cadena, *Unique Insurance Protection Against Risk & Loss: Protecting Space Travel & Exploration* at [http://www.associatedcontent.com/article/560519/unique\\_insurance\\_protection\\_against.html?cat=3](http://www.associatedcontent.com/article/560519/unique_insurance_protection_against.html?cat=3), L. Plochiriger, *Insurance of Space Risks*, pp. 85-87, Aviation Week and Space Technology, September, 1988.

<sup>410</sup> See ESA Bulletin, Number XVI, at: [http://www.esa.int/SPECIALS/ESA\\_Publications/SEM09CWX3RF\\_0.html](http://www.esa.int/SPECIALS/ESA_Publications/SEM09CWX3RF_0.html).

<sup>411</sup> Westar 6 was launched from the space shuttle in February 1984. Its PAM-D misfired, however, and the satellite was stranded in a useless low orbit. It was retrieved by shuttle astronauts in November 1984, and Hughes was contracted to refurbish it. Westar 6 was eventually sold to the AsiaSat consortium and renamed AsiaSat 1. The spacecraft was successfully relaunched on April 7, 1990, on board a Chinese CZ-3 rocket, and now provides telecommunications services to a number of Asian nations ([http://space.skyrocket.de/index\\_frame.htm?http://space.skyrocket.de/doc](http://space.skyrocket.de/index_frame.htm?http://space.skyrocket.de/doc)).

insurance capacity<sup>412</sup>.

Clauses about retrieval<sup>413</sup> provided only for collection, by the insurance company, of revenue generated by the satellite following as a result of the payment of a total loss claim.

Future satellite insurance contracts might be drawn up getting full salvage rights, subject to the relevant elements of the policy or later agreement and in such occurrence title to the satellite would be transferred to the insurer upon payment of the claim for retrieval and resale of the satellite.

Although premiums kept at a record level of 20% at the beginning of 1985<sup>414</sup>, in this year, during the launch of an Ariane launching vehicle, the situation got worst: the loss of LEASAT 3 and 4, due to malfunction, each worth US \$85 million, and the loss of ECS-3 and GTE-Spacenet, worth US \$180 million, were negatively significant occurrences.

The insurance market experienced in September 1985 an historic loss record of 200%. Insurance of the Japanese B2-2B communication satellite was arranged at the beginning of 1986 against a 31.5% premium, even though the rate of 20% had already been indicated as the lowest rate the underwriters want to charge based on the experienced loss episodes and the highest rate they could charge with any hope of attracting business<sup>415</sup>. However, in the case of the Japanese satellite, a percentage of the premium would be restituted if any loss would not occur during the first 150 days after launch, lowering the rate to 25.2%.

Another heavy loss of money (US \$92 million for space insurance underwriters) was caused by the loss of the Intelsat V-F-14 during a launch attempt of the Ariane 3, V18 from Kourou in French Guiana<sup>416</sup>.

It should be pointed out that 1986 went through a decrease of space insurance business, associated with the problems related to the different launch systems: insurance contracts were stipulated for only six satellites.

1987 ended on a total of US \$90-95 million in insurance premiums against some US \$52 million in claims and this situation seemed to mark the beginning of recovery<sup>417</sup>. 1988 experienced problems with satellite payloads in orbit: some claim followed the failure of the India's Insat I-C satellite and GTE Spacenet's Gstar-3 together with a minor claim for the French Telecom IB satellite<sup>418</sup>. Consequently, from 1988 onwards not only failures relevant to upper stages and launch vehicles, but also satellite failures in orbit brought the amount of claims up to 50.

On February 22, 1990, however, the Ariane 36 failure caused the loss of two Japanese communication satellites, BS-2X and Superbird B, worth US \$189 million, plus \$61 million provision for a free relaunch in case of failure of one of the spacecraft: this unlucky event signified the largest space insurance loss in history<sup>419</sup>.

Moreover, on March 14, a \$157 million Intelsat 6 communication satellite was left in a useless orbit because of the Martin Marietta's Titan 3 booster's malfunctioning. Since the launch service and the satellite had a "self-insurance", thanks to a reserve fund designed by Intelsat to cover launch failures, Intelsat, however, absorbed the financial cost of the

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<sup>412</sup> See Business Insurance, 1984, at: <http://www.businessinsurance.com/cgi-bin/directories.pl>.

<sup>413</sup> Refer to E.R. Finch and A.L. Moore, *Astrobusiness, A Guide to the Commerce and Law of Outer Space*, 1984, Praeger Publishers, p. 43.

<sup>414</sup> See The United Nations Registry of Space Objects - Notes (Apr 2002 edition) at: [www.planet4589.org/space/un/un\\_notes.html](http://www.planet4589.org/space/un/un_notes.html).

<sup>415</sup> *Ibidem*.

<sup>416</sup> See Aviation Week and Space Technology, N. 4, 1986.

<sup>417</sup> See Aviation Week and Space Technology, N. 3, 1988.

<sup>418</sup> *Ibidem*.

<sup>419</sup> See Aviation Week and Space Technology, N. 1, 1990.

launch failure<sup>420</sup>.

Another insurance claim, valued at \$150 million, was set up by Japan's Space Communications Corporation (SCC): in December 1990, it was obliged to shut down its Superbird-A spacecraft because of an attitude propellant leak in orbit and, as a result, it lost its ability to provide communications services.

On April 18, 1991, the Japanese BS-3H satellite was lost in a Atlas Centaur launch failure. It was previously owned by Comsat Corp., but then sold to General Electric and covered by insurance of \$96 million.

