

# Intellectual Property and Space Activities

*Issue paper prepared by the International Bureau of WIPO*

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## I. Introduction

1. Outer space activities are characterized, in particular, by the utilization of sophisticated technology in respect of which protection of intellectual property plays an important role, and by the fact that national law, in principle, only applies to the territory (including air space) of a country and not to outer space. In conjunction with its Futures Project on the Commercialization of Space and the Development of Space Infrastructure, the Organization for Economic Co-operation and Development (OECD) requested World Intellectual Property Organization (WIPO) to submit an issue paper concerning intellectual property and space activities. This paper is prepared by the International Bureau of WIPO in response to that request in order to illustrate how intellectual property issues interrelate with outer space activities.

2. The first part introduces notions of existing intellectual property and explores the relevance of intellectual property to outer space activities. The second part describes existing principles under international intellectual property law and international space law. The third part refers to recent activities that took place in the United Nations system, including WIPO. The fourth part illustrates certain issues which have been raised in respect of the protection of intellectual property rights in outer space in view of the potential for the future development of a wide range of international commercial activities.

3. Although some of the issues covered in this paper may be applicable to any titles of intellectual property, it mainly deals with patents, trademarks and copyrights and neighboring rights.

## II. Intellectual property and its role in the context of space activities

4. WIPO is an intergovernmental organization and, since 1974, it is one of the 16 specialized agencies of the United Nations system of organizations. WIPO is responsible for the promotion of the protection of intellectual property throughout the world through cooperation among States and, where appropriate, in collaboration with other international organizations, and for the administration of various treaties dealing with intellectual property. The number of States members of WIPO is 180 as of February 12, 2004.

5. WIPO's main activities consist of the establishment of international norms and standards in the field of intellectual property; the administration of treaties which embody such norms and standards as well as treaties that facilitate the filing of applications for the protection of inventions, trademarks and industrial designs; and providing industrial property information. WIPO also carries out a substantial program of legal and technical assistance to developing countries and countries in transition to market economy. In addition, the WIPO Arbitration and Mediation Center provides services to meet the need for quick and inexpensive ways of settling commercial disputes involving intellectual property.

A. Notion and roles of intellectual property

6. Article 2(viii) of the Convention Establishing the World Intellectual Property Organization of July 14, 1967 provides that “intellectual property” should include the rights relating to:

- literary, artistic and scientific works;
- performances of performing artists, phonograms, and broadcasts;
- inventions in all fields of human endeavor;
- scientific discoveries;
- industrial designs;
- trademarks, service marks, and commercial names and designations;
- protection against unfair competition; and
- all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields.

Thus intellectual property covers a wide range of various creations of human mind.

(1) Patents

7. A patent is an exclusive right granted for an invention, which can be a product or a process that provides a new and inventive way of doing something, or offers a new and inventive solution to a problem. A patent owner has exclusive rights to prevent third parties not having the owner’s consent from the acts of making, using, offering for sale, selling or importing for these purposes the patented invention. In other words, the patent owner has the right to decide who may - or may not - use the patented invention for the period during which the invention is protected, generally 20 years from the filing date. The patent owner may give permission to (license) other parties to use the invention on mutually agreed terms. The owner may also sell the right to the invention to a third party, who will then become the new owner of the patent. Once a patent expires, the protection ends, and the invention enters the public domain.

8. Patent owners are obliged, in return for patent protection, to publicly disclose information on their invention in order to enrich the total body of technical knowledge in the world. This body of public knowledge promotes further creativity and innovation by others. In this way, patents provide not only protection for the owner but valuable information and inspiration for future generations of researchers and inventors.

(2) Trademarks

9. A trademark is a distinctive sign which identifies certain goods or services as those produced or provided by a specific person or enterprise. Depending on national (or regional) law, trademarks may consist of one word or a combination of words, letters, and numerals. They may consist of drawings, symbols, three-dimensional signs such as the shape and packaging of goods, audible signs such as music or vocal sounds, fragrances, colors or a combination of colors used as distinguishing features.

10. A trademark provides protection to the owner of the mark by ensuring the exclusive right to use it to identify goods or services, or to authorize another to use it in return for payment. The system helps consumers identifying and purchasing a product or service,

because a unique trademark guarantees the consumers the nature and quality of such a product or service. Trademark protection can be enjoyed indefinitely on payment of a renewal fee.

### (3) Industrial designs

11. An industrial design is the ornamental or aesthetic aspect of an article. The design may consist of three-dimensional features, such as the shape or surface of the article, or of two-dimensional features, such as patterns, lines or colors. Under most national laws, an industrial design must be of an aesthetic nature, and does not protect any technical features of the article to which it is applied.

12. The owner of the registered industrial design has the exclusive right against unauthorized copying or imitation of the design by third parties. Such an exclusive right helps to ensure a fair return on investment, but also benefits consumers and the public at large, by promoting fair competition and honest trade practices, encouraging creativity, and promoting more aesthetically attractive products. The term of protection is generally five years, with the possibility of further periods of renewal up to, in most cases, 15 years.

### (4) Copyright and neighboring rights

13. The categories of works covered by copyright include: literary works such as novels, poems, plays, reference works, newspapers and computer programs; databases; films, musical compositions, and choreography; artistic works such as paintings, drawings, photographs and sculptures; architecture; and advertisements, maps and technical drawings. In most countries, computer programs are protected as literary works, but copyright protection extends only to expressions, and not to ideas, procedures, methods of operation or mathematical concepts as such. Copyright protection does not depend on formalities such as, for example, registration. A created work is considered protected by copyright as from the moment of its creation.

14. The original creators of works protected by copyright, and their heirs, have certain basic rights. They hold the exclusive right to use or authorize others to use the work on agreed terms. The creator of a work can prohibit or authorize:

- its reproduction in various forms, such as printed publications or sound recordings;
- its public performance, as in a play or musical work;
- recordings of the work, for example, in the form of compact discs, cassettes or videotapes;
- its broadcasting, by radio, cable or satellite;
- its translation into other languages, or its adaptation, such as a novel into a screenplay.

15. A category of rights related to copyright has developed *around* copyrighted works. They provide similar rights, although often more limited in scope and time, to:

- performing artists (such as actors and musicians) in their performances;
- producers of sound recordings (for example, cassette recordings and compact discs) in their recordings;
- broadcasting organizations in their radio and television programs.

(5) Enforcement of intellectual property rights

16. An infringement of the intellectual property right involves the unauthorized exploitation of subject matter covered by such intellectual property by a third party. The initiative for enforcing the intellectual property right rests exclusively with the owner of the right. The remedies which may be available to the owner are usually provided in the national intellectual property law and included generally civil and criminal sanctions. Civil sanctions normally available include the award of damages, the grant of an injunction, or any other remedy provided under the law such as the seizure and destruction of the infringing products or the tools used for the manufacture of those products. The usual forms of criminal sanction are punishment by imprisonment or by a fine, or both.

