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Certain Aspects of Intellectual Property Rights

In Outer Space

By

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ABSTRACT

This study analyses Intellectual Property Rights related to space activities and Space Law. The potential contradictions between these two laws are of specific interest. Besides the different approaches on which their legislation has been established, the increasing role of private companies as space actors calls for the adoption of a strong legal framework for Intellectual Property.

The issue of Intellectual Property Rights in outer space will be examined within the first Part, with a focus on Patent Law. The second Part explores the specific rules contained in the International Space Station Intergovernmental Agreement, on Intellectual Property and exchange of data and goods. Although there is some legal mechanism, no protection capable to meet the space industry's current and future needs.

RESUME

Cette thèse analyse le Droit de la propriété Intellectuelle au regard des activités spatiales et du droit de l'Espace. La confrontation des principes de base qui gouvernent respectivement chacun de ces droits revêt en effet un intérêt particulier. Outre une philosophie différente dans l'approche des questions juridiques, la participation croissante du secteur privé dans les activités spatiales nécessite de créer un cadre juridique solide en matière de Propriété Intellectuelle.

La première partie est consacrée à l'analyse du droit de la Propriété Intellectuelle, et plus spécifiquement le droit des brevets dans le cadre des activités spatiales. La seconde porte sur le cadre juridique de la station spatiale internationale, et notamment, la propriété intellectuelle et l'échange des biens et des données. Nous verrons que malgré l'existence de mécanismes juridiques, il n'existe pas à l'heure actuelle de protection qui soit suffisamment efficace pour répondre aux besoins croissants de l'industrie spatiale.

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INTRODUCTION

The period prior to the fifteenth Century is of specific interest in the history and evolution of patent. At that time, privileges were accorded by the sovereign, affording a special right to an individual; the concept of utility and sometimes favoritism playing an important role. The "Parte Veneziana," the first form of privilege, was adopted by the Republic of Venice in 1474.[1] This anecdote is relevant for a study on intellectual property rights in outer space: Although non-governmental actors are increasing, the space business remains government related as any space activity carried in outer space requires a government level approval. One of the most important manifestation of space law is the international responsibility borne by States Parties to the Outer Space Treaty[2] for national activities in outer space. As a consequence, and in the concern of avoiding the existence of any privilege or abuse in the grant of rights, it is important to guarantee a fair and protective legal framework.

[1] See *Introduction to Intellectual Property, Theory and Practice*, Ed. by the World Intellectual Property Organization (Kluwer Law International, 1997), at 17.

[2] The pillars of the international space law are the five following treaties: The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies, hereafter the Outer Space Treaty, or OST (1967), the Agreement on the rescue of astronauts, the return of astronauts and the return of objects launched into outer space (1968), the Convention on the international liability for damage caused by space objects (1972), the Convention on Registration of Objects Launched into Outer Space (1974) and the Agreement governing the activities of states on the moon and other celestial bodies. See in *Annals of Air and Space Law*, ICASL McGill University, (Pédone Ed., vol. XVIII, Part II, 1993).

First, in order to have a clear understanding of the questions dealing with intellectual property, it is useful to recall some definitions. Intellectual property comprises of two main branches: "Industrial property" embraces the protection of inventions by means of patents, protection of certain commercial interests by means of trademark law and the law on protection of industrial designs. In addition, industrial property addresses the repression of unfair competition. "Copyright" grants authors and other creators of works of the mind (literature, music, art), certain rights to authorize or prohibit, for a certain limited time, certain uses made of their works.[3] A patent, related to the first branch, is a document issued by a government office which describes the invention and creates a legal situation in which the patented invention can normally only be exploited (made, used, sold, imported) by, or with, the authorisation of the patentee. The protection of inventions is limited in time (generally twenty years from the filing date of the application for the grant of a patent).[4] An invention is a novel idea that permits in practice the solution of a specific problem in the field of technology.[5]

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[3] See supra note 1, at 3.

[4] It is estimated that the number of patents granted world-wide in 1995 was about 710,000. Furthermore, it is estimated that at the end of 1995 about 3.7 million patents were in force in the world, online: The World Intellectual Property Organization Homepage<http://www.wipo.org/eng/main.htm>

[5] Under most legislations concerning inventions, the idea, in order to be protected by law ("patentable"), must be *new* in the sense that it has not already been published or publicly used; it must be *non-obvious* ("involve an inventive step") in the sense that it would not have occurred to any specialist in the particular industrial field, had such a specialist been asked to find a solution to the particular problem; and it must be *capable of industrial application* in the sense that it can be industrially manufactured or used. For further developments, *ibid.*

The intellectual property law is usually limited to the boundaries of the country whose government grants the rights. In order to receive protection in several countries, the owner of the invention will have to seek protection in these places. To guarantee the possibilities of obtaining protection in foreign States for their own citizens, in 1883, eleven States established the International Union for the Protection of Industrial Property, by signing the Paris Convention for the Protection of Industrial Property.[6] The World International Property Organization, hereafter WIPO, was established on July 14, 1967 to promote the protection of intellectual property rights throughout the world.[7] Although the Paris Convention required the filing of a patent in each foreign country, the concept of "international application" was introduced by the Patent Cooperation Treaty of June 19, 1970, providing a great simplification in the first steps of the procedure. However, national or regional patent agency retains the final responsibility for the grant of the patent.

The relevance of intellectual property in the space sector was examined with more accuracy for about ten years. This tendency corresponds to the current evolution of this sector. "New entrants and interests are taking shape and already today there is more private than public investment in space systems. The trend will continue strongly into the

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[6] *Ibid.*

[7] "In many ways, the WIPO is one of the most effective and well managed agencies of the United Nations. In addition to raising the level of protection for intellectual property generally, the WIPO has played a vital role in helping countries set up effective intellectual property regimes." G. J. Mossinghoff and V. S. Kuo, World Patent System Circa 20XX, A.D., in *Journal of the Patent and Trademark Office Society*, (August 1998, vol. 80, No 8), at 528.

next century, when it will be foreseeable to have more purpose for private enterprise than for State activity in outer space."[8]

This phenomenon already started with the commercialization of the International Space Station,[9] hereafter, the ISS. Due to the extremely high costs required to realize the biggest international technology project, a close cooperation between States was necessary, such as the introduction of an aerospace industry. The US Commercial Space Act of 1998[10] establishes the economic development of Earth orbital space as a priority goal.[11] Space Agencies, like NASA are preparing by developing a Commercial Development Plan for the ISS. Intellectual property is therefore of great relevance. It should be noticed here that a "derogatory regime" will apply to the space station. Although the space treaties will find application, a legal framework has been created to address specific questions to the Partners. The intellectual property is a part of the International Space Station Intergovernmental Agreement,[12] hereafter IGA.

Apart from the IGA, the problem of patent protection could be divided into two parts. On the one hand, although the space treaties do not contain any explicit regulation on intellectual property, there is no total vacuum as such in the international legal

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[8] M. Ferrazzani, "Space practices on the move," in *Proceedings of the 3rd ECSL Colloquium on International Organizations and Space Law*, Perugia, 6-7 May 1999, (ESA SP-442, June 1999).

[9] See infra Part II, introduction.

[10] Commercial Space Act of 1998, October 21, 1998, (Public Law 105-303).

[11] M. Uhran, "Commercial Development of the International Space Station", online: International Space University Homepage <http://www.isunet.edu/Symposium/Symposium99/Oral%20Abstracts/Uhran.html>

[12] Signed on January 29, 1998 in Washington D.C., between the European Partner (eleven Members), Russia, Japan, United States and Canada.

framework. As will be seen in the further developments,[13] outer space cannot be appropriated. Consequently, it is prohibited to exercise any sovereignty in this area. Nevertheless, through the jurisdiction and control mechanism, an artificial link will be established between a space object[14] and a State. For example, if a company plans to launch satellites containing high technology that has been protected by a patent, or even containing no specific patent, the company will have to register at a national and international level its space object. Under Article VIII of the Outer Space Treaty,[15] the Registration State will exercise its jurisdiction and control over that space object. In case of litigation, the law of that State will apply in the absence of specific provision on intellectual property.[16] The question of the validity of a patent for an invention created in outer space does not create difficulty: for most of the countries, as patent regulation is governed by the first-to-file system. As a consequence, no matter where the invention took place, the protection belongs to the first who files the invention. In a first-to-invent system, the date of invention is of important relevance and questions of evidence will arise. On the other hand, questions remain, such as ownership and use of rights in outer space, or infringement of an existing patent of a third party.

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[13] See infra 2.2. Intellectual Property and Non-appropriation.

[14] Although the notion of space object was subject of a great controversy, especially to know as to whether a space station is a space object (see infra Part II, Chapter I, Section I, 1.), it could be defined as follows: "generic term used to cover spacecraft, satellites, and in fact anything that human beings launch or attempt to launch into space, including their components and launch vehicles, as well as parts thereof." B. Cheng, in *Studies in International Space Law* (Clarendon Press, Oxford, 1997), at 463.

[15] Article VIII OST: "A State Party to the Treaty on whose registry an object is 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." See supra note 2.

[16] We will see in the course of the study that the United States have adopted a special law in 1990, extending the applicability of their Domestic law to outer space. 35USC 105, added by Public Law 101-580, Section 1(a), 15 November 1990, 104 Stat. 2863, with retroactive effect.

In the report of the third United Nations Conference on the Exploration and Peaceful Uses of Outer Space,[17] the title "Harnessing the potential of space at the start of the new millenium" expresses the issue of intellectual property in outer space. "The feasibility of harmonizing international intellectual property standards and legislation relating to intellectual property rights in outer space should be further explored with a view to enhancing international coordination and cooperation at the level of both the State and the private sector."[18] This thesis illustrates that even if no legal vacuum exists, the current system is not satisfying enough and does not give safety and trust to the industry.

In a first part, this study highlights the current framework and future issues of intellectual property rights in outer space with a focus on patent. The second part explores the specific-project agreement, the intergovernmental agreement, signed the 29th January 1998, and governing the relations between the Partners of the International Space Station.

[17] Vienna from the 19th to the 30th of July 1999, online: The United Nations Committee on Peaceful Uses of Outer Space, UNISPACE III Report at <http://www.un.or.at/OOSA /unisp-3/docs/docs.htm>

[18] Chapter II. Background and recommendations of the Conference G. Harnessing the potential of space at the start of the new millenium 8. Promotion of international cooperation (c) State and perspectives of international cooperation (ii) §405-407, at 71. *Ibid.*

PART I

INTELLECTUAL PROPERTY AND SPACE ACTIVITIES

The study of Intellectual Property Rights in outer space is relevant in regard of several aspects. However, Intellectual Property Rights on one side, and Space Law on the other side, both rest on different approaches, thus leading to potential conflicts.

CHAPTER 1

RELEVANCE OF THE INTELLECTUAL PROPERTY IN SPACE ACTIVITIES

The development of space business in the coming years will face tremendous growth. In 1998, worldwide space revenues rose to $97.593 Billion. The forecast for 1999 is $105,012 Billion and $137,822 Billion in 2002. These statistics[19] suggest an estimated $577,1 Billion in worldwide Space revenue, with a forecast growth of 9.01%. Why does intellectual property rights have a great role to play?

Any activity, when taking place in outer space, usually requires large amount of money as the cost of a launch remains very high, and except the US Space shuttle, the launch vehicles are expendable. A completely reusable launch vehicle will revolutionize space activities as it will considerably decrease the cost of achieving access to space NASA and Boeing have recently signed a four-year agreement to build a fly and single

[19] State of the Space Industry, Outlook 1999, *Summary of statistics*, (prepared by Space Publications in collaboration with International Space Business Council, 1999) at 5, 7.

X-37 reusable vehicle in orbit. "It would cut the cost of accessing space from $10,000 to $1,000 per pound."[20]

Any industry needs to be protected through the creation of patents, and especially in the high technology area, as the vast amount of money involved requires achieving a trusting relationship with the investors. It is necessary to guarantee safe investments, not only for current space activities but also for future ones.

Manufacturing in space, either for scientific or commercial purposes, underlines the significance of Intellectual Property Rights. In addition, issues such as transfer of technology and national secrecy are also closely linked to this notion.

Section 1. Commercial and Scientific Space Research and Manufacturing:

Scientific research in space activities will affect several fields. If we consider the medical field, for example, new experiments will be realized in microgravity, on the human body itself, but also on its psychological effects on the astronauts. Several parameters affect the human body in space, such as microgravity, solar radiation, extreme temperatures, and motion sickness. The bone intensity is modified. For example, during short-term flights, both cosmonauts on the 18-day Soyuz 9 flight lost 8-10% of their calcareous density.[21] Muscles, bones and the cardiovascular system are also deeply affected.

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[20] "X-37 Explores Reentry Risks," Aviation Week and Space Technology (McGraw-Hill Companies Pub., August 9, 1999), at 72.

[21] C. Cann, S. Churchill & R. Edgerton, "Response of Bones and Muscle Systems to Spaceflight" in A. Houston and M. Rycroft Ed., *Keys to space, an interdisciplinary approach to space studies* (McGraw-Hill 1998), 18-23.

Although these phenomena have been studied in the course of space lab experiences, most of the former space mission took place in Low Earth Orbit, where astronauts did not experience the effect of deep space radiation. This question is an important stake for the future space missions in order to make possible human space flights in deep space. Furthermore, with the longer missions that will take place in the International Space Station, we will have to take into account the effects of longer periods of time under microgravity and the consequences of isolation and confinement.

Commercial space research in a microgravity environment will also give the opportunity to test improved and new materials (e.g. biomedical drug development). The Research and Development technology will be improved thanks to research on propulsion systems, thermal control, optics or high-temperature materials. Furthermore, telecommunications, spacecraft manufacturing, launch vehicles, ground equipment, and global positioning system services are part of the current and planned commercial applications that underline the importance of intellectual property in outer space. On the commercial side of space activities, these prerequisites seem naturally essential, as we are in a highly competitive environment.

In the telecommunications sector, for example, even if the satellite infrastructure has to be completed by a fiber network, a large range of opportunities will be offered to the space industry. The mobile satellite services and fixed satellite services represent an important part of this market. With the fixed satellite, multiple services will be available for the customer, such as telephony transmission, cable & video transmission, broadband services, private business network, Internet access, telemedecine and tele-education. Thanks to the development of high-resolution data, remote sensing will also be used in

many applications, such as agriculture, civil planning, and mining. The Geographical Information Systems (GIS), combined with different kinds of data, are also of great interest for the industry.[22]

In order to materialize these projects, vast investments are necessary. Since states are no longer the sole partner in the space sector. There is a growing tendency toward the involvement of private companies. As their investments are essential, these companies will look for strong protection of their interests. The importance of the return on investment may be illustrated by the recent difficulties met by the company Iridium. This company has launched its constellation of mobile satellites, offering to the customers the possibility to be reached in remote areas thanks to powerful cellular networks.[23] The cost related to the manufacture and launch of satellites was very high, and unfortunately the return on investment too slow. As a result, the commercialization did not reach the level that was expected by its managers. and Iridium is now under the US procedure of Bankruptcy, attempting to have a recovery package or to be transferred. "Iridium's filing for Chapter 11 bankruptcy buys the troubled venture some more time, but analysts say the company must move swiftly to survive."[24]

Although in this case, the difficulties have nothing to do with intellectual property aspects, the lesson of this failure is that in order to create a business in space, the return on investment has to be taken into account. "With the shift toward private entrepreneurial

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[22] See generally supra note 19.

[23] "One of the key features that the new services will offer is the option to link a satellite phone with terrestrial wireless services. The integration of the satellite component will allow phones to operate in developing countries, in the mountains, on the oceans, in aircraft or anywhere traditional cellular services are not available." See supra note 19, at 43.

