

## INDUSTRIAL PROPERTY RIGHTS IN OUTER SPACE: THE SPACE STATION INTERNATIONAL GOVERNMENTAL AGREEMENT (IGA) AND THE EUROPEAN PARTNER

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The views expressed below are those of the author and do not necessarily represent those of European Space Agency (ESA).

### Abstract

The constant evolution of high technology and the ever-changing geopolitical situation underlines the need for universal harmonisation of Industrial Property laws. The analysis of the specific problems relating to Industrial Property Rights (IPR's) arising from the utilisation of the future Space Station by the European Partner is an example which strengthens this need for harmonisation of IPR's laws. In the author's view, these potential problems justify a more elaborated research in this area.

The conclusion of the IGA<sup>1</sup> underlines the need to focus our attention on the impact of Space Station activities on the creation of intellectual property rights (IPR's). This leads to the question as to whether such IPR's should be adapted to the particular characteristics of space activities. We also see that European cooperation through the European Space Agency with regard to space activities poses specific problems with regard to the regulatory environment in which these activities are to be carried out. Also, Europe's own regulatory complexity may lead to US legislation taking precedence in

joint activities occurring on board the Space Station. The potential impact on the European partner of such an event shall be assessed.

### I Introduction

The issue of Industrial Property Rights (IPR's) in outer space has at this moment still a somewhat "exotic" character. This may be because microgravity activities, which are the activities taking place in the near-zero gravity of outer space, have not developed as quickly and thoroughly as other activities which are also using the outer space environment, such as, for instance, remote sensing and telecommunications. Furthermore, the private sector's entities active in the field of space activities are not necessarily very interested by microgravity research at this stage. Although pharmaceutical and biotechnical industries may have a potential interest in micro-gravity activities, this is a far cry from a market of production in outer space. Apart from technical and financial barriers for micro-gravity research, a clear legal structure is also needed in order to encourage private sector participation. Before going into the analysis of solutions adopted

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in the IGA for the Space Station with regard to IPR's, a brief panorama on the existing regulation in this field would be useful for better understanding of the harmonisation of IPR's laws since the last century.

## II Intellectual Property Rights and the Existing Regulations

Intellectual property<sup>2</sup> has attracted a significant amount of interest on an international scale since the end of the last century. In the first instance, the desire to protect and commercialise industrial inventions, trade marks, drawings and copyright beyond the territorial boundaries of the country where they were made, led to the creation of the Paris Union system in 1883. The treaty setting-up the system, which has been amended on a number of occasions, deals with intellectual property in general and obliges or invites States participating in the system, 99 at this stage, to enact legislation on certain intellectual property matters like, for example, temporary protection of inventions at exhibitions, priority rights and infringement.

The Berne Convention, signed in 1886 and revised several times since, is the other international instrument playing a role in the delicate process of harmonisation. Dedicated to the protection of literary and artistic works, it is the main source where the fundamental principles underlying national copyright law can be found. Indeed, it has stimulated the adoption, improvement and standardisation of national legislations, facilitated by the scale of its world-wide acceptance (80 Member States).

An additional milestone in the history of international industrial property was the signature of the Patent Cooperation Treaty (PCT) on 19 June 1970 in Washington. This treaty establishes a centralised

"international applications" procedure for the granting of various patents at national or regional level. This is done through a single operation which calls for the designation of various States. The Patent Cooperation Treaty also creates an "international search" system which is used to establish a report on the novelty value and inventive element of the invention.

With the adoption of the European Patent Convention (EPC), which was signed in Munich on 5 October 1973, the European States established a centralised system for the application for national patents and their granting. Later on, the States of the European Economic Community adopted a unitary patent process which applies to the overall territory of the EEC member States (Community Patent Convention (CBC) or Luxembourg Convention, not yet in force).