17. The national laws of most countries provide limited exceptions to the exclusive rights. These exceptions are provided carefully so that they do not unreasonably conflict with the normal exploitation of the intellectual property rights and do not unreasonably prejudice the legitimate interests of the owner, taking account of the legitimate interests of third parties. Depending on the national law, those exceptions include, in the field of patents for example, acts of exploiting the patented invention for the sole purpose of personal use or for scientific research and experimental use, or the acts of exploiting the patented invention under a non-voluntary license.

B. Role of intellectual property in the area of space activities

18. Despite the fact that space technology is always one of the most advanced technical area, and outer space activities are, in fact, the fruit of intellectual creations, it is only in recent years that intellectual property protection in connection with outer space activities has raised wider attention. One of the reasons is that the space activities are increasingly shifting from state-owned activities to private and commercial activities. These activities include remote sensing from space, direct broadcasting and research and manufacturing in micro-gravity environments. Not only is the new participation of commercial sector increasing, but the privatization of entities is equally increasing as in the cases of Inmarsat or Intelsat. In general, those non-governmental entities are more conscious of their "property", both in tangible and intangible forms. Further, due to financial and technical resources which are required to realize space projects, collaboration with the private sector is not alien to many of the state-owned space agencies today. Licensing contracts are concluded between governmental space agencies, between governmental agencies and private companies and between private companies. Such private financing has to be motivated by the expectation that the R&D investment could be recovered in the future. Thus, the acquisition and protection of intellectual property rights would have a positive effect on the participation of the private sector in the development of outer space activities and on further development of space technology in general.

19. Another reason why intellectual property has become an issue in recent years relates to the globalization of space activities. As it is the case with the International Space Station (ISS), more and more space activities are operated under international cooperation schemes, which include various players under different constituencies from different countries. Consequently, there is a need for a simple, uniform and reliable international legal framework. Although national intellectual property laws are relatively well harmonized, different national laws still apply different principles. Once a dispute arises, each national law regulates questions as to international jurisdiction. Thus, a lack of reliable international legal regime requires parties to negotiate intellectual property clauses in each international

cooperation agreement, which may include, for example, issues concerning ownership, rights of use, rights of distribution and licensing of data, information capable of legal protection and confidentiality. Obviously, while such a contractual agreement is valid among the parties concerned, it does not bind third parties.

20. Yet another reason may be that, due to the advancement of space technology, new business possibilities are emerging. For example, although it is still a dream for the general public, the development of space transportation technology have been clearing the way to space tourism.<sup>1</sup> Up to now, when discussing intellectual property matters in connection with space activities, the primary concerns have related to patent protection of inventions created or used in outer space, or copyright protection of databases using data acquired through space activities. If the space tourism becomes reality, the protection of trademarks and industrial designs in outer space may also become an important issue.

21. The importance of establishing a legal regime that effectively protects intellectual property in space cannot be overemphasized. Lack of legal certainty will influence the advancement of space research and international cooperation. Because of the large investments involved in space activities, a legal framework that assures a fair and competitive environment is necessary to encourage the private sector's participation in this field. Limited exclusive rights conferred by intellectual property protection would bring competitive benefits to right holders either by concluding a licensing agreement or by excluding competitors from using a given technology. The overall image of the company may be improved by intellectual property rights created in the company. For example, the acquisition of patents may be viewed as a proof of the technical competence of the company. The possibility of licensing intellectual property also has the advantage of allowing to negotiate a cross-license with other parties, particularly where a specific space technology concerned is a consolidation of various high-technologies. Further, legal mechanisms to establish and maintain security interests in intellectual property exists in certain countries.

### III. International conventions relating to intellectual property and outer space

#### A. International principles concerning intellectual property

##### (1) Paris Convention for the Protection of Industrial Property

22. The Paris Convention for the Protection of Industrial Property (hereinafter referred to as the "Paris Convention"), which is the basic international treaty in the field of industrial property, does not expressly consider the question of inventions in outer space. However, it contains provisions establishing the national treatment principle (Article 2), the right of priority (Article 4) and common rules, including certain measures for the enforcement of intellectual property rights, which all the Member States must follow.

23. As regards patents, patents granted in different Member States for the same invention are independent of each other (Article 4*bis*: independence of patents obtained for the same invention in different countries). This means that, on the one hand, the granting of a patent for a given invention in one Member State does not oblige other Member States to grant a

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<sup>1</sup> A company, which has brought two space tourists to space, is scouting location for a spaceport to send travelers on suborbital flights. [posted on March 16, 2004 at: <http://www.cnn.com/2004/TRAVEL/03/16/space.tourism.reut/index.html>]

patent for the same invention; on the other hand, a patent for a given invention cannot be refused, revoked or terminated in a Member State on the grounds that a patent applied for in another Member State for the same invention has been refused or has lost its effect in the latter State. Article 6 provides a similar rule with respect to registered marks.

24. Of particular interest with respect to outer space activities is Article 5<sup>ter</sup>, which provides that there is no infringement of the rights of a patentee in the case of:

(i) the use on board vessels of other countries of the Paris Union of devices forming the subject of the patent in the body of the vessel, in the machinery, tackle, gear and other accessories, when such vessels temporarily or accidentally enter the water of the said country, provided that such devices are used there exclusively for the needs of the vessel;

(ii) the use of devices forming the subject of the patent in the construction or operation of aircraft or land vehicles of other countries of the Paris Union, or of accessories of such aircraft or land vehicles, when those aircraft or land vehicles temporarily or accidentally enter the said country.

#### (2) Berne Convention for the Protection of Literary and Artistic Works

25. The Berne Convention for the Protection of Literary and Artistic Works (hereinafter referred to as the “Berne Convention”) is the basic treaty in the field of copyright and related rights. As the Paris Convention, the Berne Convention does not expressly consider the question of intellectual property rights in outer space. However, it contains provisions establishing basic principles such as national treatment, the “independence” of protection and the principle of automatic protection, i.e., copyright protection may not be subject to any formality.

#### (3) WIPO Copyright Treaty (WCT)

26. The WCT provides, among other things, for the protection of (i) computer programs, whatever may be the mode or form of their expression, and (ii) the compilation of data or other material (“databases”) in any form, which by reason of the selection or arrangement of their contents constitute intellectual creations. In particular, Article 8 assures the authors’ right to enjoy the exclusive right of authorizing any communication to the public of their works, including the making available to the public of their works in such a way that members of the public may access these works from a place and at a time individually chosen by them. This Article is also applicable to transmissions to and from a spacecraft.