From the 45 claims set up to 1991 and amounting to \$1,100 million, \$820 million of those have been in connection with failures associated with launching and upper stages and \$445 million as a result of satellite failures or failure of their main propulsion systems<sup>421</sup>.

Even though in early 1988 the top rate of 25-26% reached in 1987 to cover the launch and the initial operating period was lowered to 20%, in view of this loss-ratio it was foreseeable that later in that year it would increase again to over 20%<sup>422</sup>.

It is possible that widespread optimism connected with strong competition led, in February 1990, to the placement of two policies covering multi-launches at premium rates lower than 17%.

Nevertheless, in the last months of 1990 geostationary orbit launch premiums returned to the 16-18% rate and in-orbit rates came down to about 1-2% per year.

## 10. THE SPACE INSURANCE MARKET

It shall be underlined that the space insurance market is considerably influenced by a single loss, in terms of rates, general attitude and availability. Analyzing the characteristics of the space insurance market and the related problems could be a good approach to understand this sector gradually. Three factors should be pointed out as responsible of market failure: information divergence between insurer and client associated with insufficient technological expertise, which lead to inability to assess risk chance; the reduced number of commercial space launches and, furthermore, limitation of risk-spreading and risk-pooling.

Moreover, experts have already indicated a number of measures which might be taken to remedy the effects of an insurance market failure, particularly in relation to property insurance. Mention should be made of<sup>423</sup>:

- package insurance<sup>424</sup>, which would allow the insurer to absorb losses more easily covering a number of satellites between ten or twenty to be insured under one policy and spreading the risk;
- increasing rates;
- re-instatement of deductibles<sup>425</sup>;
- co-insurance: the satellite owner would be indemnified for a percentage of the

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<sup>420</sup> See Space News, N. 4, 1990 at: <http://www.space.com/spacnews/>.

<sup>421</sup> See G. Gobbo, "An insurer's view of the space business", Space Policy, February 1991, Butterworths-Heinemann, Ltd.

<sup>422</sup> For instance, the PAS 1, launched by the Ariane-4, was insured for US \$14 million versus a premium of 25%, at [www.planet4589.org/space/jst/back/news.373](http://www.planet4589.org/space/jst/back/news.373).

<sup>423</sup> *Ibidem*.

<sup>424</sup> For a package insurance example see J. Clover, *Eutelsat secures largest-ever insurance package*, where is reported that the largest-ever insurance package has been placed for Eutelsat ahead of the launch of Hot Bird 9 on autumn 2008. The package, completed by broker Willis Inspace and the underwriter Lloyds, will provide a guaranteed premium rate on all satellites launched on behalf of the Paris-based operator over the next three years. The first satellite to be covered will be Hot Bird 9, due to be launched by an Ariane 5 rocket in the third quarter. Eutelsat's package covers approximately \$2,400,000,000.00 of risk, although each satellite will still be individually underwritten (<http://www.broadbandtvnews.com/?p=4930>).

<sup>425</sup> Refer J.L. Magdelenat, *Space Craft Insurance*, in *Annals of Air and Space Law*, 1982, p. 373.

- payload, dividing the risks between insurance taker and insurer, or else, where the owner, on one hand, and the manufacturer and user, on the other hand, assume some of the risk;
- self insurance pools set up by satellite owners and/or other interested parties<sup>426</sup>; through this method launch customers are allowed to pay premiums via countertrade (it could be defined as a question of barter).

Self insurance pools have been suggested by insurance experts, who believe that this method will be able to quicken the commercialization of space activity: it will enable launch customers to move into the satellite sector being in some measure sure that they could get insurance cover for the spacecrafts they need, including remote sensing and communication satellites.

It should also be kept in mind that, concerning raising rates, which traditionally has been the traditional solution in a more and more destabilized space insurance sector, insurance takers will not be able or willing to pay for the risk transfer beyond a certain limit, in particular where commercial effort and private enterprise are involved.

Moreover, the rates for in-orbit satellite cover have been tripled once in the past as consequence of the heavy losses of launch insurance policies. Lately, however, satellite manufacturers were stated to be those who have to take a great part of the risk of mission failure<sup>427</sup>. Considering the experience of satellite failures-in-orbit, it may also be suggested that satellite manufacturers should undertake a reliability programs review and improve their quality control procedures.

However, launch companies should also undertake a complete reexamination of safety and liability programs, a practice which has already been started in recent years to reduce launch losses and which seems to have produced some results.

Furthermore, a transparent and honest allotment of risks among the different participants in commercial space transportation - the launch customer, the launch facility provider, the launch service provider and the various contractors and subcontractors - would let the terms and conditions by the provision of insurance mutually acceptable to insurers and insurance takers<sup>428</sup>.

In the US the Launch Services Agreement<sup>429</sup> represents the first instrument of risk allocation: it was made between the launch company and the provider of the payload to be launched and it might include inter-party waiver of claims down to the sub-sub-contractor. The Agreement regulates also the use by the launch service provider of government provided and operated launch facilities.

Limiting the amount of insurance to be covered to \$500 million and putting an insurance cover limit for loss to government property on the part of the launch provider to a maximum of \$100 million, the Amendments to the US Commercial Space Launch Act, which were set up in 1988, have become a sort of alleviation of the burden on the launching company for third-party claims.

## 11. GOVERNMENT INVOLVEMENT

In the US horizon, an analysis of the possibilities of government involvement is justified even though this field in space insurance has lost some of its vigor: in view of the implementation of the insurance cover limitation in respect of third-party liability, the condition of the insurance market and the premiums for property insurance, which are much higher than those of other insurance sectors, it could be practicable to present a

<sup>426</sup> See Communications Daily, *Inspace and Satellite Owners Discuss Self-Insurance Pool*, 1984, p. 3.

