

COPYRIGHT AND INTELLECTUAL PROPERTY IN OUTER SPACE LEGAL PROTECTION OF DISCOVERIES AND INVENTIONS MADE IN CONDITIONS OF MICROGRAVITY

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ABSTRACT

Research carried out in laboratories, in space modules, on platforms and generally speaking in space objects, has gained importance in various fields. The most developed markets regarding the placement in outer space of certain processes include pharmaceutical, electronic, metallurgical and glass production. Many processes based on biological matter are more effective if carried out in outer space in conditions of microgravity also for the total absence of impurities¹.

For the future of this particular commercial activity, called "space manufacturing", it has been necessary to develop the creation and later placement in orbit of structures to carry out the necessary researches in space and the realisation in orbit of the relevant productive processes. Through NASA, the United States follow the strategy of involving great private groups in these projects instead of directly exposing themselves financially and in the organisation². In Europe the strategy relies on local co-operation within the ESA also because the organisations following a space policy in Europe do not dispose of an instrument like the Space Shuttle to be used in an exchange with private groups. European co-operation is focusing on the EUREKA project for the construction of

an international platform to carry out six month-long experiments in conditions of microgravity³. The existence of a European space laboratory in the International Space Station "Freedom" will increase the possibilities of space experiments.

Research in microgravity has some particular aspects for the relationship between basic and applied research: basic research must be prepared on Earth with a series of hypothesis to minimise the time used for experiments in outer space. It is quite improbable that inventions, in the sense given by patent rights, will be carried out in outer space, but more frequently results will be reached which will be the object of further inventions. From this brief summary of research activity in outer space various problems arise which must be faced from a legal point of view. To be able to have costly investments made in outer space by private industries it is necessary to protect the results reached by the exploitation carried out by other competitors and to ensure an economic return to the industry itself. It is therefore necessary to protect the inventions or the creations realised in outer space with the rights of intellectual property, both in the case of patent rights and of copyrights. A part of the doctrine has opposed the application of common patent law to the inventions or the new processes realised in outer space, sustaining the peculiarity of the framework and the conditions imposed by the general principles regulating space activities. Therefore the elaboration of a series of rules of international space law referring to specific problems of industrial activities in outer space is called for.

The research will consist in analysing if the protection of industrial property, as it is conceived for inventions on Earth, in national legislation and in international conventions, is actually not also applicable to the inventions

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made in outer space because of the contrast with a few of the principles of space law.

Though we hope for the creation of a "space patent" protecting the legal interests of the new industrial actors and taking into consideration the peculiarity of the environment, we will see how utopistic it is to hope for an immediate international consent for the creation of a specific convention.

At the moment the solution to ensure adequate protection of industrial property and private investments is to refer to the principle of "almost territoriality" for the application of the law safeguarding inventions, such as it was formulated in some national legislations, in the Inter Governmental Agreement (IGA) for the International Space Station and in the contracts signed by the Agencies with private investors. A certain tempering of the exclusive right is given by the obligation to broadcast the results reached, after a certain amount of time, for the collective interest in research.

UNIVERSALISTIC TENDENCIES IN SPACE LAW

The universalistic tendencies in space law on exploration and use of outer space developed during the time when the first objects were sent into outer space nearly exclusively by the States. Some of the principles dictated in the Treaty on Outer Space of 1967 and in the Treaty on the Moon of 1979 if interpreted in a restrictive sense seemed to exclude that the use of outer space by private enterprise research could be legally protected to its advantage.

First of all private research activities in outer space only increased when commercialisation of outer space in different sectors was obviously admitted. A wider interpretation of these principles and of the rules published in the Convention allow the possibility of private intervention and therefore its interests must be protected⁴.

The purpose of the Treaty is to make sure that exploration and use are carried out for the benefit of all mankind and not for the personal interest of some space powers. The

installation of nuclear weapons in outer space and territorial claims were also to be avoided. Article XI also establishes that the public are to be informed on the scientific researches carried out ("States Parties ... agree to inform the General Secretary of the United Nations as well as the public and scientific community, to the greatest extent feasible and practicable of the nature, conduct, locations and results of such activities").

Article I is the one creating most doubts regarding the problem. In fact, when it lays down that "the exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interest of all countries", irrespective of their degree of economic or scientific development, and shall be the province of all mankind, it seems that "province of all mankind" are not only the territories in outer space, on which everybody agrees, but also the procedures of exploration and use. From this it has been deduced that industrial property rights deriving from the exploitation of microgravity are against the use of outer space as "province of all mankind"⁵.