#### (4) The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement)

27. The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) does not specifically address the question of outer space as such. In addition to the principle of national treatment in Article 3, Article 4 provides that, in principle, any advantage, favor, privilege or immunity granted by a Member to the nationals of any other country shall be accorded immediately and unconditionally to the nationals of all other Members (“most-favoured-nation treatment”).

28. Further, according to Article 27.1, patents must be available and patents rights enjoyable without discrimination as to the place of invention. Therefore, national law has to ensure that, with respect to inventions created in outer space, patents must be granted and enforceable in the territory in which it applies under the same conditions applicable to inventions created elsewhere.

B. International principles concerning outer space

29. The main body of current international space law is contained in five international agreements:

- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (1967 Outer Space Treaty);
- Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects launched into Outer Space (1968 Rescue Agreement);
- Convention on International Liability for the Damage Caused by Space Objects (1972 Liability Conventions);
- Convention on registration of Objects Launched into Outer Space (1975 Registration Convention); and
- Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979 Moon Agreement).

None of those agreements contains a provision expressly dealing with intellectual property.

30. However, since it may assist in examining whether the general rules on intellectual property protection need adaptation or exceptions for the purposes of outer space activities, the following general principles under international space law are highlighted:

(1) Outer Space Treaty

31. Article I of the Outer Space Treaty provides the so-called “space benefits” clause according to which the exploration and use of outer space should be carried out “for the benefit and interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.” Further, it states that outer space should be “free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law” and that there should be “free access to all areas of celestial bodies.” Article II provides for so-called “non-appropriation of space”, according to which outer space is “not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”

32. While non-appropriation of outer space has been agreed, Article VIII of the Outer Space Treaty establishes the principle that the State of registration has jurisdiction and control over space objects as well as personnel launched into outer space. It states that:

“A State to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body

or by their return to the Earth. Such objects or component parts found beyond the limits of the State party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return.”

(2) Registration Convention

33. Article II of the Registration Convention provides that the launching State shall register the space object by means of an entry in an appropriate registry which it should maintain. The term “launching State” is defined in Article I(a) as “a State which launches or procures the launching of a space object” or “a State from whose territory or facility a space object is launched.” According to Article I(b), the term “space object” includes component parts of a space object as well as its launch vehicle and parts thereof. Further, where there are two or more launching States in respect of a space object, they should jointly determine which one of them should register bearing in mind the provisions of Article VIII of the Outer Space Treaty, and without prejudice to appropriate agreements among the launching States on jurisdiction and control over the space object and over any personnel thereof. Article VII of the Registration Convention provides the possibility of an international intergovernmental organization registering its space objects under certain conditions.

(3) Declaration by the United Nations Committee on the Peaceful Uses of Outer Space on International Cooperation in the Exploration and Use of the Outer Space for the Benefit and the Interest of All States, Taking into Particular Account the Needs of Developing Countries.

34. An explicit reference to intellectual property rights is made in the Declaration by the United Nations Committee on the Peaceful Uses of Outer Space on International Cooperation in the Exploration and Use of the Outer Space for the Benefit and the Interest of All States, Taking into Particular Account the Needs of Developing Countries, which was adopted in 1996. Its second paragraph states:

“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.”

IV. Recent activities relating to outer space and intellectual property

35. In 1997, WIPO conducted a study, with the help of consultants from Europe, Japan and the United States of America, on the possible need for rules and/or principles for the protection of industrial property, in particular inventions, which are created or used in outer space. The discussion focused exclusively on international industrial property law questions. More general international law issues, for example, the question of territory and jurisdiction, the legal issues relating to the cooperation activities between space faring nations, and the legal questions arising between a regional space agency and its member States, were not examined.

36. The consultants raised, in particular, the following issues:

(a) clarification on the principle of Article 5<sup>ter</sup> of the Paris Convention;



(b) whether Member States of WIPO should clarify that the laws applicable to inventions in the territory of a country will also apply in the spacecraft registered by (under jurisdiction of) the said country;

(c) standardization of contractual clauses on the protection of inventions and confidential information, which are created or used in international cooperative agreements between the space faring nations.

However, the study came to the conclusion that, for the time being, there was no need for special international legislative provisions concerning the protection of inventions created or used in outer space, but that it is desirable that the International Bureau of WIPO give information on the existing protection of such inventions to interested States and organizations.

37. In July 1999, a Workshop on Intellectual Property Rights in Space was held in conjunction with the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), which was a major intergovernmental conference for the purposes of creating a blueprint for the peaceful use of outer space in the 21<sup>st</sup> century. The recommendations made by the Workshop were amended and adopted by the plenary of the Conference, and included in the Report of the Conference as follows:

“(a) More attention should be paid to the protection of intellectual property rights, in view of the growth in the commercialization and privatization of space-related activities. However, the protection and enforcement of intellectual property rights should be considered together with the international legal principles developed by the United Nations in the form of treaties and declarations, such as those relating to the principle of non-appropriation of outer space, as well as other relevant international conventions;

“(b) 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. In particular, the possible need for rules or principles covering issues such as the following could be examined and clarified: applicability of national legislation in outer space; ownership and use of intellectual property rights developed in space activities; and contract and licensing rules;

“(c) All States should provide appropriate protection of intellectual property rights involving space-related technology, while encouraging and facilitating the free flow of basic science information;

“(d) Educational activities concerning intellectual property rights in relation to outer space activities should be encouraged.”

38. Following the UNISPACE III, at the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space (COPUOS), some delegations proposed that intellectual property issues be included on the agenda to be considered by the Subcommittee. Such a proposal, however, did not find enough support by the Subcommittee Members. Although priority has been given to other activities due to the absence of any proposal by the member States concerning intellectual property in outer space, the International Bureau of WIPO has attended meetings and provided lectures on this topic on an ad hoc basis.

## V. Issues

39. In view of the general legal principles under international intellectual property law and international space law as described above, various issues have been addressed in the context of intellectual property created or used in outer space in the past by scholars and practitioners. On the basis of the results of the study referred to in paragraphs 35 and 36 and the latest developments in this field, this Chapter describes some of the issues which might be relevant to the future development of space activities.

### (1) Applicability of national/regional intellectual property law in outer space

40. As described above, national (and regional) laws on the protection of intellectual property in general apply only to the territory of the relevant country (or region). Thus, the acquisition and enforcement of intellectual property in a particular territory are governed by the applicable national (regional) intellectual property law. In other words, protection of intellectual property is subject to the applicable territorial legal framework. The treaties under the auspices of WIPO as well as the TRIPS Agreement have achieved a certain level of harmonization among national/regional laws. However, there still remain considerable differences among national/regional intellectual property laws which lead to a different level of intellectual property protection in the territory of each country (region).