The adoption or forthcoming adoption of those two Conventions has led interested States to adapt their respective national legislations to bring them in line with the principles contained in the Conventions. Thus, the Conventions have already played a major role in the process of harmonising patent law in Europe<sup>3</sup>. At European level, acknowledgement has to be made of the significant amount of work done by the European Communities (EEC). In the area of intellectual property rights, the EEC's efforts contribute to the convergence of national legislation required for the proper functioning of the common market (Article 3(h) of the EEC Treaty<sup>4</sup>). This issue has been the subject of a number of Council directives (on harmonising trademark standards, protecting computer software programmes, harmonising copyright provisions, etc.). These directives, while aiming at bringing European legislations in line with the provisions of international Conventions, seek to standardise

existing national regulations in order to provide an adequate level of legal protection.

However, the coexistence of numerous intellectual property regulatory systems, both at national and at international level, is creating significant coordination problems. For this reason, the introduction of extensive harmonisation measures on a universal scale may be required. The author believes that the overall process of harmonisation presently underway will probably make a significant contribution towards the standardisation of European national legislation.

### III. The Problems of Industrial Property in Outer Space

The main questions to be analyzed below are:

a) Which European Patent laws protect the research process conducted in space and the results of such research achieved in space? Can an infringement occurring in outer space give rise to liability under patent laws?

b) What would be the legal consequences of an invention being developed in space?

a) When trying to answer the first question, one has to bear in mind that European national regulations dealing with industrial property are not concerned with the actual location of the invention's conception. It is therefore irrelevant under this regulation to determine where the invention was made and one may apply for a patent with regard to inventions made in outer space under any national or European system (for an overview of the Conventions, see chapter II). The location could, on the other hand, prove to be relevant where the patent law of a given country provides that for certain types of inventions, i.e. the ones relating to technologies having a direct bearing on national security, the

first application for patent must be filed in the country where the invention was made. This provision has the purpose of allowing security clearance for the invention before it is published or filed in a foreign country.

As regards the use of a nationally protected invention in outer space, or the infringement that may result from that use, the situation is different. An authorized or non-authorized use will not bear the legal consequences in those European States that have not recognized the object located in outer space, where the use is made, as being an extension of their territory.<sup>5</sup>

In principle, national patents are enforceable only within the territorial boundaries of a given country. The same principle applies within the framework of the European Patent Convention which allows for (art.64 EPC) the acquisition of a "bundle" of national patents of the countries party to the Convention, indicated in the application; the patent therefore has the effect of a national patent in each of the countries mentioned in the application.

In the case of the Community Patent Convention (not yet entered into force), article 2(2) provides: "Community patents shall have a unitary character. They shall have equal effect throughout the territories to which this Convention applies and may only be granted, transferred, revoked or allowed to lapse in respect of the whole of such territories".

Outer space, similarly to the high seas and Antarctica, is generally considered as not being subject to national appropriation and, as far as international law is concerned, does not formally fall under any national sovereignty. This implies that outer space cannot be appropriated by use or claim or any

other means (Art. II of the Outer Space Treaty)<sup>6</sup>. However, a State retains jurisdiction and control over objects it sends into outer space (Art. VIII of the Outer Space Treaty). With regard to the applicability of national patent regulations, problems occur when an invention is used or infringed in outer space because these regulations are only applicable in the territory of the specified State, which, by definition, excludes the extra-territorial areas of outer space.

According to the Law of the Sea, even when a ship is on the high seas the principle of nationality applies (the "flag state", or the register of the ship). In outer space the same principle can be found; as stated above, Art. VIII of the Outer Space Treaty recognizes the launching State's jurisdiction and control over the object it launches into outer space. Nevertheless, this will not help us to find a solution to patent law applicability as these regulations are explicitly limited to the territories of the States and thus are useless in outer space even for a space object falling under the jurisdiction of a State. This situation led to the amendment of national patent law in the United States, the legislators also making this law applicable to inventions in outer space when such inventions take place on board space objects coming under the jurisdiction or control of the United States<sup>7</sup>. As we will see later, the same approach inspired the German ratification of the IGA<sup>8</sup>.

b)As we have seen above, no provision contained in European legislation or regulation would retain the location of the conception of an invention as a criterion for granting a patent application. However, a distinction is made in U.S. patent law between foreign inventive activity and domestic inventive

activity. In contrast to the patent laws of most countries, where the patent is awarded to the first person to file a patent application on the product or process, a patent will be issued under U.S. law to the first person to invent the product or process he claims in his patent. The first to invent is said to have "priority" over others claiming the same invention. Priority is determined by reference to certain key events such as conception, reduction to practice and diligence<sup>9</sup>.