However we must agree on the terms that are purposefully ambiguous in the Treaty. "Province of all Mankind" may be interpreted even in the sense that freedom of exploration must be ensured for everybody within the limits given by their technical and financial conditions. "Use" involving an exploitation preventing someone else's exploitation, such as the mining of minerals from a deposit on a celestial body, may be considered as opposed to the above mentioned principle and also to the one prohibiting appropriation, laid down by Art. II. However when it is a matter of use for research purposes, in the particular environment created by microgravity, a situation which can be used by all without impoverishment, it does not appear opposed to the principles of the Treaty.

The ambiguities present in the text are due to the attempt to reconcile the universal humanitarian intentions stated in the preamble with caution in the drafting of the articles; however, this was the only way to reach

multiple ratifications. Moreover, the Treaty on the Moon of 1979 which wishes to introduce a new legal regime on the exploitation of the resources to the advantage of all mankind, induced by developing countries asserting the constitution of a new international economic order, was not successful, having been ratified by only seven countries, among which we do not find those who mostly carry out space activities.

The United States always believed that the idea of humanitarian universalism of space law was fulfilled by the principles of free access, non appropriation, peaceful purposes, incitement for scientific co-operation and generally by the achievement of purposes useful to mankind.

The equalitarian distribution of the advantages deriving from exploration of outer space is to be intended not only in the economic sense of the term, with a distribution of goods, but a more liberal interpretation is also to be accepted. After the manufacturer has gained his profits, others may also gain advantage by buying the derived products provided by the manufacturer.

On the other hand it would be unreal to consider research financed by private or public companies without a return of the investment compatible with the amount of financial risk assumed⁶. Profit is only possible with the attribution of exclusive rights, the latter being limited in time and space and therefore not equalling appropriation. The distribution of benefits is necessary but only those who created them may decide when and which benefits to distribute. If the use of outer space were not to be thus regulated there would be no use at all.⁷

The development of industrial activities in outer space has increasingly brought private industries into a field reserved to the States and to intergovernmental organisations. Article VI of the Treaty on Outer Space indirectly authorises private companies to carry out space activities. In fact, when it is established (exceptionally, if compared to general international law⁸) that the State is responsible for the national activities in outer space, whether such activities are carried out by governmental agencies or by non-governmental organisations,

intervention of private companies in outer space is admitted. Nevertheless, it seems unlikely that the benefits of such activities, such as new products obtained in space labs and their technological consequences may be object of distribution among all countries. Certainly all the companies must have a possibility of access to space stations on a non-discriminatory basis, but only in proportion to how much these companies are prepared to contribute to space projects regarding such activities⁹.

A great part of the doctrine considers that Art. I of the Space Treaty does not lay down the obligation for the States to grant the international community the use of the results of their conduct in outer space, and therefore that this represents a mere programmatic provision¹⁰. Its programmatic nature is confirmed by Art. X which lays down an obligation of information to the Secretary general of the United Nations, and to the public and scientific community, but "to the greatest extent feasible and practicable".

Beyond the limits of space law, protection through patent rights is not in contrast with the knowledge of the technological innovations which may be diffused through publication. The dictate of the Space Treaty would be ensured if some modes of exercising the rights of intellectual property acquired in outer space were to be foreseen, modes which should actually be favourable to the circulation of innovations¹¹, and which are sometimes laid down in the contract.

Having therefore admitted the general acceptance of the patentability of inventive activities realised in outer space, the most urgent problem concerns the exact individuation of the regulations applicable to research and production activities in outer space.

TOWARDS AN INTERNATIONAL CONVENTION ON SPACE PATENT

Specific problems relevant to inventions realised in outer space have suggested an international management for space patents with the creation of a Convention establishing

independent normative principles and independent bureaucratic procedures.

First of all, regardless of the harmonising attempt made by international conventions on intellectual property, which we will be able to examine further on, a major problem consists in the variety of national legislations on the concession of patents. The rule in force in the USA and in Canada is the rule of "the first to invent", therefore the patent guarantees the priority of the invention to whoever proves to have been the inventor, whereas other countries adopt the principle of "the first to file", where the first to register is considered the inventor.

The Invention Secrecy Act establishes that if an invention is made in the United States, a person may not register a patent request abroad without first having forwarded a request in the United States and having waited for six months or without having obtained a special permit from the Commissioner of Patents and Trade Marks. These legislative differences make it difficult to identify the country to which a patent request is to be forwarded, especially for researches carried out in co-operation and in international space structures.