41. On the other hand, one of the most important principles under international space law is the non-appropriation of outer space by any country (Article II of the Outer Space Treaty). The Outer Space Treaty, however, makes a distinction between “outer space *as such*” and “an object launched into outer space”. As far as an object launched into outer space is concerned, in accordance with Article VIII of the Outer Space Treaty, the State on whose registry such an object is carried shall retain jurisdiction and control over that object, and over any personnel thereof. Further, the Registration Convention introduces a rule regarding who should register a space object. According to that Convention, a “launching State”, which is a State that launches or procures the launching of a space object or a State from whose territory or facility a space object is launched, should register the space object with an appropriate registry. Where there are two or more launching States, they should determine among themselves which one of them should register the object, without prejudice to appropriate agreements concluded among the launching States on jurisdiction and control over the space object and over any personnel thereof. Therefore, according to international space law, the country of registry retains jurisdiction and control over the space object and over any personnel thereof unless otherwise agreed among the launching States. In other words, jurisdiction and control over the space object and its personnel is determined by the nationality (registering State) of the space object.

42. The question arises whether the territorial jurisdiction under intellectual property law permits the extension of each national (and regional) law to the objects which the respective country has registered and launched into outer space. In this respect, a distinction, however, should be made between activities carried out in outer space and activities relating to outer space which are carried out on the territory of a country or on the territories of several countries. Following the general principle of territoriality of intellectual property rights, the acquisition and enforcement of intellectual property rights related to intellectual creations which were made in outer space but which are used in one or more territories on Earth are, in

general, governed by the national (or regional) intellectual property law of the country or countries concerned.<sup>2</sup> Therefore, a separate consideration as to the applicability of general intellectual property rules may be needed only in so far as activities are carried out in outer space, regardless of the place where the invention was made.

43. The United States of America is the only country that has enacted an explicit provision establishing a link between the three key elements: inventions, jurisdiction and territory. Section 105 of 35 U.S.C. (Inventions in outer space) reads as follows:

“(a) 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 with respect to any space object or component thereof that is carried on the registry of a foreign state in accordance with the Convention on Registration of Objects Launched into Outer Space.

“(b) Any invention made, used or sold in outer space on a space object or component thereof that is carried out on the registry of a foreign state in accordance with the Convention on Registration of Objects Launched into Outer Space, shall be considered to be made, used or sold within the United States for the purposes of this title if specifically so agreed in an international agreement between the United States and the state of registry.”

Therefore, the patent law of the United States of America provides quasi-territorial effect on a space object that is carried on the registry of the United States of America, unless otherwise agreed by an international agreement.

44. In other countries, there is no explicit statutory provision of this kind, except that, by virtue of the ratification of the 1988 Intergovernmental Agreement (see paragraph 47, below), German intellectual property law is applicable to the ESA-registered elements. Some argue that, in the absence of an explicit legal provision, the applicability of national intellectual property law on space objects registered by that State is doubtful.<sup>3</sup> Some others are of the opinion that in consideration of the broad concept of territoriality according to which national patent law may be applicable on ships which fly that State’s flag on the high seas and on aircrafts which are registered by that State, the national patent law might be applicable by way of analogy to space objects registered in that State, even if the national patent law does not

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<sup>2</sup> For example, according to Article 27.1 of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement), patents should be available and patents rights enjoyable without discrimination as to the place of invention. Therefore, the same principles should apply to inventions created in outer space and used in the territory of a given country. That is, in order to enforce a patent for an invention created in outer space in a territory of a certain country, an application for a patent shall be filed, and a patent shall be granted, in, or with effect for, that country in accordance with the applicable law of that country.

<sup>3</sup> Anna Maria Balsano, “Industrial Property Rights in Outer Space in the International Governmental Agreement (IGA) on the Space Station and the European Partner”, 35<sup>th</sup> Colloquium on the Law of Outer Space, Washington D.C., August 28 to September 5, 1992; Glenn H. Reynolds, “Legislative Comment: The Patents in Space Act”, 3 Harv. J. Law & Tec 13, Spring, 1990

expressly provide such applicability to space objects.<sup>4</sup> It should be noted that, in order to clarify this uncertainty in Europe, the Proposal for the Council Regulation on the Community Patent, issued by the European Commission (document COM(2000) 412), provides that the Regulation should apply to inventions created in outer space, which are under the jurisdiction and control of one or more member States in accordance with international law.

45. A similar kind of legal uncertainty also exists in the field of trademarks and industrial designs.

46. As regards copyright protection, the determination of jurisdiction of a spacecraft is less important, because it is the author's nationality which, in the first place, determines the status of the work as regards its protection. According to Article 3(1)(a) and (2) of the Berne Convention, the Convention applies to authors who are nationals of one of the countries of the Berne Union or who have habitual residence in one of those countries. Only in the case of non-protected authors, the place of the first publication is of importance (Article 3(1)(b) of the Berne Convention). However, since publication normally involves a significant number of copies, it is not likely to occur in outer space, at least in a near future. This would mean, for example, that if a database is created on a spacecraft, its status as regards protection under the Berne Convention will depend on the nationality of its creator.

47. The determination of the jurisdiction as far as intellectual property is concerned should be clearly defined, particularly where more than one country is involved in the launching of the elements of a space station. A good example of how a joint government administration can lead to a specific agreement on jurisdiction and control over the elements of an international space station is the Agreement on Cooperation in the Detailed Design, Development and Operation and Utilization of the Permanently Manned Civil Space Station among the governments of the United States of America, the Member States of the European Space Agency (ESA), Japan and Canada (the Intergovernmental Agreement (IGA)), concluded in 1988. Although the 1988 IGA was upgraded by the Agreement Concerning Cooperation on Civil International Space Station, concluded in 1998, which included the participation of the Russian Federation to the cooperation project, both Agreements contain, in Article 21, a provision establishing an intellectual property regime for the international space station.

48. In principle, Article 21.2 of the IGA stipulates that, for the purposes of intellectual property law, an activity occurring in or on a Space Station flight element should be deemed to have occurred only in the territory of the Partner State of that element's registry. As regards the European Partner States, a separate rule is necessary, since the European Partner States delegate to the ESA the responsibility to register the ESA flight elements. Article 21.2 of the IGA provides that, for the purposes of intellectual property law, any European Partner State may deem the activity to have occurred within its territory for ESA registered elements. Thus, with respect to all types of intellectual property law, the principle of quasi-territoriality is implemented on the Space Station, though ESA registered elements could be considered as a "common territory" of the European Partner States.