Another important characteristic of U.S. patent law concerns activities considered to be "prior art"<sup>10</sup>. Patent law distinguishes between domestic and foreign activity for the purpose of determining what falls under the category of prior art. For instance, patents and printed publications, no matter where they originate, are prior art, but items previously known, used, or invented are considered to be prior art only if they occur within the United States.

Finally, the definition of infringement contained in U.S. patent law as being the unauthorized conception, use or sale of an invention within the United States, creates the same problems of applicability of patent law as in other countries<sup>11</sup>.

#### IV. The Example of the Space Station

The Intergovernmental Agreement on the International Space Station, signed on 29 September 1988 by thirteen countries representing four partners (the US, Japan, Canada and ten ESA Member States), is probably the most complex and interesting example of a long-term international cooperative endeavour in space. It concerns the design, development and utilisation of a permanently-inhabited civil space station.

From a technical point of view, the

Space Station will function as a permanent facility, in low-Earth orbit, at an altitude of about 400 km and an angle of inclination of 28.5°, a complex comprising inhabited and uninhabited elements. The International Space Station envisaged is therefore a complex of elements, some attached, others flying free alongside. It is intended as an evolving modular facility in use for the next thirty years. The International Space Station will perform a number of functions: science laboratory, permanent observatory for Earth observation, transport complex, servicing facility for payload maintenance, distribution and refurbishment, assembly facility, storage area, and relay base for any future missions.

The intrinsic characteristics of the exploitation and utilisation of the International Space Station generate corresponding legal implications. These characteristics are, among others:

- the fact that the Station will be "permanently inhabited", by a multinational crew;
- the fact that the Station will be located in outer space;
- the multi-purpose scientific and commercial utilisation of this facility as a research laboratory, a factory for manufacturing materials and a service station for supplying or repairing satellites<sup>12</sup>.

The agreement between the Partners, described in the IGA, is based on a system that is complex to manage and which has been the subject of lengthy discussions. These discussions touched upon, among other things, the registration, jurisdiction and control of flight elements considered as space objects under Article VIII of the Outer Space Treaty.

These discussions focused especially on the necessity of complying with one of the

fundamental principles of outer space law which is stated in Article II of the Outer Space Treaty, under which outer space is not subject to national appropriation in whole or in part.

The solution that has been accepted by the signatories of the IGA is that each "Partner" will register each element it provides as a space object, thereby establishing its jurisdiction and control over such element, i.e. the ability to issue regulations and have them enforced. The same principle applies to persons on board the Space Station that are the nationals of the Partner States.

That is the reason why Article 1 of the IGA, which defines the scope of the Agreement and its purpose - to establish "a long-term international cooperative framework ... for the development ... and utilisation of a ... Space Station for peaceful purposes"- should be read in conjunction with Article III of the Outer Space Treaty, which stipulates that the exploration and use of Outer Space shall continue in the interest of maintaining peace and promoting scientific cooperation at international level. Similarly, the possibility of exercising jurisdiction and control over Space Station elements (Article 5 of the IGA) does not infringe upon Article II of the Outer Space Treaty, which bars any claim of sovereignty over outer space.

#### V. The IGA and the provisions pertaining to industrial property rights. Specific issues for the European Partner

Article 21 of the IGA aims at resolving issues relating to Intellectual Property Rights developed or used on board the Space Station, on the basis of the principles explained above.

The two main questions dealt with in the IGA are acquisition of

Intellectual Property Rights over results obtained from the activities carried out on board the Space Station and protection against infringement of IPR's (granted on Earth) that may occur on board the Space Station. The fundamental principle laid down in the IGA is that the part of the Space Station complex in which the invention was made is deemed to be an extension of the territory of the State having registered that element.