Some specific elements of space patent law may be examined by a convention: for example, the determination of the place and time of an invention realised on Earth and then experimented in outer space or on the contrary whose basic principle is tested and discovered in outer space and then completed on Earth; the need to distinguish experimental use which may be carried out in outer space and which, though limiting the property of the patent, could still not be considered an act of infringement; or the prevision of a period of deferment against the destructive revelation of the novelty of the invention while the inventor is still experimenting on its applications.

To meet the specific interest for the diffusion of technologies realised in outer space, especially when they are innovations of great interest for relevant productive sectors, a compulsory patent system could be identified, after a suitable amount of time, by the owner of the copyright¹². The compulsory licence would

be able to guarantee against an inadequate exploitation by the owner, and would allow other groups operating in outer space to reproduce the same technology and make improvements on it.

An international regime would allow for the concession of a single title of industrial property, of a space patent intended to protect all the patentable inventions realised in outer space¹³.

Being realistic we must admit that an agreement among the States to delegate the management of the technological innovation to an appropriate office and international patent system, still seems quite far away. On the other hand, to be guaranteed against any infringements, the owner of the space patent would still have to deposit a patent request in every country where he wishes to obtain protection. In fact, international conventions establishing centralised offices, where a request of recognition of the ownership by more countries is to be forwarded, are only seen in a regional framework and particularly in the European one. Conventions such as the one on Community patent for the creation of an automatic recognition system still have great difficulty in taking off.

While waiting for a convention giving a precise normative system, the creation of an intermediate regime is necessary so as not to obstruct the beginning development of these new space activities.

MAIN INTERNATIONAL CONVENTIONS ON PATENTS

Intellectual property involves literary and artistic property and therefore the deriving copyrights and industrial property. The most important category of industrial property is the one relevant to the property whose being is completed by an act of public administration, that is to say the release of a patent.

The patent consists in an exclusive right granted by a State, based on an agreement between the latter and the inventor. For a certain amount of time the State limits freedom of

enterprise prohibiting third parties to reproduce, use or sell the patented product on its territory, and as a counter-concession it obtains the publication of the patented invention and its destination to public knowledge. Through negotiation the inventor may grant exploitation licences. The violation of patent rights is called infringement, and by virtue of the territoriality of such rights it may only be asserted within the limits of the State granting patent protection.

Though admitting that the main instruments for the protection of industrial property are national laws, in the subject of patents there is a tendency to guarantee the inventor the application of a normative conduct as uniform as possible by stipulating international conventions to facilitate the acquisition of a protection in an international framework. Before briefly examining the contents of the Conventions a novelty is to be considered: the current negotiations for the Treaty Supplementing the Paris Convention as far as Patents are concerned (the Patent Law Treaty), if successfully concluded, would to a large extent harmonise patent procedures and standards world-wide. Changes in some systems which would be advantageous for the protection of inventions made in relation to space activities. The current draft of the Treaty provides to operate under the "first-to-file" system, and in addition would require countries to offer a grace period under which an inventor would have a period of time to file a patent application after making the invention public¹⁴.

Despite the fact that the legislative provisions and the international treaties now in force do not provide any rule that may be directly applicable to new space productions, it is certainly useful to analyse such legal sources to try and understand if and how the existing protection systems may be modified to obtain their possible application to inventions made in outer space.

The most important international normative instrument is the Convention instituting the General Union for the Protection of Industrial Property signed in Paris on March 20th 1883 and since then periodically amended

(the last amendment was in Stockholm on July 14th 1967 and another one is currently being prepared). The Convention is a treaty open to all States, at the moment there are 99 member states. One of the main principles arises from the combination laid down by Arts. 2 and 3 and consists in the principle of "assimilation" of the unionist citizen to the national citizen and assures an equality of treatment for citizens and foreigners for access to protection of inventions. Nevertheless, this does not give way to a total uniformity of treatment among the various unionist countries because of the differences in national law. However, the convention foresees a minimum of uniform protection for citizens of the Union countries and for those assimilated and it is expressed in the right of priority (Art. 4), in the independence of the patents obtained for the same inventions in different countries and within the limits for the obligation of realisation and concession of compulsory licences (Art. 5). Within twelve months the owner may also place another deposit in different countries of the Union in force from the date of the first deposit; in fact, the institution of priority does not establish any connection among the various patents obtained which remain independent, and if the inventor wishes to obtain international protection he must necessarily obtain a patent for every country where he asks for protection.

The work of harmonisation continued and the Patent Co-operation Treaty(PCT), signed in Washington on June 19th 1970, established the creation of a Union for the international deposit of patent requests. This treaty allows any citizen or person resident in the contracting country to deposit in the national Patent office or in another receiving office, an international request with the designation of the contracting States where protection is asked for. This is valid in all of the indicated countries as a national request. The aim is to simplify the deposit in more States and to overcome the difficulties for the inventor who intends to obtain protection in more states and has to deposit as many requests and undertake costly procedures and preventive exams as the states considered¹⁵. The PCT provides an inexpensive

and simple means for preserving patent rights in all countries that are active in space exploration.