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<sup>4</sup> Arnold Vahrenwald, "Industrial Property on the Space Station FREEDOM", E.I.P.R., Vol. 15, No. 9, 1993, at footnote 22 referring to Beier and Stauder "Weltraumstationen und das Recht des geistigen Eigentums", GRUR Int. (1985)

49. The prerequisite for the applicability of the principle of quasi-territoriality is the registration of “all” the space objects which might have a connection with intellectual property, that is, not only the spacecraft and the elements of the space station, but also, for example, an advertisement panel in outer space which might bear a trademark. It was reported that the current Registration Convention raised some practical difficulties, such as a different interpretation of the definition of the term “space object” and the accuracy of the registration carried out by the Contracting States. Further, the Registration Convention does not contain a provision regarding changes of ownership of the registered space object, which was probably not foreseen at the time the Convention was concluded.<sup>5</sup>

50. Although the maritime law also applies the quasi-territorial principle to ships and to ships on the high sea, in the case of the international space station, each segment, to which the intellectual property law of each registered State applies, is located in proximity. Such a physical proximity might highlight the differences among national intellectual property laws. For example, the use of a certain invention, or a certain mark, could be considered as an infringement of a patent, or a trademark, in one segment while no problem would arise in the neighboring segment.

## (2) Enforcement of intellectual property rights in outer space

51. As described above, enforcement of intellectual property rights relating to intellectual creations which were made in outer space but which are used in one or more territories on Earth are, in general, governed by the national (or regional) law of the country or countries concerned. As regards satellite broadcasting, inasmuch as a satellite transmitting signal is merely a conduit for Earth-based receivers, this would seem to constitute use on Earth, not in outer space.

52. Adopting the quasi-territoriality principle to a space object would mean that matters of jurisdiction as well as questions of applicable law with respect to such a space object are subject to the national law of the registry country of the space object. Provided that any intellectual property infringed in outer space is treated as if infringement had occurred within the territory of the particular country, the same level of enforcement in that country should be available in respect of inventions, signs and creations used in outer space. At least within a foreseeable future, activities of human beings in outer space would be confined to activities in a space station or physically connected to the space station. Therefore, the primary concerns about the enforcement of intellectual property in outer space may relate to the manufacturing and use of patented inventions as well as the use of copyrighted products, such as software, in outer space. As regards registered signs such as trademarks, in the future, it is not excluded that those signs would be unlawfully used on an advertisement panel set-up in outer space or, once space tourism becomes a reality, that space souvenirs sold in outer space might carry those signs.

53. For disputes arising within the boundaries of a country, it is a national law that will determine which court is competent to decide intellectual property disputes, including intellectual property infringement cases and validity of registered intellectual property rights.

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<sup>5</sup> Petr Lála, “The United Nations Register of Objects Launched into Outer Space”, Joint United Nations/International Institute of Air and Space Law Workshop on Capacity Building in Space Law, The Hague, November 18 to 21, 2002  
[<http://www.oosa.unvienna.org/SAP/act2002/spacelaw/presentations/index.html>]

In case of cross-border litigation, the situation is more complicated. Generally, matters of jurisdiction, applicable law and recognition and enforcement of foreign judgements are subject to a country's national rules of private international law. Since harmonization in this respect is still limited, a whole set of national private international laws coexist, and cross-border litigation often requires a complex analysis of questions of jurisdiction.

54. Nevertheless, in general, a number of jurisdiction laws set forth the complementary concepts of "general jurisdiction" and "special jurisdiction". General jurisdiction is based primarily on the "*actor sequitur forum rei*" principle, the idea behind which is that the plaintiff must bring suit against the defendant in the State of his domicile, habitual residence or principal place of business. Special jurisdiction rules focus more on the issue at stake, and refer jurisdiction in intellectual property matters, for example, to the place where a registration or deposit has been made, or in cases of intellectual property infringements considered as tort, where the harmful event took place or the damage occurred.

55. At the international level, a widely accepted multilateral instrument which covers jurisdiction and the enforcement of foreign judgements (including intellectual property disputes) does not yet exist. On a regional scale, in Europe, the fundamental instrument on jurisdiction is the Council Regulation 44/2001 on Jurisdiction and the Recognition and Enforcement of Judgements in Civil and Commercial Matters (Brussels I). As regards intellectual property litigation, Brussels I distinguishes between proceedings concerned with the registration or validity of patents, trademarks, designs and other intellectual property rights which require registration or deposit, and jurisdiction in other disputes involving intellectual property rights. Disputes involving the registration and validity of registered intellectual property rights are under exclusive jurisdiction of the courts of the Member State in which the deposit or registration has been applied for or has taken place. For other types of intellectual property disputes, it provides that the general and special jurisdiction rules of Brussels I apply. According to the Brussels I, general jurisdiction is based on the defendant's domicile in a Member State, irrespective of the defendant's nationality. Further, in matters relating to a contract, the courts of the place where the contractual obligation in question was to be performed and, in cases of tort, the courts of the place where the harmful event occurred or may occur have special jurisdiction.

56. As a part of contractual agreement, parties of a contract may determine, for example, a specific court, or the courts of a specific country, to have jurisdiction over disputes arising between them in connection with that contract. Such "choice of court clauses" are particularly common in international commercial agreements. Despite the prevalence in contracts, national systems vary considerably as to the prerequisites of choice of court clauses. While a number of countries place strict formalities on the acceptance of such clauses, such as the identification of a particular court, other countries also limit the possibility of choice of court clauses to business-to-business contracts, or provide special requirements and limitations for clauses involving consumers. In order to harmonize at least some of those issues, and to create greater predictability and reliability in this field, a draft Convention on choice of court agreements has been discussed under the auspices of the Hague Conference on Private International Law. In this context, the discussion on intellectual property matters focuses, in particular, on the question as to which intellectual property rights should be covered by the Convention.<sup>6</sup>

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<sup>6</sup> The Preliminary draft Convention on exclusive choice of court agreements can be found at: <http://www.hcch.net/e/workprog/jdgm.html>

57. Under the IGA, since the ESA elements are treated as if it were a “common” territory of the European Partner States, each of them could enforce its intellectual property law. In terms of enforcement of intellectual property rights, therefore, it needs certain additional rules regarding the intellectual property which is protected in more than one European Partner State. The question arises whether a single act that occurred in or on an ESA-registered element constitutes infringement of the same intellectual property rights owned by the same owner in more than one European Partner State. Could the right holder be entitled to compensation in accordance with each national law of the European Partner States concerned for a single act that occurred in or on the ESA registered-element? According to Article 21(4) of the IGA, where a person or entity owns intellectual property which is protected in more than one European Partner State, that person or entity could bring the proceedings against infringement only in one country.