[24] "Iridium's Future Up in the Air," *Aviation Week and Space Technology*, August 23, 1999.

space ventures foreseen for the next few decades, industry will be looking for, and the law will evolve toward, means to protect private creative endeavors in space."[25] In any venture, detailed provisions on proprietary rights are stated. The consequence of any unfair practice related to the protected rights must be considered. This protection requires extending it in all the countries where the proprietor considers his patent shall have an effect. The choice of the country will depend on its level of involvement in the space arena. For example, if the future commercialization of an invention made in the space station is to take place in a certain country, its initiators had better file a patent in that country. These questions lead us to examine the problem of technology transfer and national secrecy, which are closely related to Intellectual Property aspects.

Section 2. Question of Transfer of Technology in the Private Sector and National Secrecy:

The intellectual property is a significant issue, and according to Mrs. Balsano and M. Smith, "we deal with Intellectual Property as a tool for controlling the transfer of technology."[26]

The existence of companies such as INTOSPACE proves the significance of intellectual property protection. This German company, defines its activities as follows: To promote, initiate, and support microgravity space activities such as research, development and commercial production tasks to be carried out in space, as well as to

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[25] B. Luxenberg and G.J. Mossinghoff, "Intellectual Property and Space Activities," in *Journal of Space Law* Vol. 13, No 1, (1985), at 8.

[26] Anna-Maria Balsano & Bradford Smith, "Intellectual Property and Space Activities: A New Role For COPUOS," in *Outlook on Space Law over the 30 years*, G. Lafferranderie Ed. (Kluwer Law International, 1997), at 364.

render assistance and consultation with respect to such space activities.[27] These measures will ensure the confidentiality of the scientific data through a contractual protection as the interests of each party are quite specific and often polar opposites. INTOSPACE helps the parties to reach a compromise.[28] In the space industry, the players are governments, institutions, and private companies, which are usually working together but representing different countries and consequently specific interests. It will be tricky to entrust a satellite just manufactured to a company that will be in charge of the launch. Suspicions and conflicts could quickly arise. In order to prevent them, trade secret considerations are established in common law as well as civil law countries, through the statement of nondisclosure agreements. Consequently since the United States have accorded a specific importance on intellectual property considering it in the context of technology transfer, they have adopted a specific legislation: The oversight of the international contracts has been transferred from the Department of Commerce to the Department of State and provides a specific procedure in case of a satellite hardware and systems sale to a non-US contractor. Through this obligation, the US government exercises its control over that type of commercial operation, assuring the protection of the national technology. On the other hand, this policy might be an obstacle in the course of the satellite commercialization if the level of control exercised by the government is too high.

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[27] A. Lemius, "INTOSPACE: Applied Research in Space – Experience and Prospects of Contractual Practice," in *Proceedings of the Workshop Intellectual Property Rights and Space Activities*, European Centre for Space Law ESA Headquarter Paris, 5 & 6 December, 1994, (ESA SP-378, January 1995).

[28] "On the one hand, the launch service entity needs a maximum of information about the experimenter's payload sent into space in order to assure the security and the success of the mission, as well as information about the results obtained to be able to evaluate the efficiency of its launch or space experiment facility. On the other hand, the researching company desires to keep its efforts and scientific results secret in order to secure its investments. The confidentiality is essential for a future commercial application and exploitation of the scientific results. Therefore the access to and the disclosure of the results must be restricted", ibid, at 134.

Having examined the relevance of intellectual property, we will further precise its content in relation with space law in order to have a critical view of the different approaches.

CHAPTER 2. INTELLECTUAL PROPERTY RIGHTS AND SPACE LAW: DIFFERENT APPROACHES

It is important to keep in mind that safe rules applied to the space industry can create a conducive environment for current and future commercial successes. "The only sectors in which commercial activities have been sustained for a period long enough to allow for reasonable predictions on an empirical basis concern space transportation and communications satellites."[29] We will see that the main characteristic of intellectual property law is that this concept is based on territoriality, while the main feature of outer space is that it is outside any sovereignty. The problem is to determine how a patent can be protected in outer space. After a review of the basic legal principles concerning intellectual property law, we will examine how may difficulties arise when dealing with outer space.

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[29] P. Malanczuk, "Actors: States, International Organizations, private entities," see supra note 26, at 35.

Section 1. Legal Principles of Intellectual Property Rights and Outer Space May Lead to Potential Contradictions:

This section will emphasize on intellectual property rights principles that may have an impact on space law and *vice versa*.

1. Intellectual Property Rights and Patent Law:

1.1 Basic Mechanism:

Intellectual Property Rights have evolved for centuries,[30] based on a terrestrial context, without concern about their application in outer space. The main forms are: Trademark, trade secret, copyright and patent protection.[31] "When appropriate protection is obtained and maintained under law, the proprietor (or owner) of the right may exclude others from its practice, has legal redress in the event of misappropriation or unauthorized practice (infringement), and/or may authorize or permit (license) others to practice the right under acceptable terms and conditions. The exclusive rights afforded under a patent include the right to make, use and sell the patented invention."[32] In order to be patented, the invention must be new, must involve an inventive step, and must be industrially

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[30] The history of intellectual property could be divided in three main periods, distinction made by the World Intellectual Property Organization: a system based on privileges granted by the sovereign (15th to 18th Centuries), the national patents (1790 to 1883, the United States first patent law was in 1790 and the French law, in 1791) and the internationalization starting in 1883, "History and Evolution of Intellectual Property," see note 1, at 17.

[31] Despite that each of them can find application with space activities, however we will only focus on patent.

[32] R.F. Kempf, "Proprietary rights and commercial use of space stations," *International Colloquium on Commercial Use of Space Stations*, Hanover, Federal Republic of Germany, June 12-13, 1986.

applicable.[33] Patent law is thus fundamentally national in its origin and in the scope of its application; albeit, there exist efforts toward international harmonization. Finally, following the appropriate Patent Office procedure and the grant of the patent, the patentee receives the exclusive right to exploit his invention. In order to determine a link between a patentee or inventor and a country through which jurisdiction will be exercised, two main criteria can be taken into account: The territory or the nationality.

1.2 Types of Jurisdiction:

Jurisdiction is traditionally divided in three parts: Personal, territorial and quasi-territorial. In the case of personal jurisdiction, the State will exercise its jurisdiction depending on the nationality of the individuals or corporate bodies having its nationality; even if they are on the territory of that State. This question will create some difficulties when, for example, in the International Space Station, the experiences will be led by more than one person. Under the territoriality jurisdiction, a State will exercise its governmental powers within the territory over all persons and things. In international law, a territory includes the land, the territorial waters and the airspace above and parts on which the State exercises its sovereignty. The quasi-territorial jurisdiction is the sum total of the powers of a State in respect of ships, aircraft, and spacecraft having its nationality.[34]

Apart from these terrestrial mechanisms, there are also models of terrestrial cooperation, which recognize the existence and protection of joint inventions. In this case,

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[33] "General principles applying to patents," in *Intellectual Property Rights and Space Activities in Europe* (ESA, February 1997), at 13.

[34] For more details on this distinction, see supra note 14, at 72.

each party will ensure the protection of the invention in its own country on behalf of both parties, and has an exclusive right to use it in the territory of its own country.[35] Since outer space is under any jurisdiction, the protection does not extend to it. It is difficult to refer to a specific territory in outer space as activities may occur on orbit, on a space station, or on a different planet. However, this rule contains exceptions: For technical reasons, extra-territorial aspects of national law are applied. The classic example concerns the ships (national flag) and the airplane (national registration). We will see that space treaties do not give clear answers concerning the legal regime of intellectual property in outer space. Nevertheless, specific mechanisms contained in space law are used to respond to this problem.

2. Place of Intellectual Property in International Space Law:

The main principles governing space law can be synthesized as followed: Outer space can be used but not appropriated,[36] and must be used for peaceful purposes.[37] The State is responsible for the activities of its private sector entities,[38] and the "launching

[35] Dr. O. Vorobieva, "Intellectual Property Rights with respect to Inventions Created in Space", in S. Mosteshar, *Research and inventions in outer space, liability and intellectual property rights*, (Dordrecht, 1995), at 180.

[36] Outer Space Treaty, Art. II, see supra note 2.

[37] Outer Space Treaty, Art. IV: "States parties to the Treaty undertake not to place in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner. The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes." *Ibid.*

[38] Outer Space Treaty, Art. VI: "States Parties to the Treaty shall bear international responsibility for national activities in outer space (...) whether such activities are carried on by governmental agencies or by non-governmental entities." *Ibid.*

state"[39] is internationally liable for damages to a third Party.[40] The Registration Convention provides an obligation to register a space object[41] on which the State of registry retains the jurisdiction and control.[42] Space activities are conducted in respect of international law, "including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding."[43] The United Nations play an important role in space activities, since space treaties were elaborated by the United Nations Committee on Peaceful Uses of Outer Space, and most decisions in this field are made through this international organization.

Conferences took place within the United Nations, called the United Nations Conference on the Exploration and Peaceful Uses of Outer Space (hereafter UNISPACE). UNISPACE I (1968), UNISPACE II (1982) and UNISPACE III (1999)[44] in Vienna focused on the benefits that space could bring to developing countries. An important issue

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[39] Liability Convention, Art. I (c): "The term "launching State" means: (i) a State which launches or procures the launching of a space object; (ii) a State from whose territory or facility a space object is launched." *Ibid.*

[40] Outer Space Treaty, Art. VII: The launching State "is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its components parts on the Earth, in air space or in outer space, including the moon and other celestial bodies." *Ibid.*

[41] Registration Convention, Art. II: "When a space object is launched into earth orbit or beyond, the launching state shall register the space object by means of an entry in an appropriate registry which it shall maintain." *Ibid.*

[42] Outer Space Treaty, Art. VIII: "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". *Ibid.*

[43] Outer Space Treaty, Art. III. *Ibid.*

[44] UNCOPUOS Homepage, see supra note 17.

concerned the implementation of Article I of the Outer Space Treaty,[45] as its provisions are very broad and the obligations not clearly stated.

In 1996, a United Nations Committee on Peaceful Uses of Outer Space conference led to the adoption of the "Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interests of All States, Taking into particular Account the Needs of Developing Countries," Paragraph 2 states as follows: "States are free to determine all aspects of their participation in international cooperation in the exploration and use of outer space on an equitable and mutually acceptable basis. Contractual terms in such cooperative ventures should be fair and reasonable and they should be in full compliance with the legitimate rights and interests of the parties concerned, as, for example, with intellectual property rights."[46] This text tends also to promote international cooperation and facilitate the exchange of expertise and technology among states on a mutually acceptable basis. Consequently, the important role of Intellectual Property was fully recognized for the first time in a United Nations Space Resolution.

There are no provisions in the space treaties or in the recent resolutions adopted by the United Nations General Assembly dealing with the protection of intellectual property in outer space. Nevertheless, there are two space law principles that are directly connected with this problem: The non-appropriation rule and the benefits clause.

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[45] Outer Space Treaty, Art. I.: "Outer space (...) shall be free for exploration and use by all States" and art. II, it "is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." See supra note 2.

[46] Text of Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefits and in the Interests of all States, Taking into Particular Account the Needs of the Developing Countries, A/AC.105/L.211 (06.11.96)

2.1 Intellectual Property and the Benefits Clause, Article 1 of the Outer Space Treaty:

Article I of the outer space treaty states that "the exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind." "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 the basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies." This principle titled as "Space benefits," has been affirmed for the first time in the United Nations Resolution of 1963.[47]

Paragraph 5 of the 1996 Declaration[48] states that "International cooperation, while taking into particular account the needs of developing countries should aim, inter alia, at the following goals (...) Facilitating the exchange of expertise and technology among States on an mutually acceptable basis." These provisions underline again the role of intellectual property, and reinforce the necessity to have a strong legal regime on this matter.

The protection granted, through intellectual property rights to the space industry cover the following consequences: Invention secrecy, exclusivity of rights and appropriation of technical experiments results realized in outer space. Article I of the Outer Space Treaty provides that the exploration and use of outer space is for the benefit

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[47] Resolution 1962 (XVIII) of 13 December 1963, in *Space Law and Institutions*, Documents and Materials, edited by Ivan A.Vlasic, Institute of Air and Space Law, McGill University, 1997.

[48] See supra note 46.

and in the interest of all countries, implying a sharing of information. "The practical realization of the principle, however, depends on the operation of cooperation and knowledge-transfer mechanisms."[49] It is more protection's excesses that is critical. States and industries, through the appropriation of trade secret for example, prevent other group of people to develop the same technology.

2.2 Intellectual Property and the Non-Appropriation Principle, Article II of the Outer Space Treaty:

Before the Outer Space Treaty was adopted in 1967, the General Assembly of the United Nations established fundamental basic rules into two resolutions included in the Outer Space Treaty of 1967. In 1961, Resolution 1721 (XVI) stated that "Outer space and celestial bodies are free for exploration and use by all states in conformity with international law and are not subject to national appropriation."[50] The fact that this type of resolution is not binding does not prevent certain States[51] to consider them as recommendations. The second, Resolution 1962,[52] constitutes an important aspect in the Cold War development, because the United States and the USSR mainly initiated this agreement. This article raises the same question as did Resolution 1721. "Outer space,

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[49] F. Marcelli, "Space Research and Common Benefits for the Humanity," in *Il Diritto Industriale E Le Attività Spaziali in Europa / Intellectual Property and Space Activities in Europe*, Osservatorio di Proprietà Intellettuale Concorrenza & Telecomunicazioni (CERADI) LUISS - GUIDO CARLI & the European Centre for Space Law/European Space Agency, Roma, November 11, 1996, at 79.

[50] Resolution 1721 (XVI) of the 20 December 1961, "International cooperation in the peaceful uses of outer space," 108th plenary meeting, see supra note 47.

[51] Romania and France.

[52] See supra note 47.

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."[53]

The principle of non-appropriation could be defined as the absence of territorial jurisdiction, implying also the absence of appropriation under private law. During the negotiations of the Treaty, the Belgium delegation reminded the interpretation of this principle, explaining that it is "covering both the establishment of sovereignty and the creation of titles to property in private law."[54] For the French delegation, "non-appropriation is merely the logical consequence of non-appropriation under international law. Non-appropriation in the treaty refers to national appropriation under the international law."[55] Under international law, outer space constitutes a *re extra commercium*, since no one can appropriate this area. Article II of the Outer Space Treaty is often cited as the non-appropriation principle; also interpreted as the non-sovereignty provision.

If there is no territorial sovereignty in outer space, this does not mean that States can not exercise their authority at all over this area. Professor Bin Cheng distinguishes the traditional aspects of sovereignty that are prohibited (national appropriation) and the functional aspects of sovereignty (the exercise of sovereign rights); distinction which is especially important in Intellectual Property matters.[56] States are prevented on a uniform

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[53] See supra note 2.

[54] (4.8.66) A/AC.105/C.2/SR.71 in *Studies in International Space Law*, by M. Bin Cheng, Clarendon Press Oxford, 1997, see supra note 14.

[55] (17.12.66) A/C.1/SR.1492, see note supra 14.

[56] S. Gorove, "Sovereignty and the law of outer space re-examined", *Annals of Air and Space Law*, vol II, 1977), at 320.

basis from establishing "proprietary links."[57] Although outer space is not subject to territorial jurisdiction, there are sovereign types of jurisdiction that can be exercised in certain conditions. The non-appropriation principle and the benefits clause[58] are two pillars of the outer space treaty; thus it is necessary to take them into consideration as well.