<sup>427</sup> See Aviation Week and Space Technology, September 19, 1988, p. 21.

<sup>428</sup> See D. Nesgos, *The Challenges facing the Private Practitioner, Liability and Insurance Issues in Commercial Space Transportation*, pp. 21-27, Harvard Journal of Law and Technology, N. IV 1989 p. 21 et seq.

<sup>429</sup> *Ibidem* pp. 24 and 26.



gamut of potential government involvement in space insurance.

It will depend on the requisites and grounds of government intervention, on the one hand, and the peculiar internal legal options, on the other hand, whether government involvement will be possible, desirable and in which measure. For instance a government aid could be necessary in the provision of complete information on the technological risks associated with the various aspects of space commercialization: this measure, signifies the most limited form of government intervention. Any development of such a practice would be highly advisable<sup>430</sup>.

Government provision for insurance would be useful, in particular for smaller firms, which currently run the risk to be heavily affected by partial insurance cover or large deductibles.

Another type of government involvement may result from the demand of subsidies of rates or provision for those special fields of space commercialization which are considered to be most important and liable to be heavily hit as a consequence of the characteristics of private markets.

These last two forms of government intervention are characterized by a heavy significance and should, therefore, be contemplated as extreme solutions.

Other suggestions have been made, for instance, to set up a commercial space insurance program in order to charge premiums in view of the historical loss-ratio for each launching vehicle, while including a fee for administration and to create a reserve pool.

The proposal was advanced because of the need to ensure the re-establishment of a US expendable launch vehicle capability supporting commercial satellites owners and operators and securing the interests of commercial space enterprise. These efforts were not only led towards the practicability of property insurance, but had also the aim of reaching liability insurance limitation for private launch operators<sup>431</sup>. By the way, the introduction of the limitation provisions in the Amendments to the Commercial Space Launch Act has significantly reduced their need.

Furthermore, in 1986 in the US a different possible manner for government involvement was suggested<sup>432</sup> by a federally chartered corporation which would get initial capital from the government and ultimately convert to a public share corporation.

The USSR and Chinese launching companies present a different type of government involvement: they offer low-rate insurance for relaunching, through insurance companies supported by the state. However, Russian and Chinese insurers don't actually enlarge the total space insurance capacity, since they spread their risks by reinsuring on the international market.

## 12. CONCLUSIONS

Mention has been made of the enormous impact of the space commercialization on the insurance of risk, which is leading to a diversification as well as an enlargement of the space insurance market. Whatever action will be undertaken by the interested parties, the development in the space insurance industry will dramatically influence the trend and the

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<sup>430</sup> In the meantime, in the United States, the Transportation Department issued a major report which provides analytical risk assessment methods, being of interest to inter alia space operators and insurance companies. The Report has been compiled on the basis of unclassified information from the US military and operational space experience and the risk controls and safety practices used at missile test ranges and launch facilities in the country. It deals with the areas-operations, hazards and risk analysis. The second volume, which categorizes three areas of hazards - pre-launch and launch hazards, orbital collision hazards and re-entry hazards - studies the issue of third-party liability, in particular in respect of persons and property outside the launch range and not connected with the launch. The orbital collision hazards between space objects are studied in the light of US liability for damage to a foreign country or satellite caused by a US space craft.

<sup>431</sup> See Aviation Week and Space Technology, Vol. II, 1988 at <http://www.aviationweek.com/aw/>.

<sup>432</sup> See Aviation Week and Space Technology, Vol. VIII, 1986 at <http://www.aviationweek.com/aw/>.

proceeding of the commercialization of space and severely determine the role of private enterprise in this evolutionary process.

Moreover, practical associated with legal implications are improving and extending this process, which has brought to national and multinational policies designed to regulate this new sector of insurance: however these facts seem to be only its initial stages and the process will certainly develop in the near future.

It should be also underlined that the provisions of international space law, regarding state liability for space facilities, influences the drawing up of national legislation on this subject, which, however, will depend on each individual State and its law system: every State will decide if and to what extent a regulatory system will be necessary, and thus imposed, to secure insurance of the risks involved.

The space insurance community should have come to its conclusions and learned its lessons, trying not to overreact to dramatic losses.

In spite of the many difficulties connected with the current negativity of the market and the background in the history of space risks insurance, the insurance industry seems to be ready to continue to provide cover. Yet, in order to maintain the feasibility of space insurance, the space industries involved should participate in the risks, or support efforts to improve their products. Insurers themselves claim a better determination of the liable parties and better identification of responsibilities.

## FINAL REMARKS

The world's attention for outer space ventures increased hugely at the beginning of the so called "space race", as exciting results were achieved by the two competing superpowers, the Soviet Union and the United States. This enthusiasm reached his peak with the 1969 moon landing. Since then, the space went out of the focus of the media and of the public, and only spectacular events continued to be covered by the press and noticed by the people. Nonetheless, we now experience that the non-exciting developments are those which changed and still are trying to change our life. Actually, many developments for space exploration and the exploitation of outer space made our civilisation absolutely dependent on activities carried on in outer. To name just, reference can be made at: the raise of satellites for communication, television, Earth monitoring, weather forecasting, navigation and - what is even more unknown by the public, but changed life at least as significantly – the so called "spin off technologies", with the Personal Computer being the most prominent one. Such important changes in our lives happened widely unnoticed by the public and, as a consequence, in an almost complete lack of a legal framework..