The formulation of this principle in the IGA produces a number of consequences, including the one that the national law of the State which is deemed to have jurisdiction is applicable not only to the arrangements that may be necessary for implementing such rights but also to the acts of infringement.

The approach adopted by the Space Station Partners raises a general question about the applicability of the jurisdiction and control criteria to solve the problem of the territorial application of patent laws<sup>13</sup> and a number of questions relating to the European Partner States.

Firstly, Article 21.2<sup>14</sup> of the IGA establishes a legal fiction regarding the ten European Partner States: these States are deemed to be located on a single territory which is subject to one set of regulations.

It goes without saying that the ten European Partner States signatory of the IGA are not located on a single and unique "territory". A consequence of the legal fiction referred to above is that, in order to implement the IGA, the European Partner States will have to establish IPR's provisions at national level which are not only compatible with the ones established in the other European Partner States but also appropriate for responding to the needs

expressed in the IGA, a process that could be described as a standardization of legal texts. The process of legal harmonisation called for by the IGA imposes a certain burden on the signatory States. 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 harmonisation process already underway in Europe in the field of IPR's in order to determine whether such a process can influence or respond to the need for the protection of IPR's designed or used on board the Space Station.

The procedures applicable to the ratification of treaties differ from State to State and one has to bear this simple fact in mind when considering the implementation of IGA's provisions. The ratification procedure can involve transforming provisions provided by the IGA into national law (by legislative process) or incorporating these provisions without recourse to any procedure whatsoever - in which case, the IGA enters into force, bypassing the legislative process of the State (immediate validity)<sup>15</sup>.

The IGA has, to date, been ratified by six European States: Germany, the Netherlands, Norway, Denmark, Spain and Italy. Germany exercised the right laid down in Article 21.2 of the IGA by enacting legislation on 13 July 1991 for the purpose of ratifying the IGA<sup>16</sup>. Article 2 of this legislation stipulates that for the purposes of German copyright and industrial patent legislation, an activity occurring in or on an ESA-registered element is deemed to occur within German territory. The remaining provisions of Article 21 of the IGA are considered to be self-executing and for this reason Germany has not felt it necessary to enact further legislation.

The other European States having ratified the IGA did not consider it appropriate to enact legislation and have given immediate and direct validity to the provisions of the IGA. The United Kingdom, for its part, has informed ESA that it intends to enact legislation in line with the provisions of Article 21 of the IGA and is currently studying the scope of changes to be made to its national law in order to ratify the IGA.

The IGA entered into force on January 30, 1992, the conditions prescribed in its article 25(a) having been fulfilled with the ratification by Japan and the acceptance by the USA; the IGA has not yet entered into force for Canada and the European signatory States, these two Partners having failed until now to ratify it.

The IGA will enter into force for the European Partner only when it is ratified by four States contributing at least 80% to the Columbus Development Programme<sup>17</sup>. At present, the six signatory European States who have ratified the IGA contribute at a level of 77.5% to the Columbus programme whose objective is to implement the European part of the Space Station cooperation. Therefore, ratification by France or Belgium will be needed to permit the entry into force of the IGA for the European Partner.

The necessary harmonisation process referred to above is obviously not made easier by the procedural aspects, i.e. the numerous procedures which need to be carefully monitored and guided in order to transform the legal fiction of the IGA into reality.

The lack of coordination regarding solutions adopted or to be adopted by the ten European States could significantly affect the development of a legal system that is uniformly applicable to the design and utilisation of IPR's on

board the Space Station<sup>18</sup>. For this reason, to provide an adequate framework for the protection of rights provided for in the IGA, ratification of the IGA by all the European States through the same procedure as the one followed by Germany would be a worthwhile development.

#### IV. Practical Aspects of Experimentation on Board the Space Station

The IGA states in the annex that the Space Station elements to be provided by the European Governments, through the European Space Agency (ESA) acting on behalf of the European signatory States, are:

- as user elements, the Attached Pressurized Module (referred to below as APM and which is known as the Columbus attached laboratory within the framework of ESA's Columbus programme) for the manned base, a Man Tended Free Flyer which will be serviced at the manned base, and a polar platform;
- in addition to the flight elements above, Space Station-unique ground elements.