The progressive rapprochement of European legislations on patents was strongly incentivated by the two important Munich and Luxembourg Conventions which laid down a European system for patents.

The European Patent Convention was signed in Munich on October 5th 1973 by fourteen countries and is in force since October 7th 1977¹⁶. Besides allowing the advantages of a multinational deposit, the Convention creates a European Patent title arising from a single patenting procedure after a preventive examination of the request based on uniform principles of patentability of the invention. Such a procedure leads to the release of a patent having the same effectiveness of a national patent avoiding multiple national procedures in each of the adherent states, expressly indicated by the applicant (physical or legal person and all assimilated companies). Access to such a patent is also allowed to citizens of third countries and seems to express a principle of assimilation of the foreigners to the citizens of the contracting countries¹⁷.

The three requirements for patentability are clearly expounded in the Convention. The European patent may be granted exclusively for those inventive activities involving novel steps, for twelve months, regarding all that is not included in the "state of the art". The second requirement is the so-called novelty or inventive step, and the third is industrial application. The Convention recognises priority for whoever has regularly deposited a patent request in one of the member States of the Paris Convention. The length of the patent is twenty years with effect from the date of the deposit. The administrative structure outlined by the Convention is made up of the European Patent Organisation based in Munich and is divided in two organs: the European Patent Office and the Board of Directors.

Another international source with a considerable normative importance, despite a more restricted territorial extension, is the Convention on European Community patents

laid down in Luxembourg on December 15th 1989, but unfortunately not yet in force.

The Luxembourg Convention presupposes the Munich Convention, and refers to it regarding applicant subjects, patentability requirements and central administration organs. It establishes a new patent title, Community Patent, released for the member countries of the EEC. The Convention causes the overcoming of the principle of territoriality of the protection of the industrial patent laying down the overall and autonomous characteristics of the Community patent, therefore creating effects in all of these territories. It establishes the compulsoriness of the joint designation according to which the community patent may be released for all the Community countries and not only for some of them.

With reference to infringement of the special European patent titles, the two Conventions rely on the competent national judicial authorities¹⁸.

While hoping for an increasing consent from the states, the process of co-operation for the harmonising of legislations and for the centralisation of patent requests could improve with a possible extension of the above mentioned conventions also to inventions made in outer space. Above all, on a European level the coming in force of the Luxembourg Convention, co-ordinated with the Munich Convention, could facilitate co-operation for the protection of inventions made in the European Module, established by the ESA European countries, in the Inter Governmental Agreement which we shall later take into consideration.

PRINCIPLES TO IDENTIFY THE LAW APPLICABLE TO SPACE PRODUCTS

The identification of the applicable law is of major importance because the definition of the place where the first deposit of the patent request regarding inventive activities in outer space is fundamental for the acquisition of the rights of industrial property¹⁹.

The solution of a single national legislation chosen in the framework of

preliminary agreements to be stipulated by the member countries of an international co-operative program, such as the space station "Freedom", does not seem convincing. First of all because difficultly the choice of a national law, being the one of the State with a leading role in the conception and realisation of the project, would be peacefully accepted by the other States. Furthermore, it would be impossible for the other States to verify the evolution of the legislation on patents in the chosen State, and each national regulation certainly contains some rules privileging the issuing country²⁰.

Another potential connecting factor could be the nationality of the inventor or of the person or entity financing the research activity independently from the place where the invention was made. Even this solution has its difficulties: in many English-speaking countries, the idea of residence prevails over citizenship; the nationality of the legal organisation is not always easily identified; the invention could be jointly made by astronauts of different nationality. This approach is totally unsuitable to solve questions arising from eventual infringements in outer space. In fact it could happen that a same action, in the same element, may be considered or not as an infringement of patent depending on the nationality of the astronaut carrying it out²¹.

The other theory supported by the doctrine, and currently the most applied, is the one concerning the use of the principle of "almost territoriality" allowing the application of the legislation in force in the country registering the space object on which the invention has been made, similarly to what happens on board ships in international waters where the jurisdiction of the country of the "flag" is exercised. For outer space the principle is supported by Art. VIII of the Space Treaty and by Art. II of the Registration Convention establishing that the State registering an object launched in outer space will maintain jurisdiction and control over the object and its personnel. The basis of such a theory is found in the legal fiction which assimilates the space means to the national

territory of the registering State.