The factual starting point of this work is that outer space is, also now, a market with an impressive potential, not only because of the growing potentialities in to-date existing applications like navigation and communication, but also due to a large potential in emerging applications (i.e. space tourism) and in future applications (i.e. mining on the moon). Many innovations related to space travel and to the use of outer space made and still make our culture totally dependent on outer space activities. Reference is hereby made to the development of satellites for communication, television, Earth monitoring, weather forecasting and navigation to name just a few.

We experienced a sort of deceleration since the times of the "space race". Looking back on existing international space rules as they was envisaged and drafted within the UN, and especially studying the principles of space law, one cannot but be impressed by the foresight, the courage and the confidence shown by those early Fathers of the space law.

The creation of a regime of freedom with sovereign States as the subjects, "in accordance with international law", without a supranational authority to enforce the new set of rules, risk the raise of conflicts and tensions among States and private entities, as nowadays there is no equal opportunity (which means: "no equal capability") to use (and manipulate) the concept of "freedom to explore and use the outer space". It enlightens once again the renown problem of an equal or at least equitable participation by all States in space activities as well as the issue of the distribution of the "wealth of space", in this case an equal (or equitable, economic and efficient) sharing of the benefits of the exploitation of the natural resources of outer space.

The lack of sovereignty on a "national territory" in outer space law, and the specific provision of (the concept of) "all mankind" in positive space regulations, and of nationality only with regard to the national jurisdictions over space objects (the State of registry), make it feasible to improve new kinds of cooperation under mainly "technical" public legislation, since it exists the possibility to apply present rules of international private law in space. One of the starting point should be the permission, under the existing international space law, to institute a number of limited, functional property rights in outer space.

The ultimate aim should be to create a "level playing field" for all the entities (public

and private ones) to be active in outer space: equal chances, equal capabilities, shared “access rules” to the wealth of space for privates and companies who desire to expand their burdens of business into outer space. Close to this, and even more important is that the highest commission of the society of the States is to have all States benefit from such space activities on an equitable and widely shared legal basis.

To date, however, the current legal regime of outer space is more and more fragmented and inappropriate to face the challenges of the intensifying commercial use of space. It consist of several basic but still very general principles stated in a restricted set of space treaties adopted since 1967 (the so called “Corpus Iuris Spatialis”) and a weapon controlling treaty, together with general international law and the practices of the spacefaring nations. The legal framework also contemplates a number of agreements covering the commercial utilization of outer space, such as rights to use the geostationary orbit or agreements incorporating intergovernmental organizations (for instance, the Intergovernmental Agreement on the International Space Station, the International Telecommunications Union, the International Civil Aviation Organization, and the World Meteorological Organization).

Nonetheless, just as the pushing interests of industry have played a major role conditioning the development of the law of the sea, in the same way the interests of industrial and commercial parties will heavily influence policy in space. Since the private parties will have a preeminent role in the creation of a new legal framework for the commercial exploitation of the outer space, it could be worthy to agree on a set of common, widely shared, principles. Increasing commercial economic activity in space should be facilitated, for instance, by the introduction of a code of ethics or a sort of *Lex Mercatoria Spatialis* for the businesses involved, something that is now quite a commonplace among business operators. It should cover the most various areas such as environmental stewardship of space, the promotion of honest dealings, making safety an important concern, ensuring a free-market economy and disclosure of conflicts of interest or political contributions.

## BIBLIOGRAPHY

### REVIEWS

- *AIR (and space) LAW*: Kluwer, Law and Taxation Publishers, the Netherlands, (<http://www.kluwerlawonline.com>);
- AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS JOURNAL, AIAA Ed., Reston, VA, U.S.A., (<http://www.aiaa.org/content.cfm>);
- *ANNALS OF AIR AND SPACE LAW*: Editions A. Pedone, Paris, (<http://www.mcgill.ca/iasl/annals/>);
- *AVIATION WEEK AND SPACE TECHNOLOGY*: McGraw-Hill Weekly Publication (<http://www.aviationweek.com/aw/>);
- *JOURNAL OF SPACE LAW*: University of Mississippi Law Center;
- *SPACE NEWS*: Army Times Publishing Co., (<http://www.spacelaw.olemiss.edu>);
- *SPACE POLICY*: Butterworths-Heinemann Ltd. (<http://www.acquirecontent.com>);
- GERMAN JOURNAL OF AIR AND SPACE LAW (ZLW): Carl Heymanns Verlag AG, (<http://landingpages.wolterskluwer.de>);

### AUTHORS

#### BENKOE, M.

- *Die Arbeit des U.N. Weltraumausschusses im Jahre 1983*, s. 242, (ZLW), Heft 3, September 1985, Carl Heymanns Verlag KG;

#### BERRADA, A.

- *Space and Radio Communications*, in *Maintaining Outer Space for Peaceful Uses*, edited by N. Jasentuliyana, Proceedings of a Symposium held at The Hague, 1984, The United Nations University;

#### BOECKSTIEGEL, K.H.

- *Progress Report on Research regarding the Settlement of Space Law Disputes*, p. 97, in Proceedings of the 22nd Colloquium on the Law of Outer Space of the IISL, Munich, 1979, American Institute of Aeronautics and Astronautics, AIAA, 1980;
- *Settlement of Disputes on International Regimes Applicable to Space Activities*, p. 123, in Proceedings of the 23rd Colloquium on the Law of Outer Space of the IISL, Tokyo, 1980, AIAA;
- *Present and Future Regulation of Space Activities by Private Industry in Space Activities and Implications: where from and where to at the threshold of the 80s*, published in the Proceedings of the Symposium held at McGill University on October 16-17, 1980, Centre for Research of Air and Space Law, McGill University, Montreal, 1981;
- (editor) *Space Stations, Legal Aspects of Scientific and Commercial Use in a Framework of Transatlantic Cooperation*, in Proceedings of an International Colloquium, Hamburg, October 3-4, 1984, Carl Heymanns Verlag KG;
- *Reconsideration of the Legal Framework for Commercial Space Activities*, pp. 3-10, in Proceedings of the 33rd Colloquium on the Law of Outer Space of the IISL, Dresden, October 6-12, 1990, AIAA, 1991;