2.3 Jurisdiction and Control:

Article VIII of the Outer space Treaty states that "a State party to the Treaty on whose registry an object is 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." In the international conventions, "space object" is the term used for spacecraft and satellites, and in fact "anything that human beings launch or attempt to launch into space, including their components and launch vehicles, as well as parts thereof."[59] As the jurisdiction applies not only to spacecraft but also to the personnel on board, it is to be considered as a quasi-territorial jurisdiction. This provision constitutes an extension of a specific national law to permit its applicability over these space objects and astronauts through national and international registration requirements.[60] The State party to the treaty that shall retain jurisdiction and control over space objects and over any

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[57] Dr. K. H. Böckstiegel, Dr. P. M. Krämer, "Patent Protection for the Operation of Telecommunication Satellite Systems in Outer Space?" (Part II), *Zeitschrift fur Luft und Weltraumrecht (ZLW)*, German Journal of Air and Space Law, 1998.

[58] See infra further developments on the developing countries and space in Section 3. Future trends.

[59] B. Cheng, supra note 14, at 463.

[60] Outer Space Treaty, Art. VIII. Supra note 2.

personnel thereof, while in outer space or on a celestial body, is the State in which the object was registered.

In a certain way, we can consider that through this artifice, the sovereign rights of a State will apply outside its territory. In a recent article,[61] Dr. K. H. Böckstiegel, argues that thanks to this mechanism, space objects and their crew maintain a link with a State because they "do not pass into a legal vacuum during their sojourn in the extraterrestrial zone." Such a proposition is valid as long as space activities are related to earth (telecommunications, remote-sensing satellite, or use of a space station). In these conditions, the State of Registration is admitted to use its national patent law for a specific space activity. Although this artifice is very practical and necessary because it renders the law applicable in the absence of unified Intellectual Property space law; the situation may evolve in the future when we will have to deal with space to space activities, for example, the launch of a space object occurring from a planet different from Earth.

It is clear that a patent on a satellite can be granted for the safe use of its new technology, but as outer space is governed by the non-appropriation principle, "the real issue is whether patents can be protected in outer space as outer space is outside any state's sovereignty."[62] The jurisdiction that can be exercised concerns only the objects or the person (this will be the case in the new International Space Station).[63] As outer space

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[61] "What has been prohibited under the clear language of Article II of the Outer Space Treaty is "national appropriation" of outer space." Dr. K. H. Böckstiegel, Dr. P. M. Krämer, "Patent Protection for the Operation of Telecommunication Satellite Systems in Outer Space? (Part I)", *Zeitschrift fur Luft und Weltraumrecht (ZLW)*, German Journal of Air and Space Law, 1998, at 15.

[62] See supra note 26, at 367.

[63] See infra Part II.

is not a territory, and a patent has the attributes of personal property, how can a patent receive any protection?

The main inadequacy of space law relates to the lack of international bodies. There is no national or international regulator of intellectual property in outer space. As a matter of fact, when a patent is filed in a national agency, no research is made concerning the opportunity of the patent in regard to space law. This field is never taken into account. The question was resolved in the United States by the creation in 1990 of a specific domestic law for space.[64] A couple of real cases illustrate this issue which also demonstrate conflict of law.

Section 2. Illustration of the Problem:

1. Consequences of the Potential Contradictions:

The potential contradictions can be explained as followed: On one hand, Outer space, under an international statute, is a *res extra commercium*,[65] and the main rule governing this extra-atmospheric area is that it shall be free for use on a peaceful basis and shall not be appropriated. Consequently, its use cannot be restricted. On the other hand, we have a tremendous development of commercial space activities involving ventures that require high financial support. As a consequence, protection of these operations through intellectual property will become more and more relevant: How can we conciliate the exclusive right granted to an inventor and the benefit clause of the outer space treaty or the non-appropriation principle? The debate simultaneously involves

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[64] See supra, note 16.

[65] See supra 2.2 Intellectual Property Rights and Non-Appropriation Principle.

public international law, the freedom of use of outer space, public interest, and the large expectations of the space industry.

When outer space became part of international public law, most of the players were States and International Organizations. The space law magna carta[66] was elaborated during the Cold War and most of its provisions relate to States. The philosophy under these space treaties is to prevent the States to commit any claim of sovereignty over this area. In fact, the entire spirit of the space treaties differs from what happens on earth. As we have seen above,[67] the non-appropriation principle and the space benefit clause are two main rules governing space law. There are also provisions in the outer space treaty that share the same goal: for example, the principle of co-operation and mutual assistance,[68] that is expressed in the outer space treaty, contains the rule of dissemination of information. State Parties conducting activities in outer space have agreed to inform the Secretary-General of the United Nations, as well as the public and the international scientific community, when feasible and practical, of the nature, conduct, locations and results of such activities.[69] Although this obligation is not clearly defined,[70] we can see that this type of requirement is specific to space activities. Article I goes further, requiring

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[66] The five main space treaties, see supra note 2.

[67] See supra 2. Intellectual Property Rights and Space Law.

[68] Outer Space Treaty, Art. IX: " 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 the celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty." See supra note 2.

[69] Outer Space Treaty, Art. XI. *Ibid.*

[70] Article XI OST is often criticized, "an absolute supine provision, which in due course, proves to be even an embarrassment." B. Cheng, see supra note 14, at 404.

the share of the benefits. Even if this provision is intended to assure States act in good faith, and not to share the financial benefits of their activity, what we could call the "space treaties spirit" remains. Art. XV of the Moon Treaty contains a provision that would also be surprising if it had to do with earth activities: it allows a State Party to the Treaty to visit the facilities of one another on the moon, subject to reasonable notice and the taking of maximum precautions to assure safety, and to avoid undue interference. It is clear that the intend is to avoid competition, and to promote international cooperation.

The goal of intellectual property rights, and especially patent law is to protect a specific interest through the grant of an exclusive right. Once an invention has been made, the inventor will of course not share his work, nor open his door to let his competitor have a look at it; the disclosure will intervene only when he will apply for a patent, not before. As the invention was developed on earth, the question of ownership, except when it is the result of a joint development, does not create any specific difficulty. In outer space, ownership is prohibited. Consequently, in order to safely materialize the progress of science, it will be necessary to conciliate these principles that may appear to be antagonistic.

In fact, the legal technique should be a tool to encourage such developments. Depending on the interpretation that is given to the Outer Space Treaty, we could consider that in the early ages of space law, the place of private companies was foreseen: Reference is indirectly made to the private sector in article VI on the responsibility, providing that States Parties to the Treaty shall bear international responsibility for national activities in outer space (...) whether such activities are carried on by governmental agencies or by non-governmental entities. "National activity" could be

interpreted as covering all the activities that are within its territorial or quasi-territorial jurisdiction.[71]

When we explore the question of intellectual property in space activities, we deal with a growth of private companies' involvement, but also the application of concepts of private law in a public field. "Private actors will bring with them into outer space a range of legal instruments and practices to which they are used and more confident, ranging from private property to economic and financial law up to trade issues."[72] Illustration of these questions can be seen through recent cases.

2. Cases:

As a preliminary, we will have to look at a specific patent rule: The temporary presence doctrine. As seen above,[73] a patent confers to his inventor an exclusive right. This principle contains exceptions. "One of these exceptions is the temporary presence that provides for certain limitations on exclusive rights in case where ships, aircraft or land vehicles temporally visit foreign countries. Such temporary presence is not considered as an infringement[74] of a patentee."[75]

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[71] *Ibid*, at 238.

[72] M. Ferrazzani, "Space practices on the move", see supra, note 8, at 334.

[73] See supra 1.1 Basic mechanisms of Intellectual Property Rights.

[74] "Infringement of a patent consists of the authorized making, using, offering for sale or selling any patented invention within the United States or United States Territories, or importing into the United States of any patented invention during the term of the patent." Infringement of a patent, US Patent and Trademark Office, online: <http://www.uspto.gov/web/offices/pac/doc/general/infringe.htm>

[75] R. Oosterlinck, "Intellectual Property and Outer Space Activities," (Lecture on Space Law, Institute of Air and Space Law, McGill University, 1998) [unpublished], at 36.

The question has been raised as to whether this doctrine would apply in the case of spacecraft. Before the question of applicability of patent law on spacecraft was raised, courts had to look at claims concerning ships. The Federal Court held in 1865 that US Patent Law applies to a US merchant vessel on the high seas.[76] The 1952 amendments to the Patent Code included a definition of the United States that limited the patent laws to the fifty States, territories and possessions of the United States. The question was formulated by the Court of Claims[77] as to whether US Patent law would apply to ships. Concerning the spacecraft based on the "integrated instrumentality" criteria, the Court held in 1966[78] that US Patent law applies to an invention practiced on an orbiting spacecraft because the control stations are located on the US territory.[79] In 1981, US Congress stated that spacecraft are vehicles and consequently, their presence is temporary.[80] Until more recently, the main cases dealing with the problem of intellectual property in outer space are Hughes Aircraft Co. v. United States and TRW v. ICO Global Communications.

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[76] Gardiner v. Howe, 9 Fed.Cases 1157 (1865).

[77] Decca Ltd v. United States, 544 F. 2d 1070,1073 (Ct.Cl. 1976).

[78] Rosen v. NASA, 152 USPQ 757.

[79] See generally J. B. Gantt, "Space Station Intellectual Property Rights and US Patent Law", in *Proceedings of an international Colloquium on the Manned Space Stations* – Legal issues, Paris 7-8 November 1989 (ESA SP-305 February 1989).

[80] 42 USC Enactment, § 2457 (1).

2.1 Hughes Aircraft Co. v. United States 29 Fed. Cl. 197 (1993):

- **Patent description**: A US patent[81] was filed in April 1960 by Hughes Aircraft Co. (HAC). This patent was aimed at creating a system to get and maintain a satellite attitude on orbit. It covered an apparatus for the spin axis orientation of spin-stabilizes space vehicles.[82] Proper attitude is necessary in order to allow the satellite to properly aim its directional antennas in order to fulfill communications missions, and in some platform architectures, to orient the solar energy collectors to supply electrical energy to the payload.[83] The Patent was issued on 11 September 1973, receiving the name of his inventor, Williams. Between 1974 and 1984, NASA used this technology in several spacecrafts which had no link with the US territory except that they were launched by NASA. This international program contained several spacecraft; Helios (Germany and US), ISEE[84] (ESA and US), Ariel (NASA and the Science Research Council of the UK) and AMPTE[85] (Germany and US, Germany and UK).

- **Lawsuit**: An action has been brought by HAC against the United States pursuant to 28 USC 1498 seeking just compensation for unlicensed use or manufacture of

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[81] (US 3.758051) "Velocity control and orientation of a Spin Stabilized Body."

[82] See in Copyright © 1998 The Bureau of National Affairs, Inc. BNA, TRADEMARK & COPYRIGHT LAW DALY (April 24, 1998).

[83] B. L. Smith, E. Mazzoli, "Problems and Realities in Applying the Provisions of the Outer Space Treaty to Intellectual Property Issues", Paper presented at the 1997 International Institute of Space Law Colloquium during the International Astronautical Federation Congress in Turin, (IISL-97-IISL-3.05).

[84] The International Sun-Earth Explorer Program.

[85] The Active Magnetospheric Particle Tracer Explorer.

fourteen spacecrafts containing the patented device. The litigation lasted ten years before the first decision was finally reached.

- **Legal issues involved**: Section 1498(a) of title 28 of the United States Code contains the following provisions: "Whenever an invention described in and covered by a patent of the US is used or manufactured by or for the United States without license of the owner thereof or lawful right to use or manufacture the same, the owner's remedy shall be by action against the US in the US Court of Federal Claims for the recovery of his reasonable and entire compensation for such use and manufacture." It imposes liability on the government if three conditions are met. There must be use (1), use must be "by or for" the US (2), and the use must be within the US[86] (3).

(1)As the word "use" was not defined by Congress, the US Court of Federal Claims stated: "For purpose of this case, it is important to consider whether launching a spacecraft constitutes a use of the patent. Hughes Aircraft makes clear that the availability of the attitude control system on the spacecraft at a time when the spacecraft is being operated constitutes a use of the patent." It also had to be determined whether the spacecraft used by the government constituted an infringement of the Williams patent: Spacecraft were foreign-manufactured, foreign-owned and launched from the US territory but from command centers outside the US. For the government, there was no "use" within the US as it concerned foreign satellites and if by any chance, the "use" was established the

temporary doctrine would prevent the qualification of infringement to apply. For the Federal Court of Claim, "it is the spacecraft as a whole whose use constitutes a use of a patent."[87]

(2) Considering the control exercised by the government over this project, the Federal Court also held that "those cases stand for the principle that US involvement in a joint international space program will be sufficient to make any use of the spacecraft a use "by" or "for" the government within the meaning of §1498 (a) if the project is a cooperative one with the potential of substantial benefits to the US."[88] As we can see this is a very broad interpretation of the law that is allowed here, following one goal: the applicability of the US Patent Law.

(3) Finally, the judges had to determine the applicability of §1498 to activities in Outer Space: "We need not decide whether international law prohibits the extension of our patent laws to activities in outer space on foreign spacecraft because we conclude that Congress has not extended §1498 to cover those activities. Part of §1498 states that it "shall not apply to any claim arising in a foreign country". As outer space is not a foreign country, the question was raised as to whether the article would apply or not. Based on the decision Smith v. United States,[89] it was decided not to apply this provision to outer space.

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[86] *See* supra note 33, at 108.

[87] Hughes Aircraft Co. v. United States, 29 Fed. Cl. 197 (1993), *Journal of Space Law*, 1996, at 185.

[88] Ibid, at 187.

[89] About §1498 (a), "the presumption is rooted in a number of considerations, not the least of which is the common-sense notion that Congress generally legislates with domestic concerns in mind." Smith v. United States, 113 S. Ct. 1178, 1184 (1993).

The Court also did an analysis of the US Code and held that the patent law has no extraterritorial effect. Finally, the government was declared liable for three of the spacecraft.

This case encouraged the adoption of the US Space Bill: In 1990, section 105 was added to Chapter 10 of title 35 United States Code, called "inventions in outer space"[90] extending the applicability of US Patent Law to US registered space objects.[91] In fact, this Act does not apply to "any process, machine, article of manufacture, or composition of matter, an embodiment of which was launched prior to the date of enactment of this Act." It is highly plausible that the Court would have applied the Space Bill if the launch had occurred before the enactment of the Act. But even in that case, there is no definition of what constitutes an infringement.

It is clear that the US domestic law does not resolve all the problems. Moreover, we will see in TRW v. ICO Global Communications, that although the US Space Bill authorizes the extra-territorial application of US Patent Law on space objects, it does not cover every situation.

2.2 TRW V. ICO Global Communications:

- **Patent protection**: The company TRW, partner with Teleglobe in the Odyssee project, planned to launch twelve satellites in medium earth orbit in order to start the commercial exploitation in 1999. ICO Global Communications, whose major investor is the International Maritime Satellite Organization (INMARSAT), also,

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[90] See supra note 16.

[91] See infra the Chapter 3, Section 1, the United States.

planned to launch twelve satellites on the medium earth orbit and start in the year 2000. TRW filed a first patent with the United States Patent and Trademark Office, as a way to protect its systems.[92] The company decided in 1992 to extend the protection in Europe by filing a European Patent.[93] In 1995, a new US patent,[94] concerning this time the use of medium Earth orbit was created. The European corresponding patent was also filed.[95]

- **Lawsuit**: At that time, ICO Global Communications, a British company, planned to launch its satellites on the same altitude, 6,300 miles. TRW decided in 1996 to sue ICO in Los Angeles Court, claiming that ICO had infringed on its patent.