I will concentrate for the purpose of this article only on the APM. The volume of the APM is divided, according to the Memorandum of Understanding between NASA and ESA<sup>19</sup>, into the following percentages:

51% to ESA; 46% to the United States; 3% to Canada.

This means that ESA can offer to the European user community only 51% of the volume of the APM<sup>20</sup>. To evaluate the exact power of negotiation of ESA, other factors should be taken into account such as the resources allocated to ESA by the MOU that are equal to 12.8% of the resources available to the whole Space Station. These resources include crew time, power, data, services for communication and transportation.

Two Space Shuttle flights have been planned during the assembly phase of the Space Station in the year 1999. According to detailed calculations that have been made at this time, the total utilisation crew time available to the four Partners, that means the effective working hours of the crew, will be 1.072 hours. Therefore ESA will have 137 hours of crew time (corresponding to the 12.8% of 1.072).

In addition, the Shuttle can carry seven persons on board. Only one of them will be an European astronaut. Two of them must stay on the Shuttle during the whole mission; the other five will work in shifts. This means that a maximum of 3 astronauts may work on the APM at any one time.

Therefore, the crew will be composed by ESA or non-ESA astronauts and the experiments will come from ESA or public and private profit and non-profit making national organisations.

This explanation of the modalities of the European Partner's participation in the Space Station's early operations is important to understand in which way the existing legal provisions will apply to the IPR's created and/or used on board Space Station.

At this stage, i.e. before the realisation of a permanently manned laboratory<sup>21</sup>, the possibility of realising an invention in outer space that could be subject to relevant national or international legislation seems to be non-existent. In fact, the conception of the experiment which is destined to be realised in outer space is developed on Earth by the Principle Investigator( PIs) and integrated in the related payload placed on board a space object. The astronaut is trained by the Principle Investigator to execute a series of operations in order to confirm or check the results expected by the

Principle Investigator itself.

Who, then, exercises the rights over the data resulting from the experiment and who is entitled to file the patents ?

The author's view is that the answer should be found in contracts or other forms of agreements to be concluded between an experimenter or customer and ESA. One expects that before agreeing to undertake a joint or cooperative activity such as the Space Station utilisation, the interested parties or Partners agree on the law that would be applicable to an invention or to another aspect of IPR's that could result from such activity. A number of other matters should also be considered and settled in advance such as, for example:

- the period during which inventions or any other technology developed during the joint activity will not be published or disclosed before a patent application is filed, or before all parties agree to publish or disclose the technology;
- the entitlement to legal rights;
- entitlement to benefit from any technology developed during that activity.

The terms and conditions under which each of the interested Partners involved in the joint activity would be allowed to use the inventions or the technology owned by the respective parties should also be settled beforehand. In this respect, a licence should be requested where a third party's technology is to be used by the partners.

The situation can be somewhat different once the APM has reached a fully operational stage. However, even in this case the relationship between the PIs and the astronaut will not change substantially. The astronaut will remain the executor



of the experiment and the conception and realisation of the invention will remain with the PIs in a given territory<sup>22</sup>. A very important question which arises in this case concerns the definition of the acts that can constitute an infringement of a patent. If we apply to activities undertaken on board the APM the generally accepted definition of the act of an infringement, namely the unauthorised making, use or selling of the invention in a given State in which the patent has been granted, it would mean that an infringement would only take place when an effective production and/or commercial activity is performed. There may be a need therefore to adapt this definition to the particular circumstances in which activities in outer space, and in particular on board the APM, will take place. The definition of experimental use, and the limits this definition will set on the use of patents by third parties, will probably lead to a better understanding of what use could constitute an infringement in outer space.

It is interesting to note that the general rules within ESA regarding information and data relating to payloads flown on space vehicles are based on the funding cost<sup>23</sup>. The basic difference is that ESA will be entitled to use inventions and technical data resulting from the experiment when it has provided a cost free opportunity to fly on a space vehicle; on the other hand, if the flight is entirely funded by the customer, the latter will have exclusive rights over the resulting inventions and data.