58. Another question arises where the intellectual property right was granted with respect to the same subject matter in more than one European Partner State, and was transferred to another party in some, but not all, of those European Partner States. Could each right holder be entitled to compensation in accordance with the national law of the European Partner State concerned for the single act that occurred in or on the ESA registered-element? Article 21(4), second sentence provides that, where the same act of infringement in or on the ESA-registered element gives rise to actions by different intellectual property owners by virtue of more than one European Partner State’s deeming the activity to have occurred in its territory, a court may grant a temporary stay of proceedings in a later-filed action pending the outcome of the earlier-filed action. Thus, the court has the discretion of deciding for an order of a temporary stay of the proceedings. However, in accordance with Article 21(4), third sentence, where more than one action is brought by different right owners, satisfaction of a judgement rendered for damages in any of the actions should bar further recovery of damages in any pending or future action of infringement based upon the same act of infringement. Therefore, from the viewpoint of intellectual property owners, much depends on the quick expedition of litigation in the different States.

59. In addition, enforcement of intellectual property rights in or on the ESA-registered elements may require further adjustment to the traditional “territorial” concept of intellectual property rights as far as licensing agreements are concerned. For example, a licensee x under the national law of European Partner State X in relation to a certain patent in the State X and a licensee y under the national law of another Partner State Y in relation to the same patent registered in the State Y may not be the same party. Do both licensees x and y have a right to use the patented technology in accordance with the terms and conditions of the licensing agreements in or on the ESA-registered elements in outer space? Where a patent with respect to the same subject matter is owned by a third party z in another European Partner State Z, could the owner z prevent the licensees x and y from using the patented technology in or on the ESA-registered elements by virtue of assuming that the patented technology is used in the territory of the State Z without the owner’s consent? In order to answer those questions, Article 21(5) of the IGA provides that no European Partner State may refuse to recognize a license for the exercise of any intellectual property right if that license is enforceable under the law of any European Partner State, and compliance with the conditions of such license should also bar recovery for infringement in any European Partner State. Thus, it seems that a non-exclusive licensee in any of the European Partner States could use the licensed subject matter in or on the ESA-registered elements in accordance with the terms and conditions of the licensing agreement, without being in conflict with other licensees and right holders in other European Partner States.

60. In sum, as regards the elements registered by the ESA, the IGA intends to provide practical solutions to bridge the “national territory” approach adopted in respect of the enforcement of intellectual property rights on Earth and the assumption that the ESA-registered elements are deemed to be a “common territory” of all European Partner States. In addition to the fact that such an adjustment creates another layer of complexity,<sup>7</sup> some argue that it is not clear how an injunction issued by a national court could be executed on the space station in view of the fact that the ESA and its staff members enjoy the legal privileges and immunities provided for in the ESA Convention.<sup>8</sup> It is also pointed out that, since Article 21(4) of the IGA concerns the same subject matter protected in more than one European Partner State, the identification of the same subject matter may not always be straightforward, in particular with respect to patents with claims drafted differently.<sup>9</sup> Further, in addition to the general difficulties found in the enforcement of intellectual property at the international level, in outer space, it would be more difficult to detect infringing activities and to provide evidence for the alleged infringement.

61. It should be noted that, in the field of patents, many national laws provide that the rights conferred by a patent should not extend to the use of patented subject matter for the purposes of non-commercial experimentation and research. What constitutes “non-commercial” activities and the definition of the term “experimentation and research” differ from one country to another. The underlying objective of such an exception, however, is to provide a balance between the patentee who obtains exclusive rights and third parties who wish to test the reproducibility and usefulness of the patented invention or who wish to further develop the technology by way of experimenting with the patented subject matter. Since many activities in outer space could be characterized as experimental and research activities, certain uses of patented technology in outer space may fall under the experiment and research exemption, depending on the scope of the experiment and research exemption clause under the national law.

### (3) Role of arbitration and mediation

62. By their nature, outer space activities often involve intellectual property rights registered in one or more jurisdictions. Inevitably, the increase in the number of international commercial contracts regarding space activities also increases the likelihood of disputes arising. Considering the origin and nature of such disputes, mediation, arbitration or other alternative dispute resolution (ADR) procedures may offer advantages that are particularly relevant to space activities, namely:

(i) *A single procedure.* Through ADR, the contractual parties can agree to resolve in a single procedure a dispute involving intellectual property rights that are protected in a number of different countries, thereby avoiding the expense and complexity of litigation in any jurisdiction(s) that may apply and the risk of inconsistent results.

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<sup>7</sup> René Oosterlinck, “The Intergovernmental Space Station Agreement and Intellectual Property Rights”, *Journal of Space Law*, 1989, p.31

<sup>8</sup> Arnold Vahrenwald, “Industrial Property on the Space Station FREEDOM”, *E.I.P.R.*, Vol. 15, No. 9, 1993

<sup>9</sup> *Ibid*



(ii) *Party autonomy*. Because of its private nature, ADR affords parties the opportunity to exercise greater control over the way their dispute is resolved than would be the case in court litigation. In contrast to court litigation, the parties themselves may select the most appropriate decision-makers for their dispute. The choice of an arbitrator or mediator with relevant technology expertise may be particularly useful where sophisticated technology is involved. In addition, the parties may choose the applicable law, place and language of the proceedings. Increased party autonomy can also result in a faster process, as parties are free to devise the most efficient procedures for their dispute. This can result in material cost savings<sup>10</sup>.

(iii) *Neutrality*. ADR can be neutral to the law, language and institutional culture of the parties, thereby avoiding any home court advantage that one of the parties may enjoy in court-based litigation, where familiarity with the applicable law and local processes can offer significant strategic advantages.

(iv) *Confidentiality*. ADR proceedings are private. Accordingly, the parties can agree to keep the proceedings and any results confidential. This allows them to focus on the merits of the dispute without concern about its public impact. Confidentiality may be of special importance where commercial reputations and technological secrets are involved.

(v) *Finality of Awards*. Unlike court decisions, which can generally be contested through one or more rounds of litigation, arbitral awards are not normally subject to appeal.

(vi) *Enforceability of Awards*. The United Nations Convention for the Recognition and Enforcement of Foreign Arbitral Awards of 1958 generally provides for the recognition of arbitral awards on par with domestic court judgments without review on the merits. This greatly facilitates the enforcement of awards across borders.

63. There are, of course, circumstances in which court litigation is preferable to ADR. For example, ADR's consensual nature makes it less appropriate if one of the two parties is extremely uncooperative, which may occur in the context of an extra-contractual infringement dispute. In addition, a court judgment will be preferable if, in order to clarify its rights, a party seeks to establish a public legal precedent rather than an award that is limited to the relationship between the parties. In any event, it is important that potential parties and their advisors are aware of their dispute resolution options in order to be able to choose the procedure that best fits their needs when they negotiate complex international agreements.

#### (4) Synergy with other international obligations and morality

64. As prescribed in Articles I and II of the Outer Space Treaty, the exploration and use of outer space for the benefit of mankind and the non-appropriation of outer space by any nation are fundamental principles under international space law. Although the participation of the private sector in space activities is increasingly visible today, these principles are still valid.