- **Legal issues**: The elements of the claim had the following characteristics:[96] Launch of a constellation of satellites to between 5, 600 and 10, 000 nautical miles above the Earth, at least one satellite to have a reduced antenna field of view, less than full earth average, the satellites to be oriented in a plurality of predetermined orbital planes, receiving radio frequency signals by at least one satellite from a plurality of mobile handsets with omni-directional antennas, overlapping of a portion of the coverage region of a departing satellite with a portion of the coverage region of an arriving satellite, and predetermined criteria for the

[92] serial patent n. 07/688,412 (04.22.91)

[93] application n. 92300781.9 (01.30.92)

[94] serial patent n. 5,433,726 (05.16.95)

[95] European Patent EP 510 789 (March 1997)

[96] See supra, note 83, at 5.

assignment of calls to or from users within the coverage overlap region from a departing satellite to an arriving satellite. The first part of the claim, the location of the satellites, is the most critical point of this case in regard to the intellectual property problem.

The TRW mobile communications system has been protected in such a way that it would have been impossible to launch satellites on the same orbit.[97] As a consequence, ICO Global Communications would be prevented from realizing its project. The TRW patent constitutes a clear violation of the Outer space Treaty:

- **Patent and OST**: Article I provides that the "use of outer space...shall be carried out for the benefit and in the interest of all countries", and on article II, "Outer space...is not subject to national appropriation." Not only TRW's patent would prevent a British competitor to develop its own system, but it also attempts to reserve an "orbital shell"[98] around the earth through its patent. The patent provides a monopoly over the use of the earth orbit.

This case was dismissed in the first instance, as no infringement had yet occurred because the satellites were still under construction. A judgment against ICO Global Communications would have resulted in an injunction, which would have enhanced a tremendous loss as this project was evaluated at $US 4 Billion in installation and five to ten times that sum in revenues.

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[97] "The main claim of this patent may be interpreted as reserving an orbital "shell" surrounding the earth between the altitudes of 5600 and 10,000 nautical miles, for virtually all conceivable practical applications in the field of satellite-based communications to mobile handsets." See supra note 81, at 5.

[98] See supra, note 83, at 5.

The parties finally came to an agreement: On December 1997, TRW decided to drop its patent infringement lawsuits against ICO in return for a seven-percent share in ICO. However, it would have been interesting to see if the courts had invalidated the patent or not from the outer space Treaty viewpoint. Not only did the United States ratify the Treaty, but this convention is also considered as international customary law. "In view of the broad adherence to the Outer space Treaty, including all States having significant space capabilities and the absence of any objection to its principles, it is persuasive that most of the provisions of the treaty have now become part of the customary international law, binding upon States which have not ratified the treaty, or even upon any state which might choose to withdraw."[99] In the current development of the satellites telecommunications system, the intellectual property might be used strategically by States. "Beyond the TRW granting controversy and its dispute with ICO Global Communications, any future grant of exclusive rights over any part of outer space by a national agency may be contrary to international law."[100]

Section 3. Future Trends:

Considering the future of space law and the current status of satellite constellations, there are two main aspects, which have to be examined: The impact of the satellite space infrastructure and the role of the developing countries. There are numerous

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[99] Citation of a 1989 report to NASA by a team headed by R.B. Bilder, a professor of Law at the University of Wisconsin, by Harrisson H. Schmitt, "Space Treaty Permits Resource Use", *Space News*, No.22 (June 17, 1998).

[100] S. Mosteshar, "Satellite Constellation Patent Claim, Some Space Law Considerations," in *Telecommunications and Space Journal*, (Serdi Publshing Company, vol.4, 1997), at 252.

projects[101] implying the launch of satellites constellation on outer space, and the number of satellites involved differs from one constellation to another. Usually, a constellation is made up of ten to twenty satellites. In some cases, it can be more. For example, Teledesic[102] includes more than 200 satellites. As they will need a lot of place in outer space, a difficulty will arise for the companies planning to launch their own system in the same area; such as in the case of TRW v. ICO. The place taken will be such that it will generate a de facto "appropriation" of outer space. Moreover, in coming years, the number of satellites will undoubtedly increase the dilemma of space debris. The Subcommittee of the Committee on the Peaceful Uses of Outer Space[103] recently focused its attention on space debris mitigation measures. If we take into account future trends, even if such measures are applied, it is hard to believe that the debris will substantially decrease.

The current tendency in space activities is to mark a distinction between the "space powers" and the States, which are currently not dealing with space. It is difficult to reconcile the "free exploration and use by all States" of outer space and its use and exploration "for the interests and in the benefit of all countries."

"Space could be of help if the interpretation of terms such as "common heritage" were agreed on and sensible rules for the regulation of competition in space elaborated."[104] Space law could also be used to prevent the appropriation or the disrespect of the benefit

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[101] For example: Globalstar, Skybridge, Teledesic, Ellipso, Orbcomm.

[102] The major investors are MM. Bill Gates and Craig McCaw.

[103] Report of the Scientific Committee on the Work of its thirty-fifth session, GA Res. A/AC.105/697, (02.25.98)

[104] E. D. Gaggero, "Developing countries and space, from awareness to participation," *Space policy*, May 1989.

clause by the files of patent or by any other means. The question of space benefits is a current issue with the Committee on Peaceful Uses of Outer Space, and the UN Declaration adopted in 1996 is expected to have a great impact between States in the near future.[105] The Declaration expressly mentions the intellectual property rights[106] and also recommends a cooperation in "promoting the development of space science and technology and of its applications."[107] This Declaration "cements the freedom of the exploration and utilization of outer space but at the same time reminds the space powers to fulfill their obligations to conduct their activities for the benefit of all countries in a productive and mutually acceptable basis."[108] Finally, we can also expect that the recommendation adopted at UNISPACE III will be implemented in the near future to have the fastest practical application.[109]

Considering the questions raised previously, what type of legal framework should be adopted? Prior to a proposal attempt, we will review and criticize the levels of harmonization, i.e. national, regional and international.

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[105] *Ibid.*

[106] Paragraph 2 of the Declaration, see supra, note 46.

[107] Paragraph 5 of the Declaration, *Ibid.*

[108] M. Benkö and K.-U. Schrogl, "*Free use of outer space" v. "Space Benefits*", supra note 26.

[109] See supra note 17.

CHAPTER 3. FOR A LEGAL FRAMEWORK ON INTELLECTUAL PROPERTY RIGHTS

In order to protect the space industry and to limit conflicts of law, it is necessary to apply an intellectual property law to outer space. Since the United States have chosen to elaborate a national Space Bill, it is now appropriate for other countries to have a regulation. The main problem is to determine the level of regulation: Will this law be governed at the national, regional or international level?

Section 1. The National Level:

The elaboration of national policy and law related to space activities is an increasing phenomena.[110] However, most of the countries involved in this area of practice did not adopt specific regulations. Intellectual property is of course a great concern for the States, considering their space program and space industry; and appropriate measures should be taken for countries which will be implicated in the near future.

After a short review of Intellectual Property Domestic law, we will see how uniform rules of law could take place at this level. We will also look at the wishes formulated by States in the course of the ESA questionnaire that was sent to space

[110] A recent Act, the Australian Space Activity Act (No 123, 1998), was assented to 21 December 1998. The objects of this Act are:

(a) to establish a system for the regulation of space activities carried on either from Australia or by Australian nationals outside Australia; and

(b) to provide for the payment of adequate compensation for damage caused to persons or property as a result of space activities regulated by this Act; and

(c) to implement certain of Australia's obligations under the UN Space Treaties.

industry actors,[111] and whose conclusions were presented at the Madrid Workshop in 1993.[112] With the exception of the United States (US Space Bill), there is no legal regime governing the extension of national Intellectual Property law to registered or non-registered space objects. This question is controversial for Germany (due to a special ratification of the International Space Station Intergovernmental Agreement), and Russia (with its Russian Law on Space Activities).

1. European Countries:

In Belgium, the Intellectual Property law could be applicable to outer space if the extra-territoriality of the law was admitted, because the place of the invention is not linked to the patentability conditions. In Denmark, national patent law is applicable for an invention created in outer space but not for its utilization in outer space.[113] The Dutch Patent Act[114] does not extend to outer space, and in the case of an infringement, protection can be granted by Domestic law exclusively on Earth. In France, the French Patent Act[115] does not apply to space activities. The CNES policy is to elaborate the legal framework on a bilateral and multilateral basis and case by case. Even though intellectual

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[111] Industries, governmental agencies, scientific community, legal practitioners and scholars

[112] The Workshop on Intellectual Property Rights organized by the European Centre for Space Law was hosted by the Spanish Centre for Space Law; see the questionnaire and the review of the answers in *Proceedings of the First ECSL/Spanish Centre for Space Law, Workshop on Intellectual Property Rights in Outer Space, Madrid, Escuela Diplomatica*, (May 26, 1993), at 106.

[113] See Kobenhavns University, *ibid.*

[114] The contents of the Dutch Patent Act (December 15,1994, entered into force in April 1995) are now closer to the EPC, see supra note 32, at 79.

[115] French Intellectual Property Act, introduced by Law No. 92-597 of July 1992.

property law can apply through the registration - and it is considered by CNES that no difference exists between experiment results obtained in space or on Earth - vacuums are regulated by contracts. For example, in the legal protection of remote sensing data with regard to intellectual property: A copyright protection is granted by CNES to Spot Image through contracts.[116]

Some problems remain, such as the determination of the applicable law to an infringement in outer space. In Sweden, the exclusive right is also limited to the territory, but the temporary presence doctrine seems to have a broad application. Section 5 of the Swedish Patent Act states as follows: "The utilization of a patented invention in a foreign vessel, aircraft or other foreign means of communication for its own needs when temporarily entering Sweden in regular traffic or otherwise is not considered an infringement." As a consequence a broad interpretation of "other foreign means of communications" could lead to include space objects.[117] The German Patent Act,[118] like United Kingdom, does not provide any patent extra-territorial application. However, the German Act of 13 July, 1990, was enacted following the implementation of the 1988 IGA. With the new IGA,[119] Germany modified this ratification.[120] This provision does not mean that any space object registered by Germany should be under the jurisdiction of that country. The Intergovernmental Agreement is a specific agreement only applicable to the International Space Station. The same principle governs European countries; the

[116] C. Blemont, G. Oscar, C. Thibault, "The Practical and Legal Viewpoint of the French Space Agency," CNES, see supra, note 26.

[117] See supra note 33, at 82.

[119] See infra, Part II.

[120] "Any activity occurring in or on the ESA registered element is - for the purpose of the protection of industrial property rights and copyrights - deemed to have occurred in Germany."

protection of the exclusive right limited within the boundaries of the country and their national patent does not apply to outer space except through the registration mechanism. In that case, a country will exercise its control over the space object.

2. The non European Countries:

2.1 Canada:

Like European countries, Canada is governed by a first-to-file system. There is no Act related to space activities. The protection of Intellectual Property is made in bilateral agreements and in the contracts. In the case of research and Development contracts, Canada has adopted a policy on ownership of Intellectual Property Rights[121] which is limited to government legislation contracts.

2.2 Japan:

In Japan, once again, there is no specific law dealing with outer space. NASDA shall transfer an ownership of an industrial property right from the contractor and obliges the contractor to disclose all technical information derived under contract to NASDA.[122] Article 26 of the Japanese Patent Act[123] states that "if a special provision is provided for in a Treaty with respect to a patent, such provision shall govern."[124] Although this provision is not useful at present, as there is no treaty dealing with the question of

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[121] Under the new policy (1991) on ownership of intellectual property ("IP") arising from Government contracts involving R&D, IP resulting from the performance of the contracts is presumed to vest with the contractor, unless the contracting department determines that Crown ownership is justified. See R. S. Lefebvre, "Intellectual Property Rights and Space Activities Canadian Perspective and Point of View: Canadian Laws, see supra note 26.

[122] T. Yokoo, NASDA's Activities and Intellectual Property Rights, *ibid.* at 54.

[123] "The Patent Law and the enforcement law thereof" (Law No, 121 of 13 April 1959, as last amended in 1987) ("Japanese Patent Act"), see supra note 33.

[124] *Ibid*, at 58.

intellectual property rights in outer space, we can imagine that the situation may be different in a couple of years. It would happen if, for example, an international law of patent in outer space was elaborated through the World Intellectual Property Organization. In that case, such a provision becomes highly intriguing, because once Japan has ratified the international agreement, the provisions on patents become directly applicable through article 26 of the Japanese Patent Act.

2.3 Russia:

The Russian patent law is based, like the European countries, on a first-to-file system. The entire legislation was modified in 1992[125] as a step toward the market economy. In 1992, the Russian Federation adopted a law on Space Activities. This text contains specific provisions on patent law: Reference is made to the respect of intellectual property legal requirements of the Russian Federation,[126] and the property rights are regulated.[127] Following article 17 (2), "the Russian Federation shall retain jurisdiction and control over space objects registered in it during the ground time of such objects, at any stage of a space flight or stay in outer space, on celestial bodies as well as on their return to the Earth outside the jurisdiction of any State." Despite the existence of these rules, can we consider the Russian Patent Law applicable to an infringement occurring in outer

[125] Effect of the Patent Law on September 23, 1992.

[126] Article 4 (3) of the Russian Law on Space Activities of 1993 provides that "space activities as well as dissemination of information of space activities shall be carried out with the observation of the requirements stipulated by the legislation of Russian Federation on the protection of intellectual property rights, state (military including) and commercial secret act."

[127] Article 16 (4) of the Russian Law on Space Activities of 1993 provides that "the property rights over the physical product created in outer space shall belong to the organizations and citizens possessing property rights in the components of space techniques used to create such products, unless otherwise specified by relevant agreements. The property right over the information product created as a result of space activities shall belong to the organizations and citizens that have created that information product unless otherwise specified by relevant agreements."

space? Considering article 4 (3) and 17 (2), Dr. Olga Vorobyera considers that there is enough legal basis to admit the applicability of the Russian legislation "to the use of inventions and other objects of intellectual property protected under Russian laws."[128] This interpretation is easily accepted as The Russian Space Act contains some provisions to assure the protection of intellectual property rights and we could logically consider that the use is included in this protection. Nevertheless, if a conflict arises between two countries, for example the US and Russia, since US Space legislation is already established, the interpretation of the Russian Space Act is too uncertain to convince a judge. The law here should be more precise to ensure its applicability to the use of patent in outer space, and to be sure that any unlawful could permit to go to a Russian Court. An important provision should finally be recalled here: In case of conflict between the rules of the Russian legislation and that of a foreign State as they apply to space activities with the participation of Russian firms and citizens, the legislation of the Russian Federation shall prevail.[129]

Taking into account the provision of the space treaties relating to jurisdiction and control,[130] the United States have elaborated specific legislation on patents in outer space. The adoption enhanced some debates between lawyers from Europe and the initiators of the reform.[131] In 1990 the United States passed the Space Patent Act[132] which added

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[128] O. Vorobyera, "Intellectual Property Rights and Space Activities: Russian Experience and point of view, see supra note 26, at 49.

[129] Article 28 (2) of the Russian Law on Space Activities.

[130] See supra, note 15.

[131] See infra Part II, debate about the Space Bill.

[132] See supra note 16.

Chapter 10 of title 35 of the US Code. The US Space Bill[133] introduces article 105 in title 35 U.S.C: Inventions in Outer Space: "Any invention made, used or sold in outer space on a space object or component thereof under the jurisdiction or control of the United States shall be considered to be made, used or sold within the United States for the purposes of this title, except with respect to any space object or component thereof that is specifically identified and otherwise provided for by an international agreement to which the United States is a party, or ...carried on the registry of a foreign state in accordance with the Convention of Registration of Objects Launched into Outer Space." This provision follows the "flagship principle"[134] as applied to vessels on the high seas, or aircraft flying over international waters.