All the same such a solution has its inconveniences, which must be faced and solved. In fact, there could be a conflict with those laws demanding inventors to deposit the first patent request in the country where they have citizenship or with the rule in force in many industrialised countries demanding the National Defence of the interested State to examine each new patent request in view of an eventual subjection to military secret. Problems could arise in the identification of the applicable law when the activity relevant to the achievement of the patent takes place outside the space object or if it is divided in the elements registered by the different countries co-operating in the space station project.

Despite the above mentioned difficulties the principle of "almost territoriality" has been the most successful and has been accepted in the 1988 Inter Governmental Agreement on the Space station. It has been followed by the new US law on space patents and it is to be found in the major agreements on co-operation made by the American and European space agencies with private users.

DISPOSITIONS ON INTELLECTUAL PROPERTY ESTABLISHED BY THE INTER GOVERNMENTAL AGREEMENT FOR AN INTERNATIONAL SPACE STATION

In the framework of a long-term co-operation four partners (USA, European States represented by the ESA, Canada and Japan) intend to finish the project regarding the conception, realisation and development of a permanently inhabited civil station for exclusively peaceful means. Such an installation is susceptible of different uses and, furthermore, it may function as a space laboratory for scientific research and for the development of new materials.

At the top of the legal structure overseeing such co-operation there is the Inter Governmental Agreement stipulated in Washington on September 29th 1988²², in force

since January 30th 1992 with the ratification of Japan and the acceptance of the USA. Negotiations are in act to extend such co-operation also to Russia. For the European countries the agreement is not yet in force, having been ratified by only six States not representing the 80% of the Columbus development program²³. This agreement will be re negotiated with the eventual acceptance of Russia.

The drawers of the Inter Governmental Agreement, conscious of the particular problems which could derive from the fact that different nationality astronauts will be living and working in close contact in a structure in orbit in outer space, where a frequent interchange from one module to the other is expected, have tried to devise some functioning rules to regulate human behaviour and activities carried out on the space station and to supply an applicable legal regime. The main principle on which the association is developed, and which is the basis of all the legal regime, is included in Art. 5 of the Agreement where it is stated that each partner preserves under its jurisdiction and control the elements it has registered and the personnel of its nationality.

The provisions regarding intellectual property assume particular importance for the research. To define intellectual property one must refer to Art. 2 of the Stockholm Convention of 1967 which created the World Organisation for Intellectual Property. The definition is quite wide and also includes inventions in all the fields of human activity, literary and artistic works, trademarks and protection against unfair competition.

The IGA's main task, through Art. 21 on intellectual property, is to solve the problems concerning the acquisition of the rights arising from inventive activities carried out on the station and the protection against possible infringements of such rights²⁴. To identify the norms applicable within the space station, the drawers of the IGA have turned towards the theory of "almost territoriality", accepting the thesis sustained by the American delegation during the negotiation.

According to Art. 21,2 each country may consider as carried out in its own territory the inventions realised in the element it has registered. Such a principle involves the applicability of the national legislation of the registering State on the subject of patents, as if it were placed on Earth.

The solution found in Art. 21 for the inventions realised in the elements registered by the ESA is peculiar and has created the necessity for further specifications. Each European member State, in fact, may consider the activities as carried out in its own territory. Germany, in the ratification law of the IGA of July 13th 1992 to Art. 2, felt the need to specify that according to legislation on copyright and industrial property, the inventions realised in the ESA module are to be considered as carried out in German territory.

European States are therefore considered as if situated on a single territory subject to a single legislation. In actual fact it is not so, and the IGA does not have a uniform normative system applicable to the inventions. But it is to be noticed that European laws on the subject of patents are quite uniform and even if commercialisation and exploitation of products may not take place freely in every European State before the registration of an appropriate patent request, it is possible at the moment to make use of the Munich Convention for European patents and in the future of the Luxembourg Convention, for the Community patents, with the possibility of a single centralised request and of an automatic registration in all the designated countries.

Subsequently in the same article a solution was looked for to solve those problems which, in the absence of a uniform patent right, may arise from infringements in an element registered by the ESA. The aim was to avoid that the owner of the rights of intellectual property in more European States may obtain reparation in different countries for the same act of infringement, with the possibility of choosing in which State to begin the infringement procedure. In the event that the patent owner does not exploit it personally, but grants

exploitation licences to different European countries, a same infringement, having taken place on the European module Columbus, considered as happened within the territorial limits of all the ESA countries could be prejudicial to the interests of the owners of the rights of different nationality. The jurisdiction of different countries could be involved to judge an infringement relevant to an event having taken place on the station. The agreement establishes in such a case that is an action undertaken formerly is pending, the court may decide for a temporary suspension of the next proceeding, allowing therefore whoever was the first to undertake legal action a greater possibility to obtain compensation for damages (principle of first appeal).