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<sup>10</sup> The WIPO Arbitration and Mediation Center administers ADR procedures which are widely recognized as particularly appropriate for technology and other disputes involving intellectual property, see <http://arbiter.wipo.int/center/index.html>.

While recognizing the importance of intellectual property for the exploration of outer space and the further development of science and technology, questions have been raised as to whether the protection and enforcement of intellectual property rights may conflict with fundamental principles laid down in the Outer Space Treaty.

65. One of the issues concerns the access to knowledge and information derived from space activities. In view of Article I, paragraph 1 of the Outer Space Treaty which stipulates that exploration and use of outer space “must be effected for the good and in the interest of all countries, regardless of their state of economic and scientific development, being the attribute of all mankind”, it has been argued that the knowledge and information resulting from space activities should be available to all countries, in particular, to developing countries.<sup>11</sup> For example, earth observation data may be useful in the areas which are critically important for all nations, such as agriculture, natural resources, protection of the environment as well as the prevention and intervention in the event of natural disasters.

66. Another issue concerns the freedom of exploration and use of outer space on the one hand and the possibility of excluding others from accessing to outer space by way of obtaining intellectual property rights on the other. Today, there is general agreement that the notions of propriety rights over space objects and of appropriation of outer space *as such* should be clearly distinguished. However, it is pointed out that, in certain cases, protection of intellectual property may hamper the development of subsequent research, especially in the case of intelligent orbits for which the necessary technology has been patented. Since these orbits are elliptical and quasi-geostationary, but located outside the equatorial zone, their characteristics of not requiring limited frequencies provide significant advantages for the application to telecommunication. It is argued that such a patent that would cover a system or a method of satellite communication using these orbits would have the effect of limiting the access to those orbits by third parties.<sup>12</sup>

67. The World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), which is an advisory body of United Nations Educational, Scientific and Cultural Organization (UNESCO), looked into the issues relating to the ethical dimension of outer space activities, and adopted Recommendations at its second session, held from December 17 to 19, 2001.<sup>13</sup> The COMEST believes that every space policy must be based on the concept of mutual and reciprocal benefits, while safeguarding fair competition and the principle of return on investment. It emphasizes the importance of the role that ethics must play in the choice of a specific project and its long-term assessment from the viewpoint of human security and economic criteria.

68. In connection with the intellectual property issues, the COMEST recommends:

“To take all appropriate measures to provide researchers with free access to scientific data in order to guarantee sharing of knowledge with a view to promote

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<sup>11</sup> Alain Pompidou, “The Ethics of Space Policy”, UNESCO, 2000

<sup>12</sup> Ibid

<sup>13</sup> In accordance with Article 9 of its Statutes, the COMEST submitted the Recommendations on the Ethics of Outer Space to the Director General of UNESCO. The Director-General transmitted the results of the COMEST’s work to the General Conference of UNESCO, which took note with interest of the Recommendation in October 2003 (see UNESCO document 32 C/Resolutions).

scientific progress; to place scientific outer space data at the disposal of the developing countries; to foster the definition of procedures to permit sharing of the resulting benefits, bearing in mind the legitimate interests of these countries and acting in the most equitable and balanced manner possible.”

It further recommends:

“To pursue reflection with a view to reaching an agreement on the management of intellectual property in manned stations and more broadly in the field of outer space industry, notably as to the eligibility for patenting of products or processes produced in orbital stations or associated with on-board materials or vehicles.”

69. It should be noted that many national patent laws take into account the ethical concerns. They contain a provision according to which inventions the commercial exploitation of which is necessary to protect public order or morality are not patentable.<sup>14</sup> Further, with respect to the enforcement of patent rights, in order to prevent the abuses which might result from the exercise of the exclusive rights conferred by a patent, many national laws provide that a non-voluntary license may be granted to a third party or the government without the owner’s consent. The owner, however, should be paid adequate remuneration. A similar non-voluntary license may be granted in the cases where the non-voluntary license is deemed necessary due to a national emergency or other circumstances of extreme urgency.

70. However, national patent laws obviously do not address all the public policy issues. The determination of the patentability of an invention is essentially based on a technical evaluation of the invention in view of existing technical art, such as the determination of novelty, inventive step (non-obviousness) and industrial applicability (utility). It is other laws that regulate and control the commercial exploitation of patented inventions from the viewpoint of public welfare. For example, in order to safeguard the quality and safety of pharmaceutical products and certain chemical products, those products, whether they are patented or not, are subject to strict marketing approval processes before commercial exploitation. Many products, from daily goods to high technology products, should comply with various quality standards and safety standards for their commercial exploitation. Thus, patent law is not deemed to be a major legal instrument to monitor and control issues such as public security and welfare. In any event, a patent does not confer a positive exclusive right to exploit or market the patented invention. Such a consideration is reflected in Article 4<sup>quater</sup> of the Paris Convention, which provides that the grant of a patent should not be refused and a patent should not be invalidated on the ground that the sale of the patented product or of a product obtained by means of a patented process is subject to restrictions or limitations resulting from the domestic law.

71. Under the national laws on copyright of most countries, databases that constitute an intellectual creation by reason of the selection or arrangement of its contents are protected. It is to be noted, however, that the threshold of originality that is required to qualify for copyright protection differs from country to country. While a particular kind of database

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<sup>14</sup> In Article 27.2, the TRIPS Agreement provides that “members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect order public morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law.”

might be protected under copyright in some countries, a similar database might not qualify for copyright protection in other countries. This means that copyright protection might not be available for certain databases, depending on the level of originality required under the copyright law of a particular jurisdiction, even if substantial investments have been made to produce them. Databases that contain comprehensive information without selection in a straightforward manner, such as alphabetical or numerical order, may not be protected under copyright in all countries. This is why certain countries have extended intellectual property protection to such databases through a *sui generis* regime. Other models of protection are also available, such as unfair competition or misappropriation laws.

72. Copyright protection of original databases is well established and harmonized through international treaties to that effect, such as the Berne Convention, the TRIPS Agreement and the WCT. However, there are no international norms on protection of non-original databases.

73. At regional level, the Directive 96/9/EC of the European Parliament and of the Council of March 11, 1996, on the legal protection of databases grants a “*sui generis*” right to database makers to protect their investment of time, money and effort to establish a database, regardless of whether the database is in itself innovative. At national level, the copyright law of Mexico and the Korean Copyright Act of 2003 contain provisions on protection of non-original databases.

#### (5) Interpretation of Article 5<sup>ter</sup> of the Paris Convention

74. As described in paragraph 24 above, Article 5<sup>ter</sup> of the Paris Convention provides for certain limitations on the exclusive rights conferred by a patent in the public interest in guaranteeing freedom of transport. In principle, if ships, aircraft or land vehicles temporarily visit foreign countries and have patented invention on board, licenses on patents in force in these countries are not required in order to avoid infringing such patents (doctrine of temporary presence).