The aim of this Bill was to extend the patent law protection extra-territorially. As a consequence, it is a unilateral extension of a national law, which usually only applies to a certain territory.[135] Nevertheless, such an extension will only apply to space objects, not to outer space itself. This type of legislation contradicts the international cooperation that takes place in space activities. The Intergovernmental Agreement containing the rules applicable to the Partners of the International Space Station is an illustration of this cooperation.[136] It becomes difficult to conciliate the preexisting international rules and the contents of a domestic law. Similar conflicts to the TRW case may start again in the near

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[133] S.459, Nov.16, 1990. Published in BNA's Patent, Trademark & Copyright Journal, vol.41, 90-93 (111.22.90).

[134] US Senate report on S 459, P.91, "Extraterritorial application of the patent laws," 1990.

[135] "(...) *it may be seen that US patent law may be applied to the widest territory out of this world, and potentially even to foreign-owned and operated spacecraft which have never even touched US soil* !", by A.M. Balsano and B. Smith, supra note 26.

[136] As for example the article 16 establishing a cross-waiver system of liability.

future. In order to constitute a violation of the law, an act of infringement must take place in the United States of America, its territories and possessions,[137] but the US patent law does not give any precise definition of infringement.

Even if the US Space Bill appears to solve the question of applicable law in a majority of situations, we still do not know which acts constitute infringement in the territory. In addition, there is also a perceived negative role which can play in the transfer of technology, and the fear of monopoly of space technologies by a few countries is not unique to space activities. Consequently, a clear definition, a sanction, and a way to enforce that sanction should be provided in order to apply the same rules to all States without consideration of their domestic law.

As seen above, the place where the invention was made is not relevant in most of the countries. In some cases, there are interesting elements in the Domestic legislation of Japan (article 26 of the Japanese Act), Swedish law (with its broad interpretation of the "temporary doctrine"), but none of them contain sufficient rule to assure the protection of the use of the patent.

At a national level, at least two issues could be discussed: The adoption of specific laws dealing with Intellectual Property in outer space, or amendments to Domestic laws for an extra-territorial application. The first solution would lead undoubtedly to a mosaic of national laws and enhance conflicts. This uncertainty will not provide trust in space investments. The second solution will render each law applicable to space objects launched into outer space. This situation is already covered through the registration procedure, and such a solution is insufficient, as there is no way to solve the unlawful use

[137] US Patent Law, Section 100 (c).

of a patent. We would come up to a level of protection that would be completely different from one country to the next. Notions such as "infringement" or "use" would be interpreted with different approaches.

In the second and third levels of approach, we will try to determine, on the basis of current rules, how a uniform solution could take place, either at a European level, or at an international level.

Section 2. The Regional Level:

Anticipating the necessity to protect the internal market that was starting to take place in Europe, a European Patent system was elaborated in 1973, entering into force in 1977, the European Patent Convention, hereafter the EPC. With one application, the protection is granted in each individual Signatory State of the Convention thanks to standards rules. The territorial limits are maintained as opposed to the Community Patent Convention, hereafter the CPC providing a supranational patent within the European Union.

The CPC, dated December 1989, is still not entered into force. "The crucial significance of the Community patent for the European internal market lies precisely in providing protection which traverses the internal borders in this market, embracing and covering the entire internal market of the European Union."[138] The European Patent Office will have a great role to play in the implementation of this mechanism.

[138] A. Krieger, "When Will the European Community Patent Finally Arrive,?" in *International Review of Industrial Property and Copyright Law*, (Vol. 29, No. 8, 1998), at 857.

The space agencies, and especially the European Space Agency, have been considering the problem for a couple of years. As a result, some initiatives have been taken through this Agency. In June 1997, The European Commission adopted a Green Paper on the Community Patent.[139] The parties were invited to offer any suggestions. The European Space Agency replied through its Director General, urging the European Commission to take into consideration these issues by adopting a specific legislation on inventions in Outer Space.

That same year, a resolution on the Green Paper was adopted by the European Parliament, with on the 9th paragraph a specific provision for space activities. It is considered that the European Patent should assure the protection of inventions that are made or used onboard spacecraft and satellites, protection is not guaranteed by the current European legislation. This resolution is a plea for the creation of Community Patent regulation.

More recently, in a Communication from the Commission to the Council, the European Parliament and the Economic and Social Committee, actions and recommendations were elaborated on the community patent and the need of complementary harmonization of national legislation.[140] The main features of a Community patent are exposed in §2.3 of the Communication[141] and the question of inventions made or used in space is directly addressed. Their protection through

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[139] Green Paper on the "Community Patent and the Patent Protection System in Europe - Promotion of Inovation Through Patents," June 24, 1997, COM (97) 314 final.

[140] "Communication from the Commission to the Council, the European Parliament and the Economic and Social Committee, Promoting innovation through patents, the follow-up to the Green Paper on the Community Patent and the Patent system in Europe," COM (99) 42.

[141] "The nature of the Community patent must be unitary, it must be affordable, it must guarantee legal certainty and must coexist with existing patent systems," *Ibid.*

legislation is considered as an important step forward for the space industry: "It is vital, given the substantial European involvement in the International Space Station and the absence of specific European legislation defining the protection of commercial rights in the case of value added technologies applied or developed in orbit, that such legislation be introduced for patents and licenses, as has been done in the United States, and is currently being prepared in Japan and Russia."[142]

What kind of approach should be adopted regarding space activities? Shall we create a Directive, an EC Regulation specific to outer space related inventions, keep the European Patent Convention, the Community Patent and include provisions on this matter?[143] An interesting suggestion was made by O. Bossung[144] that would simplify the entire system: The replacement of the CPC and the EPC by only one European patent. The need for a unitary system of protection by patent is expressly mentioned in the 1999 Commission Communication.[145]

Almost all the European countries, when answering to the ESA study, agreed on the necessity to harmonize the European law although the choice of forum was different. For Belgium, Germany, Ireland and the Netherlands, the PCT does not seem to be a good solution, as the validity of the patent will be limited to earth,[146] for Italy, an international code of conduct should be adopted.

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[142] §2.3 of the Communication, *Ibid.*

[143] M. Schmittmann, "Conclusions of the study for the European Space Agency," supra note 113, at 59.

[144] O. Bossung, "Return of European Patent Law to the European Union," *International Review of Industrial Property and Copyright Law*, 27 IIC 287 (1996).

[145] Commission Communication §2.2, see supra note 142.

[146] See answer of the Belgium delegation, see supra note 113, at 119.

The forum of harmonization could be ESA (Belgium, Germany, UK), the European Patent Office (Denmark, Netherlands), EC Regulation (Germany, UK) or a cooperation between the two (University of Amsterdam, Netherlands). The main problem concerning the PCT is the fact that its application is restricted to the territory and does not regulate the effects of the patent, as it is limited to the grant. The CPS has many advantages: It will contribute to the free movement of goods,[147] prevent the "forum-shopping," ensure uniform protection, and guarantee lower fees.

Prior to this chapter conclusion, we will examine the eventuality of an international regulation.

Section 3. Common Regulation at an International Level?

The idea to create a world patent is not a new phenomenon. Among the studies that have been written on this topic, a world patent applicable to space has emerged. This section is not aimed at reiterating the different regional patent systems that exist on earth and the international conventions on this topic. We will focus on some of them which are of particular interest in the course of the present study, and see if this level of regulation is desirable.

[147] Article 30 of the European Union Treaty, online: <http://www.europa.eu.int/eur-lex/en/treaties/index.html>

1. Through Global Initiatives: The 21st Century as "Era of Intellectual Creation"[148]

Patent protection practice is mostly used in European countries, Japan and the United States, as approximately 85-90% of total patent activity in the world takes place in these nations.[149] The globalization of the law of patent is a phenomenon that is taking place in most of the intellectual property legal framework.

In Europe, the Paris Convention could be considered a pioneer in the elaboration of the international law of patent; the main drawback being the obligation to file in each country where protection is needed. The concept of a unitary patent was born in Europe with the European Community Patent Convention.[150] In the United States, the integrated system was planned to take place through the North American Free Trade Agreement, whose approach went far ahead of the Paris Convention.[151] In Japan, a recent report by the Commission on "Intellectual Property Rights in the twenty-first Century"[152] to the Japanese Patent Office conclusion was based on the insufficiencies of the current legislation as restricted by a country's boundaries. Among the Commission's proposals was the creation of a global patent. Apart from these three main players, it is crucial to mention the Eurasian Patent Convention ("EAPC"), created by twelve countries of the

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[148] Toward the Era of Intellectual Creation. Challenges for Breakthrough. Report of the Commission on Intellectual Property Rights in the Twenty First Century to the Commissioner of the Japanese Patent Office (April 7,1997), cited by G. J. Mossinghoff and V. S. Kuo, World Patent System Circa, 20XX, A.D., see supra note 8, at 523.

[149] M. N. Meller, "Planning For A Global Patent System," in *Journal of the Patent and Trademark Office Society*, June 1998, vol.80, No.6, at 381.

[150] See supra Section 2

[151] NAFTA extends the concepts of national treatment under the Paris Convention across all fields of intellectual property. See supra note 8, at 532.

[152] *Ibid*, note 8, at 150.

former USSR.[153] The filing of a Eurasian patent can be done with a single application, with a single payment at the time of the filing and in a single language. This patent could serve as a "model for the next generation of multinational patent systems."[154]

The question came to its apogee with the Trade-Related Aspects of Intellectual Property Rights ('TRIP's"). "By harmonizing substantive patent rules among the world's major nations, TRIP's clearly set the stage for the next steps in effective multinational patent protection."[155] With the development of international commerce and the development of electronic commerce, the protection of a patent restricted to the country's borders will become less and less justified. Moreover, if requirements to file a patent may differ from one country to another, the basic rules governing the protection is more or less similar. This reasoning led Intellectual Property authors,[156] followed by the patent agencies, to defend the idea of a global patent. This will be of course an ideal situation, where a patent will be granted on a worldwide basis, under the supervision of an international organization.

Such a reform has already started through the coordinated work of national and regional agencies. Considering the task that has to be accomplished, the implementation of the world patent will not take place overnight.

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[153] Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz, Moldova, The Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

[154] Supra note 8, at 540.

[155] Supra note 8, at 532.

[156] L. C. Thoreau, "Needed: A New System of Intellectual Property Rights," *Harvard Business Review*, Sept-Oct 1997, at 95. M. N. Meller, see supra note 123, G. J. Mossinghoff, see supra note 8.

The Patent Cooperation Treaty[157] allows the applicant to file an "international application" in several countries. The harmonization is more on the form, content and procedure though, the final grant still belongs to the national or regional patent office. In order to get closer to a real uniform system in the substantive part of the law, the PCT will link to the Patent Law Treaty (PLT). A Diplomatic Conference will take place from May 11 to June 2, 2000 that will lead to the possible adoption of this Treaty.[158] The World Patent system, which will start with common rules on the procedure is coming up soon.

And now this question comes into play: If we take the hypothesis of an invention made or used in outer space, is the elaboration of such a system desirable?

2. Shall We Have a Specific International Intellectual Property Law For Space Activities?

The proposition that dealt with the creation of a specific regulation did not plan to integrate the new system in a future world patent, but to adopt specific rules to outer space. In the conclusions of the study for the European Space Agency,[159] it was proposed to regulate this question through WIPO, in combination with World Trade Organization and with the assistance of the United Nations Committee on the Peaceful Uses of Outer Space. It was also proposed to consider outer space as an area where a unique set of international rules would apply. The WIPO would be in charge of the important issues

[157] The Patent Cooperation Treaty is entered into force on January 24, 1978. It also deals with standardization of administrative procedures.

[158] See www.wipo.org/eng/pressupd/1999/upd99_70.htm

[159] M. Schmittmann's , see supra note 143, at 59.

such as grant and infringement.[160] The centralization of the legal matters would limit the conflicts and help avoid the delicate question of territory.

The implementation in the near future of these provisions is less probable, as a lot of time will first be required to elaborate the new treaty, and establish the responsibilities at national and international level. In addition, the process of ratification is always very long, and since the United States patent system is based on a different approach, (the first-to-invent rule), the bringing together of this legal system with the first-to-file is desirable. This evolution is being implemented.

Finally, in case of an unlawful act sanctioned by a Court, this question, unfortunately, the same one concerning international law arises: How to enforce the decision? It will be hard to mobilize the "patent community" for the question of invention in outer space. However, debates on the question of a world patent might be easier.

Furthermore, in the course of a study led by WIPO in 1997, the conclusion was that no specific provision were absolutely needed, and "due to other priorities, no specific project relating to outer space is foreseen in the current budget and program of WIPO."[161]

As a consequence, in a first step, favor should be given to large regional systems (e.g. NAFTA, Europe, Eurasia, South East Asia) in which a specific legal framework on intellectual property in outer space could be implemented. In Europe, protection of inventions made or used in outer space through the Community Patent would guarantee a

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[160] R. Oosterlinck, "Tangible and intangible property in outer space," in *Proceedings of the 39th Colloquium on the law of Outer Space*, 271-283 (1996).

[161] T. Miyamoto, "Space-related Aspects of Intellectual Property: WIPO's Role and Activity," see supra, note 8, at 107.

good legal framework. In one hand, it would avoid the problem of extra-territorial application of national law in space, enhancing the absence of conflict of law, and on the other hand, bring a uniform enforcement of patent in the European Union. Space patent could be part of this framework: The Community Patent regulations could be considered applicable to any invention made or used in outer space on a space object registered in a European country. This provision should provide the sanction of an unlawful infringement by a European Court.

During a transition period (about one to five years), patent agencies will closely collaborate on the elaboration of the world patent treaty, which will apply to all kinds of application. Special attention will have to be made to high technology (computer copyright software, space technology). In a second step, it will be necessary to explain and convince the countries to take part into a world patent system.

We should keep in mind that most of country's legislation is becoming similar. For example, Russia and China have adopted standards similar to the US, Europe or Japan.[162] This will favour the evolution expected.

The International Space Station legal framework is a tool that will also encourage the standardization of Intellectual Property Rights. Although the international agreement governing the relationship between the participants to the International Space Station provides specific rules about intellectual property, it provides only the basic principles.

PART II

INTELLECTUAL PROPERTY AND THE INTERNATIONAL SPACE STATION

The civil International Space Station, hereafter ISS, constitutes one of the most ambitious projects between countries in terms of international cooperation. In the 1950's, the US government considered building a space station. The project Skylab was initiated under the Nixon Presidency, and was placed into orbit in 1973. Although this laboratory had a short life span, it gave the opportunity to astronauts, who later became scientists, to experience this station in space until eighty-four days.[163] Several missions were then elaborated for human space flight: Space shuttle, Spacelab, Salyut and Mir. The scientific community agrees that the experiences realized in the Russian station are a significant source of information for the future ISS. A great amount of work was done on human behavior during long space missions and further studies are now necessary, for example, for future Mars missions.

In the state of the Union Address of January 2, 1984, President Reagan gave to the National Aeronautics and Space Administration (NASA) the responsibility to build and put into orbit a manned space station. He also offered member States of the European Space Agency, Canada and Japan to participate in this project. Negotiations started and the Agreement[164] was finally signed four years later in Washington D.C. on September 29, 1988.

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[162] See supra, note 150.

[163] W. Astore and J. Sellers, "Entering Space", see supra note 22.