#### BOURELY, M.G.

- *Legal Issues Relating to Flights of the Spacelab*, p. 109, in Proceedings of the 21st Colloquium on the Law of Outer Space of the IISL, Dubrovnik, 1978, edited by M.D. Schwartz, distributed by F.D. Rothman & Co., Littleton, Colorado 80123, USA;

- *National Space Legislation in Europe*, p. 97, in Proceedings of the 30th Colloquium on the Law of Outer Space of the IISL, Brighton, 1987, AIAA, 1988;

BOWETT, D.W.

- *The Law of International Institutions*, London, Stevens and Sons, 1975;

BURNETT, D.J.

- and Fuchs, M., *Amendments of COCOM Rules and the Commercialization of Space*, pp. 11-17, in Proceedings of the 33rd Colloquium on the Law of Outer Space of the IISL, Dresden, October 6-12, 1990, AIAA, 1991;

CHEN, Y.

- *China's Space Policy - a Historical Review*, pp. 116-128, May, 1991, Butterworths-Heinemann Ltd.;

CHENG, B.

- *The Commercial Development of Space*, pp. 17-44, in Journal of Space Law, Vol. 19. No. 1, 1991;

CHRISTOL, C.Q.

- *The Legal Common Heritage of Mankind: Capturing an Illusive Concept and Applying it to World Needs*, paper presented at the 18th Colloquium on the Law of Outer Space of the IISL, Lisbon, 1975;

- *Protection of Space from Environmental Harms*, p. 433, in Annals of Air and Space Law, Vol. IV, 1979, Editions A. Pedone, Paris;

- *The Modern International Law of Outer Space*, Pergamon Press, 1982;

- *National Claims for the Using/Sharing of the Orbit/Spectrum Resource*, p. 301, in Proceedings of the 25th Colloquium on the Law of Outer Space of the IISL, Paris, 1982, AIAA;

- *Protection of Outer Space from an Inefficient Use of the Orbit/Spectrum Resource*, p. 382, in Proceedings of the 27th Colloquium on the Law of Outer Space of the IISL, Lausanne, 1984, AIAA

COCCA, A.A.

- *The Settlement of Disputes in International Space Law*, p. 107, in Proceedings of the 22nd Colloquium on the Law of Outer Space of the IISL, Munich, 1979, AIAA, 1980;

COLINO, R.R.

- *Formulation of the Reagan Administration Policy on International Satellite Telecommunications*, p. 103, in Journal of Space Law, Vol. 13, 1985, no. 2;

COVAULT, C.

- *Commercial Winged Booster to Launch Satellites From B-52*, in Aviation Week and Space Technology (ISSN 0005-2175), June 6, 1988.

DANN, P.

- *The Future Role of Municipal Law in Regulating Space Related Activities*, in Space Law: Views of the Future, p. 125, Kluwer Law and Taxation Publishers, 1988;

DEMBLING, P.G.

- *Liability Problems, Insurance and Indemnification*, in International Conference on Doing Business in Space: Legal Issues and Practical Problems, Washington DC, November 12-14, 1981;

- and Walters R.C., *The 1986 Challenger Disaster: Legal Ramifications*, in Journal of Space Law, Vol. 19, No. 1, 1991;

DIEDERIKS-VERSCHOOR, I.H.Ph.

- *The Legal Aspects of the Space Shuttle*, in Annals of Air and Space Law, Vol.I, 1976, p. 199 et seq.

- *Harm Producing Events by Fragments of Space Objects (Debris)*, p. 1, in Proceedings of the 25th Colloquium on the Law of Outer Space of the IISL, Budapest, 1983, AIAA, 1984;

- *Legal Aspects of Environmental Protection in Outer Space regarding Debris*, p. 131, in Proceedings of the 30th Colloquium on the Law of Outer Space of the IISL, Brighton, 1987, AIAA, 1987;

- *Some Observations on the International Civil Aviation Organization and an International Space Agency*, in the Proceedings of the 20th Colloquium on the Law of Outer Space of the IISL, AIAA 1978.

DOYLE, S.E.

- *Regulating the Geostationary Orbit: ITU's WARC-ORB-8588*, pp. 1-23, in *Journal of Space Law*, Vol. 15, No. 1, 1987;

- *Space Law and the Geostationary Orbit: The ITU's WARCORB 85-88 concluded*, pp. 13-21, in *Journal of Space Law*, Vol. 17. No. 1, 1989;

DULA, A.

- *Materials Processing as a Subject of Space Law*, p. 224, in Proceedings of the 28th Colloquium on the Law of Outer Space of the IISL, Stockholm, 1985, AIAA, 1986;

EVENSEN, J.

- *Aspects of International Law Relating to Modern Radio Communications*, p. 115, *Recueil des Cours*, Academy de Droit International, 1965;

FENEMA (van), H.P.

- *Cooperation and Competition in Space Transportation, The Highways of Air and Outer Space*, Conference on the Law, Policy and Commerce of International Air Transport and Space Activities, Taipei, 29-31 May, 1991;

FINCH, E.R.