75. The question arises whether the doctrine of temporary presence applies to spacecraft. It can be argued that, since Article 5<sup>ter</sup> of the Paris Convention only mentions vessels, aircraft or land vehicles, space objects do not fall under this provision; therefore the temporary presence of elements of a space station for the purpose of launching or return in a foreign country will not automatically be exempted from patent infringement. According to this argument, in the context of international cooperation, if the transport of payloads or flight elements of country X depends on launchers registered by country Y, the space agency of country X might infringe patents enforced in country Y due to the fact that the nationality of the launchers is country Y.

76. In order to clarify this question, the IGA shed some light on the temporary presence of an article in relation to outer space activities in Article 21(6). According to that Article, the temporary presence in the territory of a Partner State of any article, including the components of flight elements, in transit between any place on Earth and any flight element of the Space Station registered by another Partner State or ESA should not in itself form the basis for any proceedings in the first Partner State for patent infringement. Thus the transport of patented articles to or from the Space Station through a launching site would not infringe patents enforceable in the country of the launching site.

(6) Ownership and entitlement

77. The principles for determining ownership of intellectual property and entitlement to use objects protected by intellectual property rights are the same for cooperative space efforts as for cooperative projects on the ground. Ownership of technology resulting from joint development is often determined by the terms of the joint agreement itself. Thus, when inventions or other objects of intellectual property are expected to be produced in the execution of the joint activities, it is advisable that the following issues be agreed upon beforehand: (i) the extent to which any inventions or other technology developed during the joint activity will not be published or disclosed before patents are applied for, or before all parties agree to publish or disclose the technology; (ii) the entitlement to rights; and (iii) the entitlement to benefit from any technology developed during that activity. Similarly, the partners to a joint project should agree on a system that suits their interests for the purposes of protecting confidential information shared by them in a cooperative international project.

78. Further, in general, the development of distinct public-sector intellectual property management skills and policy mechanisms are important for effective deployment of public funds. In particular, since space activities are largely supported by public investment and other public resources, establishing policies for managing intellectual property from public funded research is essential for successful public-private partnership models.

79. As a separate issue, currently, many national laws require that an inventor should first apply for patent protection in the State of which the inventor is a resident or in the State in which the invention was made. This is due to the concern that, without such a measure, inventions involving national security might be disclosed in foreign countries by way of filing patent applications abroad. If such a requirement is imposed in relation to international cooperation activities in an international space station, it might have a negative effect on the sharing of elements for research and on the collaboration of researchers from different countries. Thus, in Article 21(3), the IGA states that, in respect of an invention made in or on any Space Station flight element by a person who is not its national or resident, a Partner State should not apply its law concerning secrecy of inventions so as to prevent the filing of a patent application (for imposing a delay or requiring prior authorization) 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. Therefore, despite the general principle in Article 21(2) of the IGA that activities carried out in the Space Station flight element should be deemed to have occurred in the territory of the Partner State of that element's registry, the rule concerning secrecy of inventions for the purposes of national security should not apply to an inventor who is not the national or resident of that State. However, in accordance with Article 21(3), second sentence, once the inventor has filed a patent application with the Office of a particular country, the provisions concerning secrecy of inventions for the purposes of national security of that country may apply to that application.

VI. Conclusion

80. It can be expected that technical inputs as well as financial contributions from the private sector will become more and more important in the context of future development of outer space activities. Further advances in a wide range of technologies will create more opportunities for the development of new space applications by the private sector. Although a number of public policy tools can be envisaged to attract the participation of the private sector, intellectual property protection will play an important role in developing successful

space business models involving public/private collaborations. While it is difficult to forecast the future, it is very likely that intellectual property protection will be one of the key factors for the establishment of the institutional and regulatory environment that supports further development of space business.

81. In the absence of legal certainty as to how the territorial jurisdiction under intellectual property law could apply to extraterritorial activities on a spacecraft which is subject to nationality jurisdiction, in practice, registered space objects are treated as quasi-territory for the purposes of intellectual property under a number of international agreements concluded with respect to international space projects. This leads to a patchwork of national intellectual property laws each of which could only be applicable on a relevant registered object. It means that, in the case of international cooperation activities, a complex segmentation of the international space station, or any other future international platform, cannot be avoided. Further, the lack of a global agreement leads to the situation that an agreement would have to be concluded among the parties in each single case of international cooperation.

82. From the business perspective, one expert considers that the legal certainty is an essential factor for the space industry. He suggests that, while recognizing the difficulties to overcome the existing national and territorial legal framework, the best solution be to declare space and its accessories (for example, launch sites and vehicles) as a single territory with a single and uniform law and with a single and universal enforcement body.<sup>15</sup> Indeed, it appears that many of the practical difficulties that arise from the commercial application of space technologies stem from the very principle of territoriality and differences among national intellectual property law. To name a few, industrial property rights should be obtained and enforced in each country in which the protection is sought under its applicable law; the same subject matter may not be protected to the same extent in various countries; the requirements concerning the entitlement to the rights, including the employee's entitlement to his creation, are different under each national law; the rules concerning licensing contracts and the protection of confidential information vary in each country; and the enforceability of a court judgement in respect of an international dispute may not always be certain.

83. Such differences among national intellectual property laws, however, affect not only the space business, but also any other business which expands at the international level. The increasing international dimension of trade and business requires protection of intellectual property assets beyond the borders of the home country. The differences among the national laws require an applicant to "customize" the application in accordance with the applicable law. Time and efforts being spent for the customization of the application to accommodate national specificity may be considerable, and often, professional advice by a local expert is indispensable. Facing this challenge, in order to facilitate the access to the patent system internationally, a number of treaties and recommendations have been adopted under the auspices of WIPO, and efforts for further harmonization of intellectual property law and practice have been undertaken in WIPO in all fields of intellectual property.

84. Although harmonization of national intellectual property law and practice would eliminate some of the difficulties faced by space agencies and space industries at the practical level, the fundamental issue, i.e., the establishment of an appropriate legal framework for

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<sup>15</sup> Bradford Smith, "Matching space-related intellectual property rights to space industry needs", *Echanges ASPI-1997*, No.53

identifying and exercising intellectual property rights in connection with extraterritorial activities, remains unresolved. In order to forestall any legal complexity and disputation, and to underpin the cooperative development of space-based industries, a broad debate on the long-term prospects of space activities would contribute to the progressive development of a less ambiguous and better-coordinated international intellectual property framework. A simple and reliable international legal framework would facilitate maximizing the collective utilization of public and private resources in the area of space technology for the benefit of all nations.

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