With reference to inventions realised in the ESA module, Par. 5 lays down specific provisions where no European State may refuse to recognise an exploitation licence granted on the basis of the legislation of the other countries and in accordance with the provision of such licences will not prevent compensation for any infringement having taken place in another European country.

As for the secrecy of requests for patents holding protected information for national security, per. 3 of Art. 21 regulates the case of an invention being realised on an element of the space station by an inventor who is neither citizen nor resident of the partner state who registered the element. In such a situation the "almost territorial" state does not apply its legislation on the subject of secrecy of the invention according to the measure for which this would prevent the deposit of a subsequent patent request in another partner state, by imposing a term or demanding a preliminary authorisation. The partner state must however ensure the protection of the secrecy of the request involving classified or otherwise protected information for reasons of national security and may prohibit the further diffusion of the request in other countries in accordance with international obligations.

Finally, Art. 21 establishes that the transit in a partner state of product and flight

components for or towards a space station is not an infringement of its legislation or industrial property, so that the State cannot prohibit the transport towards the station or the restitution to the country of origin.

The solution accepted by the IGA is in conformity with recent American legislation on the subject of space patents. The final text of the law, signed on November 15th 1990, has added a new section, n. 105, "Inventions in Outer Space", to chapter 10 of Art. 35 of the United States Code "Patents"²⁵. Each invention made, used or sold on a space object and on one of its components being under the jurisdiction or the control of the United States will be considered as made, used or sold on their territory. The first part of the provision emphasises the adoption by the US legislation of the two main principles of registration and "almost territoriality" of the registered object by the registering state.

The application of the American law creates some difficulty for the adoption of the principle of the "first to invent", and also for the subjection of the inventions made in outer space to the Inventions Secrecy Act. This obliges the person having realised an invention in the USA to deposit the first patent request in the United States, and only after six months or after having obtained a derogation from the Commissioner of Trademarks, grants the possibility of depositing the request abroad. Such an application would create many problems especially in the case of a foreign citizen who, having made an invention in the American module and having deposited the first patent request in his country of origin, wishes subsequently to place a deposit in the USA claiming priority according the Paris Convention. The patent eventually obtained in the USA would be null because not in accordance with the provisions of the Inventions Secrecy Act²⁶.

Apart from the difficulties created by the application of American legislation on the subject of space patents, the United States bill, right from its first appearance, gave rise to worries for the European states because the expression used, "jurisdiction or control", is in evident contrast with the dictate of Art. VIII of

the Space Treaty and with the similar principle of the IGA. They considered that an affirmation of jurisdiction based on a mere technical control would have created problems in the event of a foreign space object under American control or using American structures. As the control exercised by the United States in the space station is indisputable, a few specifications were necessary. In the second part of Section 105 of the Patent Act an exception was therefore introduced to ensure European partners. It establishes that the inventions carried out or commercialised on an element registered by a foreign state will not be subject to US law even if under the jurisdiction and control of the USA, unless this has not expressly been established by an international agreement between the latter and the registering state²⁷.

MAJOR CO-OPERATION AGREEMENTS BETWEEN THE AMERICAN AND EUROPEAN SPACE AGENCY AND PRIVATE USERS

It may be useful to compare in the contractual procedure between Space Agencies and private sectors how the problem of patentability of inventions made in outer space and of the diffusion of the relevant information has been faced, as we are still lacking an international rule globally dealing with the problem of the protection of intellectual property in outer space.

The United States use the provisions of the National Aeronautics and Space Act of 1958²⁸ according to which NASA may use any kind of contract with any kind of private opponent. The main aim of the NASA is to keep a wide flexibility against agreements concerning different situations. This diversity is first of all due to the parties to the case, which can be governmental agencies, international organisations or private commercial entities or to the kind of financing which can be public, private or both. The Agency tends to realise contracts to measure rather than applying standard provisions.

As for the attribution of the rights of

intellectual property, it must be specified that Section 305 of the Space Act lays down that when it is a question of contracts regarding American administration, the ownership of the rights relevant to the data and inventions remains to the US government, unless the administration of the Agency has waived it. In such a case NASA reserves itself a free irrevocable, non-exclusive and non-transferrable patent to carry out such an invention all over the world and the right to ensure access to new technology if the contracting party does not develop the invention; all this if the interests of the Government are not damaged²⁹. In actual fact has had to adopt a constant policy of waiver of the property rights.