- and Moore, A.Lee, *Astrobusiness, A Guide to the Commerce and Law of Outer Space*, Praeger Publishers, 1985, New York;

FUCHS, M.

- and Burnett, D.J., *Amendment of COCOM Rules and the Commercialization of Space*, pp. 11-17, in Proceedings of the 33d Colloquium on the Law of Outer Space of the IISL, Dresden, October 6-12, 1990, AIAA, 1991;

FUGUA, D.

- *Space Industrialization: some legal and political considerations for private enterprise*, in *Journal of Space Law*, p. 1, Vol. 8, no. 1, 1980, The University of Mississippi;

GALLOWAY, E.

- *Conditions for Success of Institutions for International Space Activities*, p. 105, in Proceedings of the 24th Colloquium on the Law of Outer Space of the IISL, Rome, 1981, AIAA, 1982;

- *The Relevance of General Multilateral Space Conventions to Space Stations - Space Stations, Legal Aspects of Scientific and Commercial Use in a Framework of Transatlantic Cooperation*, p. 33, edited by K.H. Boeckstiegel, in Proceedings of an International Colloquium, Hamburg, 3-4 October 1984, Carl Heymanns Verlag KG, 1985;

GANTI, J.B.

- *Space Station Intellectual Property Rights and U. S. Patent Law*, in *Les Stations Spatiales Habitées - Aspects Juridiques. Manned Space Stations - Legal Issues. Proceedings of the Colloquium held 7-8 November, 1989 in Paris*. Edited by Duc Guyenne. ESA SP-305. European Space Agency, 1990, p.107.

- *The commercialization of space - twenty years of experience; some lessons learned*, *Journal of Space Law*, Vol. 12, 1984, p. 109 et seq.

GOEDHART, R. F. A.

- *The never ending dispute: Delimitation of air space and outer space*, Editions Frontieres, Vol. 4 of *Forum for Air and Space Law*, 1996, eds M. Benko and W. de Graaff.

GOROVE, S.

- *Studies in Space Law: its Challenges and Prospects*, 1977, A.W. Sijthof Leiden;
- *The Space Shuttle: some of its features and legal implications*, in *Annals of Air and Space Law*, Vol. VI, 1981, p. 381, Editions A. Pedone, Paris;
- *United States Space Law, National and International Regulation*, Oceana Publications Inc., 1982;
- *Major Legal Issues arising from the Use of the Geostationary Orbit*, p. 3, in *Regulation of Transnational Communications*, Michigan Yearbook of International Legal Studies, 1984;

JAKHU, R.S.

- *The Evolution of the ITU's Regulatory Regime Governing Space Radio Communication Services and the Geostationary Satellite Orbit*, p. 381, in *Annals of Air and Space Law*, Vol. III, 1983, Editions A. Pedone, Paris;

JASENTULIYANA, N.

- and Lee, R.K.S.,(editors), *Manual on Space Law*, Volumes I-IV, 1979, Oceana Publications Inc.,Dobbs Ferry, New York/ Sijthoff & Noordhoff/ Alphen van de Rijn;
- *Conditions Essential for the Peaceful Use of Outer Space - the Moon Treaty*, paper presented at the Symposium co-sponsored by the U.N. University and the IISL, Peace Palace, The Hague, the Netherlands, 12-15 March 1984;
- *Environmental Impact of Space Activities: an international law perspective*, p. 390, in *Proceedings of the 27th Colloquium on the Law of Outer Space of the IISL*, Lausanne, 8-13 October 1984, AIAA, 1985;
- *Priorities for International Protection of the Space Environment*, paper presented at the International Colloquium on Environmental Aspects of Activities in Outer Space - State of the Law and Measures for Protection, Cologne, 17-19 May 1988;

KAYSER, V.

- *Launching Space Objects: Issues of Liability and Future Prospects*, Kluwer Academic Publisher, 2001.

KAMENETSKAYA, E.

- *Large Space Systems Belonging to International Organizations: Certain problems of registration, jurisdiction and control*, p. 179, in *Proceedings of the 23rd Colloquium on the Law of Outer Space of the IISL*, Tokyo, 1980, AIAA, 1981;
- and Vasilevskaya, E. and Vereshchetin, V., *Outer Space Politics and Law*, Progress Publishers, Moscow, 1987;

KNIGHT, S.L.

- *The Deregulation of International Satellite Communications: US Policy and the INTELSAT Reponse*, in *Space Communications and Broadcasting (1985)*, Elsevier Science Publishers B.V., North Holland;

KURACHI, S.

- *Update on Japan's Space Policy*, pp. 96-102, in *Space Policy*, May 1991, Butterworths-Heinemann Ltd.;

KUSKUEVELIS, I.I.

- *The Aerospace Plane: In the Direction of an Aerospace Law*, p. 175, *Proceedings of the 29th Colloquium on the Law of Outer Space of the IISL*, Innsbruck, 1986, AIAA, 1987;

LACHS, M.

- *The Law of Outer Space*, Sijthoff, Leiden, 1972;

LARSEN, P.B.

- *Future Protocol on Security Interests in Space Assets*, in *Journal of Air Law and Commerce*, 2002;

LAURIA-WHITE, R.



- and White H.M., *Evolving Principles of Space Communications Regulation in the ITU: 1959-1985*, in Proceedings of the 31st Colloquium on the Law of Outer Space of the IISL, Bangalore, 1988, AIAA;

LEISTER, V.