[164] Agreement among the Government of the United States of America, Governments of Members States of the European Space Agency, the Government of Japan, and the Government of Canada on Cooperation in

With Russia's inclusion in the project,[165] new negotiations took place between the former participants and Russia through a succession of meetings between 1994 and 1997. The aim of these meetings was to come up with the "new IGA in 1998,"[166] which displayed a significant evolution between the different partners relationships.[167]

Located between 335 and 460 km above the earth, with a mass of 400 tons, the space station is considered as a multi-use facility in low earth orbit with the specificity to be evolutionary. Forty-six launches are planned between 1998 and 2004 to assemble the modules. Because of this long period of time, it will be necessary to add some elements on the existing one before the launches are complete, and after the completion, because the life span of the station has been fixed at around fifteen years. The main interest of the ISS is to work for a long period of time under microgravity conditions. The concept of a new space station was, and still is highly criticized. The project is costly, ($20B to $100B), and part of the scientific community is skeptical concerning the practical applications of the space station. Moreover, solar radiation and space debris constitutes an important risk for this infrastructure.

In a more optimistic light, this project is a fantastic opportunity for research. Activities on board the space station will include "fluid and materials science experiments, crystal growth for commercial application,[168] combustion experiments to

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the Detailed Design, Development, Operation and Utilization of the Permanently Manned Civil Space Station, hereafter the "Intergovernmental Agreement", or "IGA".

[165] On December 17th, 1993.

[166] The second agreement was signed in Washington D.C. on the 29th of January, 1998.

[167] This Agreement will replace the 1988 IGA.

[168] On the specific question of protein crystal experiments, see M. Harrington, "Protein Crystallography Services on the International Space Station," the paper summarizes previous results from microgravity

improve energy and propulsion systems, human physiology experimentation for long duration flights and for actual medical research, biological research and bioengineering."[169] Simulation of Flight for International Crew on the Space Station[170] started during the summer 1999 at the State Research Center in Moscow to study the effects of isolation in the hermetic chamber. In fact, the analysis of the physiological and psychological effects before and after the flight are simultaneously for space and earth applications.[171]

An interesting cross-cultural experience was conducted concerning the integration of Russian Soyuz Spacecraft for the ISS. Among the differences that will have to be taken into account (e.g. units of measure), the notion of leadership is seen differently: Americans are used to distributed management and frequent changes in personnel, whereas Russians are more accustomed to centralized management, a single spokesperson and few changes in personnel.[172] On earth, the preparation of ISS missions will also require qualified people from a diversity of professions, who can create new opportunities for futures generations. The ISS has become more political tool, since Russia entered the program in 1993. Nevertheless, the international exchange generated by the project will have positive consequences on the international scene.

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protein crystal growth experiments and describe the facilities envisioned for the International Space Station. <http://www.isunet.edu/Symposium/symposium99/Oral%20Abstracts/Harrington.html>

[169] R. Monti and R. Savino, "Microgravity Sciences", supra note 22, at 17-58.

[170] SFINCSS'99, see infra note 171.

[171] For example, investigations are made on the effectiveness of equipment and the interaction of several international groups. See "SFINCSS Project Scenario", Paper delivered at the International Space University Summer Session Program, on August 14, 1999, [unpublished].

[172] Andrew Petro, NASA Johnson Space Center, Houston, "Integration of Russian Soyuz Spacecraft for the International Space Station," (International Space University Summer Session Program on August 14, 1999), [unpublished]

Finally, the International Space Station also constitutes an important commercial project. The US 1998 Commercial Space Act requires NASA to encourage commercial utilization of the ISS. This objective is clearly stated in the executive summary[173] prepared by the NASA Office of the General Counsel in September 1999: "The long term objective of the commercial development plan for the International Space Station is to establish the foundation for a marketplace and stimulate a national economy for space products and services in low earth orbit, where both demand and supply are dominated by the private sector." Several provisions of this unique text of international law are original. Questions related to Intellectual Property have this feature.

CHAPTER 1. THE LEGAL FRAMEWORK

The legal framework governing the International Space Station is composed of three levels: The Intergovernmental Agreement, four Memoranda of Understanding between the Space Agencies, and the Implementing Arrangements. The Intergovernmental Agreement[174], hereafter, IGA, contains the main principles that guide the five Partners participating in this unusual project. The Five Partners are Russia, United States, Japan, Canada and Europe, with eleven States.[175] An international agreement creates the same rights and obligations as a Treaty made but the choice, by the

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[173] NASA Office of the General Counsel, executive summary on "Intellectual Property and the International Space Station: Creation, Use, Transfer, and Ownership and Protection" http://www.hq.nasa.gov/ogc/iss/exec_summary.html

[174] See supra note 166.

United States for an executive agreement, was essentially to avoid the Congress ratification.

Section 1. A Unique Framework Under International Law:

1. Main Legal Provisions of the IGA:

In order to fully examine the question of intellectual property, we must first look at the main legal features governing the space station, to better understand the spirit of this Agreement. The first point of this study is to determine whether a space station can be qualified as a single space object. Under article II of the Registration Convention: "When a space object is launched into earth orbit or beyond, the launching State shall register the space object."[176] Can we consider that a space station is one space object? Since any space object has to be registered (article VIII OST),[177] the whole space station would be registered by a single procedure. The consequence of this qualification should not be neglected as the registration determines the jurisdiction and control over the space object.[178] In such an international program, it would mean the jurisdiction by a single State over the modules belonging to the fifteen contracting States.[179] Past experience has shown that it is a delicate matter: When United States started the construction of the shuttle, a memorandum of understanding was signed with Europeans to construct a space

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[175] We will see in Chapter II Section II that the qualification of "Partner" for Europe involves important consequences at the level of the member States.

[176] Convention on Registration of Objects Launched into Outer Space, see supra, note 2.

[177] See supra, note 15.

[178] Article VIII of the Outer Space Treaty, see supra note 15.

[179] Every time a new module is added to the space station, new registration will be required.

laboratory. The Spacelab was under the jurisdiction of the United States, and some "flight opportunities" were offered to Europeans. "Another lesson of national self-interest and maneuvering appears here: The shuttle four years late had created some animosity between allies. When the first Spacelab succeeded, the Europeans still complained that they had not gotten their money's worth out of the venture."[180] In that kind of hypothesis, a State is best to not be under the jurisdiction of another one involved in the same project. The fact that these space programs are of an international dimension does not prevent conflicts of interest.

This is why the drafters of the IGA chose a separate registration by each Partner.[181] According to article V of the IGA, "each partner shall register as space objects the flight elements listed in the Annex which it provides." Consequently, "each Partner shall retain jurisdiction and control over the elements it registers and over the personnel in or on the Space Station who are its nationals." This rule enhances specific consequences for the European Partner.[182] The utilization of the station is characterized by a sharing system. The use of each part of Partners 'module is determined by a specific allocation[183] and "the Partners have the right to barter or sell any portion of their respective allocations."[184]

Furthermore, the provisions on the utilization of the space station are unusual too. Partners who provide resources in the stations shall be given a fixed percentage of the use

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[180] N. C. Goldman, "International Affairs and NASA", *in American Space Law*, (Iowa State University Press, 1988), at 145.

[181] ESA is in charge of the registration for the European partners.

[182] See infra Chapter II, Section II.

of any of the other modules. Consequently, non-partners will have to negotiate with the partners as to how they can utilize the specific allocations.[185]

In order to assure the continuity of the program, as many space agencies and contractors are involved, Partner States agree to a cross waiver of liability.[186] The system applies not only on at the partners' level, but also for the cooperating agencies, contractors, subcontractors, etc.... There are a few exceptions to this rule, and one of them concerns intellectual property claims.[187] This provision underlines once again the relevance of the required level of protection.

In addition, article 1 of the IGA, covering the entire agreement, states that "this Agreement is to establish a long-term international cooperative framework among the partners, on the basis of genuine partnership." Like the question of cross waiver of liability, this provision constitutes a transposition of private law to public international relations.[188] The legal framework is more a juxtaposition of rules as each Partner State exercises its jurisdiction and control over its module. Nevertheless, the wish contained in the IGA remains the pursuance of a genuine partnership despite the political

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[183] For example, the Japanese Agency received 51% of the user accommodations on the Japanese Experiment Module (JEM).
[184] IGA Article 9.

[185] For e.g., concerning the ESA module, Europe is entitled to use 51% and the US 46.7%, while Russia retains 100% utilization over its own module. The utilization repartition is determined in the Memorandum of Understanding.

[186] "Although these provisions are far from being tested by national courts, they would constitute at this point, the "state of the art" liability provisions in an international space endeavour, and they are already finding their way into other international agreements."A. Farand, "The legal regime applicable to the space station cooperation: a canadian perspective, *Annals of Air and Space Law*, 1992 Part I, vol. XVII, at 299.
[187] See IGA Article 16.

[188] "In order to really get to the roof of it, we have to think of a private partnership transposed or translated into the partnership of nations." K. J. Madders, "The partnership Concept and International Management and the debates concerning Partnership", in *the Proceedings of the Colloquium on Manned Space Station, Legal Aspects* (1989), at 82.

consideration.[189] "The IGA contains rules which, taken together, could be seen as constituting a particular legal regime for the Space Station."[190] Although overall management of the space station has been entrusted to the United States,[191] Russia will have a role to play. "The new IGA is still consistent with the closed partnership approach."[192]

Finally, financial obligations are subject to a Partner's funding procedures and the availability of appropriated funds.[193] The same type of agreement was signed between the European Partners and the United States concerning the spacelab.[194]

2. IGA and Intellectual Property Rights:

The IGA contains the main feature on Intellectual Property and exchange of data and goods. However, work on their implementation at national level and modalities of application remain to be done.

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[189] "European Partners" did not seek to participate in the "American space station" program with international participation but to assure a "genuine partnership" for the international space station." K. Tatsuzawa, "the International cooperation on the space station," in *Proceedings of the 33d Colloquium on the law of Outer Space* (American Institute of Aeronautics and Astronautics, 1990).

[190] A. Farand, "The International Space Station and the Protection of Intellectual Property Rights," see supra note 27.

[191] Art. 1.2: "The Partners will join their efforts, under the lead role of the United States for overall management and coordination, to create an integrated international Space Station."

[192] A. Farand, "Space Station Cooperation", in *ESA Bulletin*, (No. 94, May 1998), at 51.

[193] IGA Article 15

[194] "The obligations of the Government of the United States of America and of the European Partners shall be subject to their respective funding procedure." Spacelab Agreement, see N. C. Goldman, *American Space Law* (Iowa State University Press Ed., 1988), at 146.

2.1 Mechanism of Article 21:

The IGA refers[195] to article II of the Convention Establishing the World Intellectual Property Organization[196] to define "intellectual property."[197] The choice of this definition will assure stability in case of any misunderstanding concerning the intellectual property. In the case that experiments would take place aboard the space station with great commercial applications, the question of the benefits would be raise and consequently, this article has been the source of long discussions in the course of its adoption.

2.1.1 General Procedure:

IGA Partners States have chosen a multi-territorial approach. The principle governing IPR in §2 is that "an activity occurring in or on a Space Station flight element shall be deemed to have occurred only in the territory of the Partner State of that element's registry." Consequently, each Partner will be able to apply its domestic law to its element and personnel. With this mechanism, national legislation is extended extra-territoriality through public international law and the nationality of the inventor is not taken into account.

In the case of ESA Member States, the situation is very original: "for the elements registered by ESA," art. 21§2 states "any European Partner may deem the activity to have occurred within its territory". A legal fiction has been elaborated to solve this question in

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[195] See Article 21§1

[196] Stockholm, July 14, 1967.

[197] "Intellectual Property shall include rights relating to: [1] literary, artistic, and scientific works; [2] performances of performing artists, phonograms and broadcasts; [3] inventions in all fields of human endeavor; [4] scientific discoveries; [5] industrial designs; [6] trademarks, services marks, and commercial names and designations; [7] protection against unfair competition; and all rights resulting from intellectual activity in industrial, scientific, literary or artistic fields."

Europe, but in practice, this provision generates complications[198] and involves important consequences at a European level[199].

In case of an invention by a non-national of the flight element, "a Partner State shall not apply its laws concerning secrecy of inventions so as to prevent the filing of a patent application in any other Partner State that provides for the protection of the secrecy of patent applications containing information that is classified or otherwise protected for national security purposes."[200] For example, if an European astronaut, an ESA employee, makes an invention in the US module, he or she has the choice of the place to file the patent without consideration of the US Inventions Secrecy Act.[201] The condition he has to follow is that the legislation of the country chosen must contain provision for the protection of the secrecy of patent applications containing information that is classified or otherwise protected for national security purposes.[202] This rule can be explained by the fact that in the United States, during the six months following the filing of a patent in the US, the filing in a foreign country is prohibited.[203]

To avoid the risk of multiple recoveries in Europe, a special provision[204] was elaborated by the IGA's Drafters. For example, if a patent is protected in two or more

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[198] See infra Section 2

[199] See infra Chapter II Section 2

[200] Article 21 § 3

[201] US Inventions Secrecy Act, 35 U.S.C. Secs.184.

[202] See generally J. B. Gantt, "Space Station Intellectual Property Rights and US Patent Law", in *Proceedings of an International Colloquium on the Manned Space Stations, Legal issues*, Paris 7-8 November 1989 (ESA SP- 305, February 1989), at 79.

[203] See supra.

[204] "Where a person or entity owns intellectual property which is protected in more that one European Partner State, that person or entity may not recover in more that one such State for the same act of infringement of the same rights in such intellectual property which occurs in or on an ESA-registered element." Article 21 § 4

European countries, a patentee will not be able to recover in more that one European country when dealing with an act of infringement. As a result, the patentee has the opportunity to choose where the procedure will start. Here again, the difference between national laws will have a great impact, because the patentee will choose the State whose legislation is the most favorable for him. In a case when the invention is owned in two or more European Partners, the court may grant a temporary stay of proceedings in a later-filed action pending the outcome of an earlier filed action.

Finally in order to avoid litigation, and "with respect to an activity occurring in or on an ESA-registered element, no European Partner State shall refuse to recognize a license for the exercise of any intellectual property right if that license is enforceable under the laws of any European Partner State, and compliance with the provisions of such license shall also bar recovery for infringement in any European Partner State."[205] As a consequence, a license granted in one European country should also be recognized in other European countries. The protection of intellectual property must receive the same protection in each of them.

The last paragraph of article 21 contains an innovative provision. Indeed, it provides that it will not only apply to activities in or on the station flight element, and also to transitory activities such as the launch or the return from the station. The temporary presence doctrine, based on the Paris Convention, is consequently extended in article 21 §6[206] to flight elements. Usually, limitations on the exclusive rights given to the inventor

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[205] Article 21 § 5.

[206] "The temporary presence in the territory of a Partner State of any articles, including the components of a flight element, in transit between any place on Earth and any flight element of the space station registered by another State or ESA shall not in itself form the basis for any proceedings in the first Partner State for patent infringement."

are afforded in the case of ships, aircraft and land vehicles that visit temporally foreign countries..

2.1.2 Hypotheses of Application:

We will first consider situations where ESA member States and ESA registered element are not involved, and where a Partner, Japan, United States, Russia or Canada has an activity in its own module: That Partner will be able to apply its own Domestic law because the module and its components were registered in his country. If a Partner has an activity in or on a flight element that do not belong to his country, the activity shall be deemed to have occurred only on the territory of the Partner State where the element is registered. Consequently, a Russian astronaut making a revolutionary discovery on the development of plants in the US module would be considered to have realized it on the US territory. In these cases, there is no choice concerning the applicable law of space activities. Moreover, there might be no link between the nationality of the owner of the rights and the State where the applicable law will take place.

Now, we will introduce the ESA-registered elements: A Partner has an activity in or on ESA-registered element. Although article 21 does not contain provisions on this hypothesis, we can consider that the Partner has the choice of the European partner State jurisdiction.

Finally, ESA member States are directly involved in the following situations: An ESA member State has an activity in or on a flight element of a non-European Partner.