To develop commercialisation of space activities NASA has created the CCDS (Centres for the Commercial Development of Space), syndicates including industries and Universities; the Government finances a part of the experiment and the intellectual property goes to these Centres and the Government only keeps an exploitation licence³⁰.

When it is the case of "commercial" flights, the situation is different. There are two kinds of contracts: purely commercial contracts, where the Agency is only a carrier indifferent to the manufacturers sharing the flight and co-operation contracts, where NASA participates in the joint endeavour. In the former NASA ensures space services, that is to say the supply of the necessary data to conceive an experiment suitable for the appointed flight, the boarding of the space vehicle, the flight, the return and the restitution of the experiment. The "maitre d'oeuvre", the intermediary between the manufacturers and the NASA, develops the engineering of the project co-ordinating the services of the manufacturers and supplying all the technical directions necessary to NASA for a proper development of the flight. Such an operation involves mutual transfer of information subjected to the condition of confidentiality. NASA carries out a transportation for manufacturers who keep the property of the reached results and who, if the invention allows it, may obtain a patent on Earth

in normal conditions. Due to the scarceness of flight opportunities and to their high cost, and also due to the lack of competition, these contracts often include particular clauses. Researchers and manufacturers in fact are obliged to pay for the flight in kind, in the shape of the sharing of the results obtained even if this is not in accordance with industrial and scientific logic. To obtain even a small reduction of the flight expenses the "maitre d'oeuvre" is obliged to share the results of the experiment with the NASA from six to twelve months after the return on Earth, but the NASA undertakes not to make industrial or commercial use of the supplied results. When the reduction is greater or the flight is even free, the intellectual property still belongs to the private company but it is possible that the NASA may freely use the results³¹.

In the second kind of contract NASA participates in the research right from its conception. A division of the results is established together with a co-ownership of the patents if a patentable invention originates from the experiment. The decision to patent is taken unanimously by the Committee representing the co-operating parties. Co-operation may also generate diversified applications that allow the different partners to each exploit a part of the inventions developed in outer space.

The Joint Endeavour Agreement³² is the most complete and sophisticated form of agreement between the American Agency and the private partner created to obtain mutual advantage without the transferring of money or property titles. The private company is committed to develop the commercialisation of the technology obtained through co-operation. In the guidelines established by NASA in 1978 private companies are allowed to keep the rights of intellectual property protecting the results obtained only in the case of the manufacturer not commercialising the results in a reasonable amount of time for security reasons or for the public welfare.

The European policy on the subject of intellectual property is partly different because the ESA numbers among its aims that of

promotion of scientific research in space and to favour an industrial policy consequential to the programs to be realised. Art. 3 of the instituting Convention demands the fulfilment of a few general obligations including the necessity of redistributing the scientific results without considering the real financial contributions of the member states³³. It is a contradiction of principle between the aims of the member states and the industries and the general functioning rules of the ESA mostly based on a policy of solidarity and willing to distribute and circulate information despite the differences in the financial efforts.

In the clauses and general conditions regarding the ESA contracts diversification of the information has been foreseen so as not to discourage investments from the manufacturers. Due to the diversity of the dispositions the necessity has been felt to standardise them in a single document: a set of rules regarding the information and data, based on Art. 3 of the Instituting Convention, accepted by the ESA Council in 1989. It suggests five different models expressing the basic principles of the circulation of information in relation to the procedures in the financing of the flight.

The first model refers to inventions and to the relevant data, created by the personnel of the Agency. The ESA is the owner of the results of the researches, as in common law, but is obliged to communicate them to all the member states in accordance with its institutional aims, such as the improvement of scientific research and competitiveness of European industry. If the developed technique refers to space activities the ESA grants fee and non-exclusive licences to its members with the possibility of granting sub-licences, or grants licences upon the payment of royalties.

The second model is placed in the framework of the contracts stipulated by the Agency with private or public organisations, such as Universities, research laboratories and companies specialised in the space field with reference to optional or compulsory programs. In these contracts the partners are the owners of the inventions realised and of the relevant

information and have the right to protect them through patent or copyright. They are however obliged to supply the results of the inventions to the Agency and to the member states participating in the project, through a free and irrevocable licence authorising them to use the inventions for their needs. The states have the faculty to subsequently grant sub-licences to natural and artificial persons under their jurisdiction. Even if the contracting parties have a six month-long priority term on the results, this is the model most questioned by manufacturers because the disclosure of the results also allows competing companies, who did not participate, to benefit from it.