- *Prospects for a Latin-American Space Agency*, paper presented at the 31th Colloquium on the Law of Outer Space of the IISL, Bangalore, October 1988;

LEIVE, D.M.

- *International Telecommunications and International Law the regulation of the radio spectrum*, Oceana Publications Inc., Dobbs Ferry, N. Y., 1970;

- *The Role of INTELSAT in the Use of the Geostationary Orbit*, paper produced for a session of the Academy of Astronautics, Brighton, October 1987;

LUXENBERG, B.

- *Protecting Intellectual Property in Space*, p. 172, in Proceedings of the 27th Colloquium on the Law of Outer Space of the IISL, Lausanne, 1984, AIAA, 1984;

- and Mossinghoff, G.J., *Intellectual Property and Space Activities*, p. 8, in Journal of Space Law, Vol. 13., 1985 no. 1, University of Mississippi Law Center;

LYALL, F.

- *Law and Space Telecommunications*, Dartmouth Publishing Company Limited, England, 1989;

MADDERS, K.J.

- *Space Insurance: European Perspectives*, pp. 172-172, in Journal of Space Law, Vol. 19, No. 1, 1991;

MAGDELENAT, J.L.

- *Space Craft Insurance*, p. 363, in Annals of Air and Space Law, Vol. VII, 1982, Editions A. Pedone, Paris;

MALANCZUK, P.

- *The Relevance of International Economic Law and the World Trade Organisation (WTO) for Commercial Outer Space Activities*, in International Organisations and Space Law, Proceedings of the Third ECSL Colloquium, Perugia, Italy, 6-7 May 1999, R.A. Harris Edt., 1999;

MARSHALL JR, H.R.

- *Commercialization of Space. Incentives, Impediments and Alternatives*, in Journal of Space Law, p. 163, Vol. 13, 1984;

- *Outer Space Commercialization in the United States: Effects on Space Law and Domestic Law*, p. 90, Proceedings of the 27th Colloquium on the Law of Outer Space of the IISL, Lausanne, 7-13 October 1984, AIAA, 1985;

MASSON-ZWAAN, T.

*International Telecommunications and ITU Developments*, paper written for the Conference on the Law, Policy and Commerce of International Air Transport and Space Activities, Taipei, Taiwan, ROC, 26-31 May 1991;

MATTE, N.M.

- *Aerospace Law From Scientific Exploration to Commercial Utilization*, Editions A. Pedone, Paris, 1977;

- *Institutional Arrangements for Space Activities: An Appraisal*, in Annals of Air and Space Law, Vol. VI, 1981, Editions A. Pedone, Paris;

- *Aerospace Law, Telecommunications Satellites*, Toronto, Butterworths & Co. (Canada) Ltd., 1982;

MENTER, M.

- *Commercial Space Activities and the Moon Treaty*, p. 35, in Proceedings of the 23rd Colloquium on the Law of Outer Space of the IISL, Tokyo, 1980, AIAA, 1981;

- *Legal Aspects of Commercial Space Activities*, paper presented at the National Institute of the American Bar Association, May 29, 1982, in *Aviation Litigation and Space Law*, Washington DC;

MEREDITH, P.

- *Status of the Patents in Space Legislation in Congress*', pp. 163-167, *Journal of Space Law*, Vol. 17. No. 2, 1989;

MORA, I.

- *The Future of Direct Transmission Via Satellite From the Aspect of the Author*', p. 57, Proceedings of the 22nd Colloquium on the Law of Outer Space of the IISL, Munich, 1979, AIAA;

MOSSINGHOF, G.

- *Protecting Intellectual Property in Space Activities*, paper presented to the *Colloquium on Air, Space and Law*, Paris, April 15, 1983;

NOONAN, R.J.

- *Outer Space and Antarctica - Sexuality Factors in Extreme Environments*, Health and Physical Education Department, Fashion Institute of Technology of the State University of New York 2004;

O'BRIEN, J.E.

- *The U.S. /International Space Station*', p. 35, *Journal of Space Law*, Vol. 15 no. 1, 1987, University of Mississippi;

OKOLIE, C.C.

- *Patent Law and Space Activities of States in Industrial Property Technology Cooperation*', p. 178, Proceedings of the 27th Colloquium on the Law of Outer Space of the IISL, Lausanne, 1984, AIAA,

PEREK, L.

- *Telecommunications and the Geostationary Orbit: The Missing Regulation*', p. 33, Proceedings of the 26th Colloquium on the Law of Outer Space of the IISL, Budapest, 1983, AIAA;

PICHLER, M.H.

- *Copyright Problems of Satellite and Cable Television in Europe*', Graham & Trotman/ Martinus Nijhoff Publishers, 1987;

POP, V.

- *Appropriation in outer space: the relationship between land and ownership and sovereignty on the celestial bodies*, Elsevier Science Ltd., 2000;

PRIYATNA, A.

- *Developing Countries and Use of Geostationary Orbit*', p. 375, Proceedings of the 30th Colloquium on the Law of Outer Space of the IISL, Brighton, October 10-17, 1987, AIAA;

QIZHI, H.

- *The G.S.O. and Developing Countries*', paper presented at the 31st Colloquium on the Law of Outer Space, Bangalore, October 1988.

VAN REETH, G.

- and Oosterlinck, R., *'Exploitation of Data and Product, Experience of the European Space Agency'*, p. 187, *Space Stations, Legal Aspects of Scientific and Commercial Use in a Framework of Transatlantic Cooperation*, edited by K.H. Boeckstiegel, Proceedings of an International Colloquium, Hamburg, 3-4 October 1984, Carl Heymanns Verlag KG, 1985

REIFARTH, J.