Here, the law of the State that registered the flight element where the activity occurred is applicable. And if finally, an ESA member State has an activity in or on an ESA-registered element, any European Partner State may consider the activity to have

occurred within its own territory.[207] This solution is the most unusual and of great interest on an European viewpoint.[208]

2.2 Practical Consequences Enhanced by Article 21:

The law of the State of jurisdiction will apply to the IPR and to the infringement. In this case, a problem will arise: How will the different partners deal with the scientific activities having commercial applications? Although cooperation and genuine partnership characterize the "IGA spirit," what kind of behavior will astronauts adopt during the experiments? It will be extremely important not to divulge any experience prior the filing of a patent.

Conflicts of law between domestic laws will probably arise. With each Partner exercising its jurisdiction and control over its flight element, we will have a kind of legislation "patchwork," and we will probably be confronted with conflicts of law. In order to reach a uniform application of the IGA between the member States, harmonization of Intellectual Property law is required. Concerning Europe, Mrs. Balsano underlined the fact that the unification of the general problem of intellectual property rights in outer space in Europe should, at the same time, take into account the requirements included in the IGA.[209] Since it is stated in article 16 that the cross-waiver of liability do not apply to article 21, the clarification of the applicable law in each Partner is especially relevant in Europe.

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[207] See infra Section 2.1

[208] See infra, Chapter 2, Section 2.

[209] "As a first step, the States concerned will have to proceed with the identification of possible obstacles to be surmounted if harmonization is to be achieved and, as a second step, they must assess the results of the harmonization process already underway in Europe in the field of IPRs in order to determine whether such a process can influence or respond to the need for the protection of IPRs designed or used onboard the Space Station". "Intellectual Property Rights and Space Activities, in *ESA Bulletin* (No. 79, 1993-94), at 40.

An other issue concerns inventions that can only has space applications, what will happen, as sale is not permitted in outer space? Moreover, if the invention can only be used in outer space, what can be done in the case of infringement?

Moreover, in order to implement §3 of article 21 on secrecy, which states are considered by the US to "provide for the protection of secrecy of patent applications containing classified information or otherwise protected for national security purposes." Under which criteria will these States be selected? The choice might be very subjective. Moreover, since the cross waiver of liability do not apply to article 19, it is important to clarify the law applicable to each Partner and also in Europe.

Finally there is no regulation on the sharing of rights. This hypothesis could happen if nationals of several countries make an invention. For example, an American and a Japanese making an important discovery in the Russian module. A national involved in a joint program will meet the same problem. As it is impossible to elaborate uniform system of sharing of rights, solutions will have to be determined on a case by case basis. Even though, an a priori agreement will have to be created, common basic rules could be elaborated as a first step.

As a result, many questions still need to retain the attention of the Partners since the legal aspects of intellectual property are not completely resolved. This work constitutes however a great challenge and will probably contribute to ameliorate every national law systems in Europe.

3. IGA and Data Protection, Article 19:

Considering the design and the goal of the international space station, the difficulties which might arise because of the protection of confidentiality may be illustrated by M. R. F. Kempf's comment: "The closeness or commonality of the structuring of space station elements or modules, the complex logistics needed to support activities in outer space, and the diversity of interests of the involved participants, are going to make the confidentiality requirements needed for trade secret protection much more difficult and sensitive from an administrative and management viewpoint."[210]

3.1 General Mechanism:

Like article 21, article 19 is formulated in general terms. Consequently, the provisions dealing with its practical implementation are of great importance; "Except as otherwise provided in this paragraph, each Partner, acting through its Cooperating Agency shall transfer all technical data and goods considered to be necessary (by both parties to any transfer) to fulfill the responsibilities of that Partner's Cooperating Agency under the relevant MOUs and implementing arrangements. Each Party undertakes to handle expeditiously any request for technical data or goods presented by the Cooperating Agency of another Partner for the purposes of Space Station cooperation." This obligation is limited in its scope.

Firstly, the transfer of data and goods are the one "necessary to fulfill the responsibilities of that Partner's Cooperating Agency" and secondly this transfer is limited to data and goods considered to be necessary to fulfill these responsibilities. Under this principle, Agencies do not have any obligation to transfer the data and goods

[210] Speech at the International Colloquium on Commercial Use of Space Stations, Hanover, Germany, June 12-13, 1986.

of their contractors.[211] The transfer of data and goods by persons or entities other than the Partners or the Cooperating Agencies shall be supported by the Partners, but will be covered by national laws and regulations.[212]

The third paragraph of article 19 establishes a distinction: Some data and goods shall be transferred with restrictions,[213] and the others, without restrictions.[214] The Furnishing Cooperating Agency shall mark with a notice the technical data and goods that are to be protected for export control purposes,[215] for proprietary rights[216] and classified data and goods.[217] In these three hypotheses, the cooperating agency shall include through the notice or identification, the specific conditions regarding how these specific categories may be used by the receiving cooperating agency, its contractors or subcontractors.[218] "Guidelines for security of information" will also have to be established by the Partners through their Cooperating Agency.[219] Consequently, this protection will have to be implemented in the national law of the Partner State and it will be up to that State to ensure that the notice conforms with the IGA. This provision is reinforced in the provision on "Communications" in the Space Station.[220] It will be necessary to ensure

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[211] A. Farand, "The international space station project and the protection of intellectual property rights," see supra, note 27, at 159.

[212] See IGA Article 19§2.

[213] In that case, the transfer is restricted by national laws and regulations.

[214] "The transfer of technical data for the purposes of discharging the Partners' responsibility with regard to interface, integration and safety shall normally be made without the restrictions set forth in this paragraph."

[215] See IGA Article 19 §3 (a).

[216] See IGA Article 19 §3 (b).

[217] See IGA Article 19 §3 (c).

[218] See IGA Article 19 §3, a, b, c.

[219] See IGA Article 19§8

that every national law assures a safe protection through its own Communication Law. If this is not the case, specific provisions will be implemented to guarantee the respect of article 13 of the IGA. Here again, we might meet different level of protection.

Although the IGA was elaborated to have a common framework, an important part of the regulation will take place at a national level.

3.2 Practical Consequences:

Regarding these provisions, we can make the same remark as we did for article 21: Although the IGA is a specific agreement that will govern the Space Station, in many cases, it is up to the Partner State to provide specific Domestic law that will be consistent with the IGA. In article 19, the enforcement and remedies that have to be implemented will take place at a national level, assuring flexibility but also requiring the same degree of protection as in the Domestic law of the Partners. Article 19 is very general and as the data and goods that will be transferred may be of high potential on a scientific and commercial point of view, it is necessary to maximize information security. Article 8.4 of the Memorandum of Understanding between ESA and NASA provides that "in order to protect the intellectual property of Space Station users, procedures covering all personnel, including Space Station crew, who have access to data are developed by the Mulitlateral Coordination Board."[221] Article 12.1.k. of the same MOU states that "Each Partner will respect the proprietary rights in, and confidentiality of, appropriately marked data and goods to be transported on its launch and return transportation system." The Multilateral

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[220] IGA Article 13, Communications; "Each Partner shall respect the proprietary rights in, and the confidentiality of, the utilization data passing through its communication systems, including its ground network and the communication systems of its contractors, when providing communication services to another Partner."

[221] This Board is composed of representatives of the Space Agencies and is chaired by a NASA representative.

Coordination Board task is to "ensure coordination of the activities of the partners related to the operation and utilization of the Space Station."[222] The MOU provides that decisions of the MCB "should be made by consensus."[223]

When dealing with sensitive topics such as data confidentiality, we can imagine that consensus is hard to reach. What type of provisions will have to be introduced to assure the security of the data transfer? If we suppose that an experience has taken place aboard the space station by a Japanese team in the US module. Once the Japanese are back on earth, what can be done to assure the protection of their data?

Finally, Partners will also have to take into consideration the question of conflict of law if the protection of the confidentiality is solved at a contractual level. The following question would be: Could we adopt classical conflict of law rules, such as a prior agreement on the choice of forum? The choice of one forum is not the solution adopted by the drafters of the IGA. In those conditions, under which law would the conflict of law be solved? The case by case solution could be adopted: For each contract dealing with the protection of a specific right, a choice of one place of forum could be given.

Prior to the analysis of the implementation of these provisions in the Domestic law of the Partners, we will briefly examine the last two level of regulation.

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[222] Article 8.1.b. (Management aspects of the Space Station Program Primarily Related to Operations and Utilization) of the MOU.

[223] Art. 8.1.b. "Where consensus cannot be achieved on any specific issue within the purview of the MCB within the time required, the Chairman is authorized to take decisions."

Section 2. Intellectual Property, Memoranda of Understanding and Implementing Arrangements:

1. Memoranda of Understanding:

Memoranda of Understanding are at the second level of the Space Station's legal framework. These international agreements "constitute today the principal expression of international cooperation in the space field."[224] Usually, a MOU do not generate the same rights and obligations as an international agreement. In the course of a symposium that took place in May 1999, M. André Farand stressed that "the memorandum of understanding is considered to be a type of arrangement that registers a political and moral commitment on the part of an international organization, a government, or a constituent part of the latter, to conduct itself in a certain way. Because of their close link with the IGA, it would appear that the Space Station MOUs will have acquired the status on international agreement, as an exception to the general practice in this field."[225]

Four MOUs have been elaborated between the main space agencies.[226] For matters of Intellectual Property, the MOU between ESA and NASA states that the IGA applies

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[224] G. Lafferranderie, "the United States Proposed Patent in Space Legislation, an International Perspective," *Journal of Space Law* (vol 18, Numbers 1 & 2, 1990), at 8.

[225] A. Farand, "Legal environment for exploitation of the International Space Station (ISS)," *4th ISU Symposium, ISS: The Next Marketplace*, 26-28 May 1999, Strasbourg, France, online <http://www.isunet.edu/Symposium/home.html>

[226] See the Preamble of the IGA: "Recognizing that NASA and CSA, NASA and ESA, NASA and the Government of Japan, and NASA and the Russian Space Agency (RSA) have prepared Memoranda of Understanding in conjunction with their Governments' negotiation of this Agreement, and that the MOUs provide detailed provisions in implementation of this Agreement."
See also IGA article 4.1: The Cooperating Agencies shall implement Space Station Cooperation in accordance with the relevant provisions of this agreement, the respective Memoranda of Understanding (MOUs) between NASA and CSA, NASA and ESA, NASA and the Government of Japan, and NASA and RSA concerning cooperation on the civil international Space Station, and arrangements between or among NASA and the other Cooperating Agencies implementing the MOUs (implementing arrangements). The

with respect to exchange of data and goods and intellectual property[227]. These bilateral agreements contain more developments on the respective obligations of the Partners, but the specific information which implies more details are enunciated in "implementing arrangements."

2. Implementing Arrangements:

The implementing arrangements are considered to be the third level of the ISS's legal framework. The MOUs shall be subject to the IGA and the Implementing Arrangements shall be consistent with and subject to the MOUs.[228] Because of this link, the United States will always have to be part of these arrangements. There has been, until now, only one implementing arrangement between NASA and ESA regarding the shuttle launch of Colombus orbital facility and its offset by ESA provision of goods and services.[229] More arrangements will be established between in the future the Cooperating Agencies.

Future provision on the allocation of risks, patent and data rights and disputes settlement, will be determined in "the Launch Services Agreement." Concerning intellectual property, the parties have agreed that all data and inventions will be kept confidential and no dissemination to third parties shall be permitted without a specific

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MOUs shall be subject to this Agreement, and the Implementing arrangements shall be consistent with and subject to the MOUs.

[227] See article 15 of this MOU.

[228] IGA Article 4.2 *in fine*.

[229] The purpose of the Arrangement is to establish, pursuant to Articles 6.3, 12.1 and 16.4 of the MOU, and consistent with the provisions of the 1988 MOU, terms and conditions for an equitable barter of the Shuttle launch of the integrated COF, as specified in Article 2, through provision by ESA of goods and services, on the basis of no exchange of funds, within the framework on the International Space Station Program.

protection.[230] Furthermore, in the hypothesis of an invention performed in the course of this arrangement, Parties have agreed to report any inventions conceived or developed by its employees or by employees of its contractors or subcontractors. The provisions dealing with intellectual property were an important concern for the drafters, and remain a deciding factor for the following steps.

The elaboration of the legal framework of the International Space Station is a progressive process and provisions on intellectual property and data protection will be implemented in the near future containing more detailed requirements. Since each Domestic law may apply, its implementation is not an easy process.

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[230] Article 6.1 Intellectual Property Rights, Arrangement between the NASA of the United States of America and the ESA regarding shuttle launch of Columbus orbital facility and its offset by ESA provision of goods and services.

CHAPTER 2. IMPLEMENTATION OF INTELLECTUAL PROPERTY PROVISIONS IN DOMESTIC LAW

The IGA will enter into force as soon as the last instrument of ratification, acceptance, or approval of Japan, Russia and the United States has been deposited,[231] the Depositary State being the Government of the US.[232] Ratification of the 1988 IGA had already started, but with the new IGA, a new procedure has to take place. Japan and United States have ratified the IGA on the 9th of November 1998; but Russia did not. Once the Duma will have made a decision and the Russian ratification will be effective, IGA will enter into force. In Canada, the procedure should be completed by the end of January 2000, as required by the international commitments.

The analysis of the implementation of the IGA in Europe will be seen separately, as it involves specific consequences for a legal point of view.

Section 1. The Individual Partner States:

As explained in the first chapter[233], the Partners chose to extend their Domestic law to the flight element provided by them because each of them retains jurisdiction and control over it. Consequently, prior to the ratification, the participating States in the IGA will have to make sure their legislation is not in contradiction with the international agreement.

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[231] IGA Article 25.3(a)

[232] IGA Article 25.2

1. Canada:

In Canada, no specific law to implement a Treaty is required. However, following a parliamentary tradition, Canadian laws have to be modified to permit the application of the international provisions. As a consequence, the Canadian House of Commons has elaborated an Act to implement the IGA, whose first reading took place in the 15th of October 1999.[234]

The Canadian Space Agency is in charge of the design, manufacture and operation of a robotics system, the Mobile Servicing System. This participation in the International Space Station is of particular importance because, what is commonly called the "Canadian Arm" will be useful during the first steps of the Station assembly, as well as in the course of its utilization. The main contractor is MacDonald Dettwiler and Associates Ltd. The CSA has to ensure that this project will generate benefits for Canada. That is why the CSA will be able to own all the Intellectual Property realized in the execution of the contracts. "CSA was successful in obtaining a derogation to the new Government's Policy[235] on ownership of intellectual property.[236] Consequently, it is the CSA that is licensing the contractors. In order to coordinate this function, an Intellectual Property Management and Commercialization Committee has been created within the CSA.[237] We should keep in mind that the Partners did not always accept the principles on which the

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[233] See supra, Chapter I

[234] The House of Commons of Canada, Bill C-4: "An Act to implement the Agreement among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America concerning Cooperation on the Civil International Space Station and to make related amendments to other Acts."

[235] September 19, 1991, Policy on ownership of intellectual property arising from Governments contracts involving research and Development (R & D), See supra, note 27.

[236] R. Lefebvre, "Canadian Perspective and Point of View, Canadian Laws", see supra note 27.