The reasoning behind ESA's choice can be interpreted as follows : ten Member States decide to fund the construction of a European infrastructure in space in order to develop European technological expertise in the field of micro-gravity during the construction and utilisation of the Space Station.

Therefore, the investments are justified by wider access to the derived information by research and industrial bodies of the Member States.

A final observation should be made at this stage concerning the mandate of ESA "... to facilitate the exchange of scientific and technical information pertaining to the field of space research and technology ....."<sup>24</sup>. It is questionable in which way ESA can perform this role with regard to non-space applications. In practice, if ESA is entitled to use, promote or divulge technical information or inventions resulting from experiments not relating to space applications, it is doubtful if and how ESA can fully perform this role! Micro-gravity research includes a whole range of interest in different areas such as materials synthesis, fluid dynamics, life sciences etc. Is the fact that this research is done in outer space a sufficient reason to consider it as space research or space application ? Will these activities be subjected to ESA rules with respect to the circulation of the information and data ?

Since these questions are beyond the scope of this article, they will not be discussed here.

#### **VII. CONCLUSIONS : Attempt to propose amendments to the existing laws**

Are we facing at present a legal vacuum in the area of the conception or use of inventions in outer space, or do the existing patent laws adequately cover, at this stage, activities carried out in outer space ? The application of the relevant provisions of the IGA would lead to a situation where the rights of the inventors who make inventions in outer space and the use of inventions in outer space are governed by the law of the States which recognize the

activity developed on board one of the elements of the Space Station as occurring within their own territory. At present, the only applicable national laws seem to be the ones of Germany and the United States. The solution linked to the criteria of jurisdiction and control to determine which law is applicable is therefore not suitable for IPR's<sup>25</sup>.

The scope of the IGA provisions should be carefully studied in relation to Conventions and national IPR's regulations in European States in order to assess what kind of amendments may be necessary for these somewhat "special" IPR's, at least in terms of the environment in which they can be created and used. The importance of such an analysis stems from the need to enable future European users of the Space Station to work in space on an equal footing with other economic competitors like the United States and Japan.

Therefore, the amendments to be made to European national legislations and regulations in order to cover IPR's created in outer space should respond primarily to the need to protect initial investments by the States and by the users in the future.

In the opinion of the author, there are several elements of patent law that should be analyzed to respond to the above needs:

- experimental use limiting the monopoly of the owner of the patent;
- compulsory licences which can be granted on the grounds of insufficient exploitation by the patentee;
- the grace period as protection against the destructive disclosure of the novelty of the invention while the inventor is using it (before applying for a patent) in connection with an activity occurring in outer space.

Other provisions of the IGA also require attention, and in particular those significantly limiting national legislative and procedural provisions. These provisions concern the legal remedies for acts of infringement. Article 21.4 of the IGA envisages the particular situation of the European Partner State in the event of an infringement of IPR's occurring in or on an ESA-registered element. The IGA stipulates that where IPR's are vested in a single person or entity, the latter may recover damages in only one State in which that right can be exercised. This is done in order to prevent the same act of infringement involving a multitude of procedures in different ESA Member States. Moreover, where more than one person or entity owns rights in various countries and is entitled to bring an action for infringement, a court may grant a temporary stay of proceedings in a later-filed action pending the outcome of an earlier-filed action. Only one judgment may be rendered on the same act of infringement. Satisfaction of a judgment rendered for damages bars further recovery of damages in any other action based on the same act of infringement.

NOTES

January 1967.