- *Nationale Weltraum Gesetze in Europa*, Z.L.W., s.3, 36 Jahrgang, Heft 1, March 1987;

REIJNEN, G.C.M.

- *Utilization of Outer Space and International Law*, Elsevier Scientific Publishing Company, Amsterdam, 1981;

REYNOLDS, G.H.

- *Outer Space: Problems of law and policy*, Westview Press, 1997;

ROSENFELD, S.B.

- *"Use" in Economic Development of Outer Space*, p. 79, Proceedings of the 24th Colloquium on the Law of Outer Space of the IISL, Rome, 1981, AIAA;

SARKAR, S.K.

- *Criteria of Equitable Access to the Geostationary Orbit and Frequency Spectrum*, p. 41, Proceedings of the 26th Colloquium on the Law of Outer Space of the IISL, Budapest, 1983, AIAA;

- *Effect of Fibre-optic Communication on Space Radio Regulations*, p. 110, Proceedings of the 28th Colloquium on the Law of Outer Space of the IISL, Stockholm, 1985, AIAA

SCHIMROCK, H.

- *Current Difficulties of Buying Insurance for Space Ventures*, p. 64, ESA Bulletin, No. 43, August 1985;

SCHWARTZ, L.E.

- *International Organizations and Space Cooperation*, Durham (North Carolina), 1962;

SGROSSO, G.

- *Establishment of the Italian Space Agency*, pp. 162-164, Proceedings of the 31d Colloquium on the Law of Outer Space of the IISL, Bangalore, 8-15 October, 1988, AIAA, 1989.

SMITH, D.D.

- *Communication via Satellite, A Vision in Retrospect*, 1976, A.W. Sijthoff, Leiden/Boston Mass.;

- *The Moon Treaty and Private Enterprise*, p. 62, *Astronautics and Aeronautics*, January 1980;

SMITH, M.L.

- *The Commercial Exploitation of Mineral Resources in Outer Space*, p. 45, *View of the Future*, International Institute of Air and Space Law, Leiden University, Kluwer Law and Taxation Publishers, Deventer 1988;

- *The Space-War: Reflection on 1985, Prospects for 1988*, p. 139, Proceedings of the 29th Colloquium on the Law of Outer Space of the IISL, Innsbruck, 1986, AIAA;

- *International Regulation of Satellite Communication*, Martinus Nijhoff Publishers, Dordrecht/Boston/London, 1990;

STEPTOE, E.J.

- *United States Government Licensing of Commercial Space Activities by Private Enterprise*, p. 191, Proceedings of the 27th Colloquium on the Law of Outer Space of the IISL, Lausanne, 1984, AIAA;

- *Regulations of Private Commercial Space Transportation by the United States Department of Transportation*, p. 240, Proceedings of the 28th Colloquium on the Law of Outer Space of the IISL, Stockholm, 1985, AIAA;

TRAA-ENGELMAN (van), H.L.

- *The Moon Treaty - Legal Consequences and Practical Aspects*, p. 73, Proceedings of the 23rd Colloquium on the Law of Outer Space of the IISL, Tokyo, 1980, AIAA;

- *International Legal Requirements as a Basis for Juridically Feasible Space Transportation*, p. 139, Proceedings of the 24th Colloquium on the Law of Outer Space of the IISL, Rome, 1981, AIAA;

- *Environmental Hazards from Space Activities: Status and Prospects of International Control*, p. 55, Proceedings of the 25th Colloquium on the Law of Outer Space of the IISL, Paris, 1982, AIAA;
- *Problems of State Responsibility in International Space Law*, p. 139, Proceedings of the 26th Colloquium on the Law of Outer Space of the IISL, Budapest, 1983, AIAA;

TUCKER, S.

- *Communications Satellites and Insurance*, ABC Newsletter of Product Liability, Vol. VII, no. 1, Fall 1984;

TWIBELL, S.

- *Space Law: legal restraints on commercialization and development of outer space*, in UMKC Law Review, 1996;

VERESHCHETIN, V.

- *Interaction of International Space Law and Domestic Law in Space and Time*, p. 209, Proceedings of the 23rd Colloquium on the Law of Outer Space of the IISL, Tokyo, 1980, AIAA;

WALTERS, R.C.

- and Walters, P.G., *The 1986 Challenger disaster: legal ramifications*, Journal of Space Law, Vol. 19, No. 1, 1991;

WHITE, H.M.

- and Lauria-White R., *Evolving Principles of Space Communication Regulation in the ITU: 1959-1985*, Proceedings of the 31st Colloquium on the Law of Outer Space of the IISL, Bangalore, 1988;

WHITE, W.

- *Real Property Rights in Outer Space*, American Institute of Aeronautics and Astronautics, Inc., 1997;

WIESSNER, S.

- *Access to a Res Publica Internationalis: The Case of the Geostationary Orbit*, p. 147, Proceedings of the 29th Colloquium on the Law of Outer Space of the IISL, Innsbruck, October 4-11, 1986, AIAA;

WILLIAMS, M.

- *The Growing Momentum of Satellite Broadcasting and the Geostationary Orbit*, p. 45, Proceedings of the 26th Colloquium on the Law of Outer Space of the IISL, Budapest, October 10-15, 1983, AIAA;

YOSHIDA, H.

- *The Meaning of Japan's Space Commercialization Efforts*, paper presented at the 34th Colloquium on the Law of Outer Space of the IISL, Montreal, October 5-11, 1991.

ZULLO, K.M.

- *The Need to Clarify the Status of Property Rights in International Space Law*, in Georgetown Law Journal, 2001.



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