[237] Its first mandate was to prepare a CSA policy statement on the commercialization of CSA's IP. *Ibid.*

IGA is based as such. The question of the extra-territoriality of the law was a source of disagreement between Canada and United States, as the Canadian government did not share this artificial extension of national law that was encouraged by the US government in specific cases of international law.[238]

2. Japan:

Japan ratified the IGA on the 9th of November, 1998. This partner will furnish the Japanese Experimental Module (JEM), the JEM Exposed facility, the JEM Remote Manipulator System, the JEM Experiment Logistics Module and the Centrifuge Accommodations Module[239] Like for most of the Partners, the Domestic law of Japan does not apply to outer space, except in the International Space Station. Nevertheless, in Japan, the IGA is self-executing. For matters of intellectual property, NASDA shall be transferred an ownership of an industrial property right from the contractor, making the contractor disclose all technical information derived under contract to NASDA. In the utilization of the space station, following this standard of contract, such a disclosure does not guarantee any confidentiality for the contractor. Here again, the question of confidentiality of data will be very relevant. Finally, to co-operate with a private entity, NASDA use its national policy and joint research guidelines.[240]

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[238] See A. Farand, "The legal regime applicable to the space station cooperation: A Canadian perspective, *Annals of Air and Space Law*, 1992 Part I, vol. XVII, at 298-299.

[239] The JEM will utilize the space environment for many applications in varied fields such as micro-gravity science, biological science, space science and astronomy, Earth science and Earth observation. See M. Matsubara, "Japanese Experiment Module (JEM) and its Utilization Plan," (Space Engineering Department Student /Faculty Workshop, International Space University Summer Session Program, Suranaree University of Technology, Nakhon Ratchasima, Thailand, August 5, 1999) [unpublished].

3. Russia:

This Partner still did not ratify the IGA. However, we will see that the Domestic Law has taken space law into account. The Russian Law on Space Activity of 1993 contains some provisions on Patent Law. As seen above,[241] only a broad interpretation of this National law would lead to consider this legislation applicable in outer space. As a consequence, Domestic law should be created. However, if we consider the question of property rights protection, article 16§4[242] of the Russian law could be a basis on which further agreements may be adopted. The content of further contracts between the Russian Space Agency and its contractors and subcontractors could include additional provisions that would assure them the confidentiality and protection of their data.

4. United States:

The Drafters of the Intergovernmental Agreement decided to create an "Executive Agreement" instead of a Treaty since this type of agreement do not need to be ratified by the Senate.[243] However, the IGA generates the same rights and obligations as any other international agreement, and the Partners have to depose instruments of ratification.[244]

Although the space station is an international program, the US Partner remains the leader of this project and furnishes the major flight element of the space infrastructure. As a consequence, the US law is very relevant. The introduction of the US Space Bill during

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[240] For eg. The royalty income are shared among the owners according to their share and all technical information necessary to implement joint research are transferred to each other on a royalty free base.

[241] See supra, note 35.

[242] Article 16§4: "The property rights over the information product created as a result of space activity shall belong to the organizations and citizens, that have created such information, product, unless otherwise specified by relevant agreements."

IGA negotiations was a matter of great concern to the other Partners. In 1990, article 35 USC 105 is added to US Patent Law.[245]

This text was the source of important discussions that may be summarized as follows: The US Space Bill was to extend the US Patent Laws to inventions made, used, or sold in outer space on a space object, or components thereof under the "jurisdiction or control of the United States," modifying, by a Domestic law, the concept of jurisdiction and control, pillar of space law. The debate that took place prior to and after the adoption of this provision raised several legal difficulties: The use of "jurisdiction or control" instead of "and control" might enter into conflict with the IGA, international agreement to which the US had become Party. The expression "jurisdiction and control" mentioned under article 5 of the IGA is the result of a long process approved in the course of the elaboration of the IGA and whose implications are of high importance.[246] Although flight elements would be registered in a non-US country, US Patent law would be applicable to the Space Station on the basis of the US control. Since the control would be sufficient for the US to apply its law, the scope of the Domestic law would not only contravene the international agreement, but also be have a broader application.[247]

These discussions led the US to propose a new draft to meet European concerns.[248] This episode stresses the difficulties that the Partners experienced in order to reach a

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[244] A. Farand, "The Space Station Cooperation," *ESA Bulletin*, No 94, May 1998.

[245] See supra, note 16.

[246] See supra Part II, Chapter I, Section I.

[247] "In a letter to the US State Department dated 6 March 1989, the ESA Director General addressed these concerns. He noted that an assertion based on the sole technical control (implied by the use of ""or control"" would be inconsistent with the letter and spirit of article 21 of the IGA." See G. Lafferranderie, the United States proposed patent in space legislation, an international perspective," *Journal of Space Law* (vol 18, Numbers 1 & 2, 1990), at 5.

consensus on article 21. The wording of a legal text is, as shown here, extremely delicate. We can imagine that in the adoption of more specific provisions (in the future implementing arrangements), as the commercialization of the space station becomes a reality, debates will become more complicated. A second problem concerns the establishment of the date of invention,[249] as the US law is based on a first-to-invent system. Precautionary measures were proposed, such as a system of reports to a US location, either on Earth or on a US flight element. This process, found to be useful in a trial case, would ensure proof of the creation of the invention in the United States.[250] However, since the United States seem to be in the way to modify their system to a first-to-file principle, these considerations may loose their significance in the future.

Section 2. The Specificity of the European Partner States:

On the European side, involving eleven Signatories,[251] the IGA will enter into force for the European Partner (the member States that will have ratified by that time) when the instruments of ratification of at least four European States will have been received by the Depository. Following IGA article 25.3 (b) "a formal notification by the

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[248] For a more detailed explanation of the debate between the US government and ESA, see G. Lafferranderie, *Ibid.*

[249] Article 35 USC 104 states as follows: "In proceedings in the Patent Office and in the courts, an applicant for a patent, or a patentee, may not establish a date of invention by reference to knowledge or use thereof, or other activity with respect thereto, in a foreign country, except as provided in sections 119 and 365 of this title".

[250] J. W. Goans, C. V. Horn, R. Brumley, "Consequences of 35 USC 104 on non-US flight elements of the proposed space station."

[251] Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, and the UK.

Chairman of the ESA Council" has been given. In December 1997, it has been decided by the ESA Council that this notification would not be sent prior to the ratification by the three main European Member States ratification: Germany, France and Italy. We will see that the implementation of the IGA is far from satisfactory. Not only has the IGA not been ratified by the four States as required, but there is also no provision in European Domestic law that ensure the protection of intellectual property in outer space.

1. Situations of the European Member States:

To implement the IGA and assure at the same time cohesion between European Partners, harmonization of the law is a major stake for Europe. Although merging the law is necessary, it will not solve all problems. Japan, the United States, Russia and Canada also have their own provisions on intellectual property which may enter into conflict with European legislation and IGA. The procedure of ratification differs from one country to another in order to integrate an international obligation in internal law. The question of the implementation of the IGA in national law was debated during workshops involving Intellectual Property experts: Lawyers, professors, and personnel of the industry, of the space agencies and Patent Offices.[252] IGA will be directly applicable in some countries, unlike others which will have to go through a legislative process. For the moment, Norway is the only European country that has ratified the IGA. Germany enacted legislation in 1991 after having incorporated the text of the 1988 IGA. If a German provision contradicts or creates a conflict with the IGA, this provision will not apply. The German government amended the 1988 ratification law in order to make the 1998

[252] See Review of the Answer to the Questionnaire sent to the European Industry by the European Centre for Space Law, see supra, note 113, 118-137.

ratification possible. "Any activity occurring in or on the ESA registered element is-for the purpose of the protection of industrial property rights and copyrights-deemed to have occurred in Germany."[253] In this case, if there is an infringement, prosecution will be brought about in Germany. Nevertheless, except for the IGA, the Domestic law does not extend to outer space.

Most of the European countries did not elaborate specific provisions to implement the IGA. For example, although the UK deposited its instruments of ratification, it did not modify its national law. The UK applicable law to patent is limited to the territory. In principle, the UK jurisdiction does not extend to spacecraft. Nevertheless, there is no provision that prevents an invention made in outer space to be patented in the United Kingdom. The IGA will improve this country patent system, but as it does not extend to outer space, the question of enforcement of the law remains. The territorial application of patent law will also not help the resolution of infringement issues. In most of the European countries: Belgium Denmark, France, Germany, the Netherlands, Sweden and Italy, no matter where that invention was made, the Domestic law of Patent will apply to an invention created in Outer Space. As the exclusive rights will receive a protection only within the boundaries of the country, legal uncertainty remains in the case of infringement. Here again, the ratification will not ensure the protection of future inventions in the space station. Nevertheless, with a broad interpretation of the temporary presence doctrine in Sweden and Netherlands' laws, the use of a patented invention (in the respective States) will not constitute an infringement. Article 21 of the IGA gives the main principles dealing with intellectual property.

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[253] See response of the German Ministry of Justice. *Ibid*, at 121.

However, many problems have not been solved.[254] In respect to European Member States, the main issue is the possibility to go to a court in the case of infringement. At this stage of the European legislation, a patent can be granted for an invention in outer space. In the absence of enforcement of this provision, the protection is not effective. This point has less to do with the State of jurisdiction than the fact that space industry wants to carry out space activities safely. The legitimacy of article 21 will depend on its availability to answer to practical situations that will arise, as the International Space Station will become a reality.

The last aspect of this discussion is related to the fiction elaborated for Europe in the Intergovernmental Agreement. As only a few countries have ratified the IGA in Europe, the opportunity should be taken to encourage a uniform way of ratifying. The solution adopted by Germany is interesting, because it offers the possibility to go to a German Court if necessary, assuring an effective legal protection.

2. The "European Partner," an Innovative Notion in International Law:

The European Member States are composed of eleven entities which, in the International Space Station Agreement, are represented only by one Partner. Some are ESA members but not EU members.[255]

2.1 IGA and the European Partner Legal Fiction:

The concept of European Partner has a deep impact when related to specific provisions of the Intergovernmental Agreement. This notion appears at different places in the IGA, among others: The European Partner has delegated to ESA, acting in its name

[254] See supra Practical consequences enhanced by article 21.

and on its behalf, the responsibility to register as space objects the flight elements,[256] this Partner shall entrust ESA, acting in its name and on its behalf, with ownership over the elements it provides,[257] through ESA, he shall be responsible for management of its own program,[258] the Partners, as well as ESA, shall remain liable in accordance with the liability Convention.[259] As seen above the European Member States are considered as one single State for the application of article 21. The notion of European Partner is also stressed in Art. 19§7 where "any transfer of technical data and goods by a Cooperating Agency to ESA shall be deemed to be destined to ESA, to all the European Partner States, and to ESA's designated Space Station contractors and subcontractors." The goal here is to also consider European Member States as a single entity. Every time rights and obligations are provided to a Partner in the Agreement, it is deemed to be accorded to the European Partner, taken as a whole, and represented by ESA.

2.2 Justification of the Fiction:

This fiction could be interpreted as a way to increase two levels of cooperation, European and International. Europe is becoming more and more involved in space projects, where ESA is the representative of the European Member States. The weight of countries is heavier when they are involved together in negotiations and furthermore, it is desirable to have several partners in the space program, as the cost is often important. Article II ESA Convention defines the purpose of ESA as to "provide and promote, for exclusively peaceful purposes, cooperation among European States in space research and

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[255] Switzerland and Norway.

[256] IGA Article 5, Registration; Jurisdiction and Control.

[257] IGA Article 6, Ownership of Elements and Equipment

[258] IGA Article 7, Management

technology and space applications, with a view to their being used for scientific purposes and for operational space applications systems.[260] Although consensus is very hard to reach between European Member States, every time a decision has to be taken, the fact that Europe is represented by one Partner will oblige them to have a common policy.

The IGA will aim at increasing the international cooperation between space agencies. "This is done not only to permit the sharing of the significant costs involved in large programs, but also to take advantage of existing know-how and facilities, including launching capabilities, that could be provided by one Partner."[261]

2.3 Consequence of the Qualification:

At European law level, with the legal fiction elaborated in article 21, participating States will have the choice of the law that will apply in the case of an invention in the space station. As a consequence of the applicability of different Intellectual Property law by each European Member State, although Europe is considered as a unique Partner, European judges might be confronted with conflicts of law. To avoid such a problem and limit the difficulties enhanced by this multi-territorial approach, common solutions should be adopted at a national level.[262] The harmonization of European Intellectual Property law shall ensure the same level of protection among the European Member States. Although much work remains to be done, to provide detailed provisions for IGA's application

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[259] IGA Article 17, Liability Convention

[260] Reference ESA Convetion, online: EU Treaty, online at <http://www.europa.int/eur-lex/en/treaties/index.html>

[261] A. Farand, Legal Aspects of the International Space Station and Other Facilities for Microgravity Research, see supra note 110, at 58.

[262] See Supra PartI, Chapter III.

(implementing arrangements, Code of Conduct, contracts), this is a challenge for Europe that could be useful for future international projects.

This fiction is also of specific interest from an international point of view. Like individuals in Domestic law, States are normal subjects of international law. The most important part of space law includes the "attribution, regulation of the competence of States in their mutual relations.[263]

When a State takes part in space activities, it does so as a sovereign State. "Space activity is the object of legal relations which emerge between the subjects of international law on the basis of the norms of space law, i.e. space activity causes states to enter into legal relations.[264] Usually, these legal relations emerge between States as a single entity. It is more in the private practice area that projects involve companies whose nationality is different, as in the case of joint venture.

In the Intergovernmental Agreement, Partners look like a multinational public company, except that it is led by public entities, rather than by companies. A multinational venture is becoming a reality with the commercialization of this International Space Station.

As a consequence, even if each State remains sovereign, under the leadership of the European Space Agency, a common spirit will animate the European Member States.

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[263] B. Cheng, see supra, note 14, at 72.

[264] E. Konstantinov, "Space Law as a Branch of International Law," in *Proceedings of the Colloquium on the law of outer space*, IISL, American Institute of Aeronautics and Astronautics, 1992, at 383.

CONCLUSION

Space continues to offer short-term and long-term investors tremendous opportunities. Firstly through increases in satellite traffic from the Internet, new data and video applications, secondly through continued growth forecast for remote-sensing, GPS applications and the manufacturing of ground equipment, and finally a combination of stable revenues from the manufacturing and launch of satellites and from government R&D contracts.[265]

As a consequence, the role of Intellectual Property in outer space shall not be neglected. It has been, and is still sometimes considered that Intellectual Property questions should be treated as any other Intellectual Property matter since a patent can receive protection on Earth. However, outer space has a special statute under international law which has to be respected, whatever the level of involvement of the private sector will become.

Harmonization of the law of Intellectual Property should be a major topic whose elaboration should start as quickly as possible. As a first step, this evolution could take place at a regional level, in order to concentrate the rules of law that are applicable: in Europe (the European Community Patent could be a good start), in the East-European countries, in Asia, North America and South America. The second step would be the

[265] See supra, note 20, at 6.

creation of a world patent system, where the space patent would be a part of it. This evolutionary law-making process will have to be made in the respect of the space law principles established in the five space treaties, and especially the Outer Space treaty.

This obligation is expressly mentioned in the preamble of the Intergovernmental Agreement. Although the IGA codifies principles on Intellectual Property and Exchange of data and Goods, we have seen that implementation rules are required.

In the course of a colloquium held in May 1999, N. Jasentuliyana,[266] did a presentation on the role of the United Nations in strengthening international space law. "Matters such as international commercialization launching services and the liability aspects thereof as well as intellectual property rights, insurance, the growing interest in space tourism and the mining of asteroids are only a few of the new legal issues requiring examination."[267] Such a progress, through the United Nations and the World Intellectual Property Organization, would contribute without any doubt, to simplify the rules of law, limit the conflicts of law, as well as enhance the international cooperation.

[266] Deputy to the Director-General, United Nations Office at Vienna; and Director, Office for Outer Space Affairs

[267] N. Jasentuliyana, "Strengthening International Space Law, the Role of the United Nations, see supra, note 8.

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