1. The International Governmental Agreement among the Government of the United States of America, Governments of Member States of the European Space Agency, the Government of Japan and the Government of Canada on cooperation in the detailed design, development, operation and utilisation of the permanently manned civil Space Station, was signed in Washington, D.C. on 29 September 1988.
2. Intellectual property may be literary and artistic or industrial. Literary and artistic property covers the enjoyment of copyright by writers, artists composers of music etc., in respect of their creations. Industrial property covers patents for inventions, designs, trademarks etc. This article addresses only problems related to industrial property and in particular to patents for inventions.
3. See J.M. Mousseron in "Traité des brevets" (1986).
4. Treaty establishing the European Economic Community, Rome 25.3.1957.
5. With the exception mentioned in the above paragraph, which in principle doesn't concern us because of the given principle of the peaceful use of outer space, Article 1 of the IGA states : " The object of this Agreement is to establish a long-term international cooperative framework among Partners, on the basis of genuine partnership, for the detailed design, development, operation and utilisation of a permanently manned Civil Space Station for peaceful purposes, in accordance with international law ...."
6. Treaty on principles governing the activities of States in the exploitation and use of Outer Space, including the moon and other celestial bodies, signed on 27
7. Paragraph 105 of article 35 (Patents) of U.S. Code states "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.  
  
Any invention made, used or sold in outer space on a 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, 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."
8. Article 2 of the law of 13 July 1991 ratifying the IGA states that an activity occurring in or on ESA registered elements shall be deemed to have occurred, for the German legislation on copyright and industrial property, in German territory.
9. For example if A, a foreign company, conceives and reduces to practice a satellite stabilizing mechanism outside the U.S. in early 1990, but does not file a patent application until late 1991, and B, an U.S. company, conceives and reduces to practice the same invention in late 1990 but files the invention in early 1991, B will have priority.

However, if A and B both conduct their research in the U.S., then A, as the first to conceive and reduce to practice, would win the patent. See Gleen H. Reynolds and Robert P. Merges "Outer Space - Problems of law and policy" (1989), p.p. 282

10. In order to be patentable, an invention must be novel in the sense that no identical inventions exist under legally recognized prior art, and non obvious compared to prior art.
11. See section (a) above.
12. For further details, see G. Lafferranderie, "La Station spatiale", in Droit de l'Espace: aspects récents (Paris: Pedone, 1989), pp. 147-196).
13. See section (a) above.
14. Article 21.2 of the IGA states "Subject to the provisions of this Article, for purposes of intellectual property law, 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, except that for ESA-registered elements any European Partner State may deem the activity to have occurred within its territory. For avoidance of doubt, participation by a Partner State, its Cooperating Agency, or its related entities in an activity occurring in or on any other Partner's Space Station flight element shall not in and of itself alter or affect the jurisdiction over such activity provided for in the previous sentence."
15. For further details, see P. Guggenheim, "Traité de droit international public" (1953) Volume I, pp 33
16. See note 5 above.
17. The Columbus Development Programme was decided at the Council meeting in The Hague in 1987. The programme comprises two pressurised laboratory modules, one of which will be docked with the Space Station while the other will fly free on the same orbit; the two of them will be part of a larger system, the European in-orbit infrastructure that will also include the Columbus polar platform (PPF) and the Data Relay Satellite (DRS).
18. The entry into force of the Community Patent Convention can partly solve the problems relating to the fact that ten different patent legislations could potentially be applied to inventions realised and used on board the European Module. As mentioned in Chapter III(a), this Convention instigates a unitary patent covering the territory of EEC Member States.
19. The Memorandum of Understanding between the European Space Agency and the National Aeronautics and Space Administration on cooperation in the detailed design, development, operation and utilisation of the permanently manned civil Space Station, foreseen by article IV.2 of the IGA, was signed in Washington on 29 September 1988.
20. In practice the 51% corresponds to 21 racks in which the boxes of the experiment can be situated.
21. The permanently manned laboratory is planned to be operating by 1999.
22. The only exception is in the case where the PI could be identified as the astronaut and thus conceive a patentable invention while he is experimenting.
23. Chapter III of ESA/C(89)95, rev.1
24. Cf. Article III of ESA Convention.
25. It is interesting to note that the European Centre for Space Law (ECSL) has issued a Questionnaire concerning Intellectual Property Rights in Outer Space. This Questionnaire tries to achieve the following results:

- Identification of the needs of the European actors;
- Creation of a European forum to discuss issues concerning intellectual property rights in outer space;
- Make a proposition (where feasible) for harmonised European legislation in this area.

The results of this study will indeed contribute to a better understanding of the problems linked to intellectual property in outer space as well as the needs of the future users.