The third model refers to information and data relevant to the payloads transported on the space vehicles by the agency for researchers and manufacturers to whom the Agency grants the opportunities for flight. The ESA, who finances the flight, is due the results that may derive from the research. The experimenter is granted the right of priority access and therefore an intellectual exclusiveness for six months to a year; if he obtains an invention from the data he may patent it provided he grants the Agency a free licence without the possibility of granting sub-licences. On its hand, the Agency may develop its own techniques starting from the results supplied and will have to grant a non-exclusive licence to the experimenter who will not be allowed to grant sub-licences. The model is satisfying for researchers, a little less for the manufacturers, but the obligation of the concession of the licence to the Agency without the possibility of sub-licences is not too heavy as it is not a commercial organisation directly exploiting the results obtained.

The fourth model concerns the payloads boarded on the part of a client who totally finances the flight; the data are transmitted to the client who is the only owner and freely exploits the results with no restrictions.

The last model considers the possibility of a plurality of funds requiring subdivisions among the participants, to be defined case by case.

The logic of the system is based on the

cost of the investment. ESA will have the right to use the inventions and the technical data resulting from the experiments and there will then be the subdivision and distribution each time it will have financed all or part of the operation granting the possibility of a free flight on the space vehicle; if, instead, it is the industry who sustains the cost of the services offered by the Agency, it will have all the exclusive rights of intellectual property on the deriving inventions and data. This policy is only to be understood by taking into consideration the reality of the market: private investments in space activities are incentivated and justified only by a wider access of private industries to the information deriving from the research and the possibility of obtaining legal protection of the results reached.

NOTES

¹For example, electrophoresis, a method used for the separation of organic molecules. Attention is also placed on the production of ceramic crystals, to be used as semiconductors in computer memories and in optic communication. Various kinds of metals having the same resistance as the classic ones but with a lighter weight are being studied. See GUMP, *Space processing products and profits* 1983/1990, 1983, p. 40; CATALANO SGROSSO, *La responsabilità degli Stati per le attività svolte nello spazio extra-atmosferico*, Padova 1990, p. 87.

²For example in 1983 NASA stipulated an agreement with Fairchild Industries for the creation of a not permanently occupable platform, called Assecraft; the project was developed and financed independently by Fairchild with the technical support from the Agency and with the incentive of being able to use two free Shuttle launches, after the construction, to position the platform in orbit and subsequently to equip it. STEPTOE *Regulation of private commercial space transportation by United States Department of Transportation*, Proc. 28th Colloquium on the Law of Outer Space, 1985, p. 240.

³In Europe Belgian, Spanish and French manufacturers with the co-operation of the CNES have created the SBS purification project within the Eureka programme. RAYNAUD & VACHE', *Les fabrications dans l'espace: protection et valorisation des innovations; le point de vue d'un utilisateur*, ESA, Proc. of the Colloquium on "Manned Space Stations - Legal Issues", Paris, 7-8 nov 1989, ESA SP-305, jan. 1990, ISBN 92-9092-062-9, p.

115.

⁴HERMITTE, Découvertes et inventions en microgravité, in "L'exploitation commerciale de l'espace, droit positif, droit prospectif", direction de KAHN, Univ. de Bourgogne, CNRS, 1992, p. 337.

⁵On the ambiguity of the world " province of all mankind" see KISS, La notion de patrimoine commun de l'humanité , RCADI, 1982, II, p 156.

⁶MURPHY OOSTERLINK, Protection des données et des inventions dans l'espace, in Droit de l'espace, aspects recents, sous la direction de DUTHEIL de la ROCHERE , Paris, 1988, p. 290.

⁷SMITH, The commercialization of Space, in Space Law, Views of the Future, Leiden 1988; MARTIN, Legal Regime of Inventions in Outer Space, Proc. 32th Colloquium on the law of Outer Space 1990; MARTIN, Droit des activités spatiales, Paris 1992, p. 192.

⁸For States international responsibility for national activities ,see CATALANO SGROSSO , La responsabilità.. note 1, p. 13

⁹MURPHY, Activités industrielles menées en microgravité - propriété industrielle, in L'exploitation commerciale..note 4 p. 425.

¹⁰BEIERE, STAUDER, Weltraumstationen und das Recht des geistigen Eigentums, Proc. Colloquium Hamburg 1984 on the space stations, p. 157; BOCKSTIEGEL, Handbuch des Weltraumrechts, Koeln , Berlin, Bonn, Muenchen, 1991, p. 299.

¹¹MARCELLI , La tutela delle invenzioni effettuate nello spazio extra-atmosferico e l'art. 21 dell' Intergovernmental Agreement relativo alla Stazione Spaziale, in CATALANO SGROSSO, Diritto dello spazio, recenti sviluppi e prospettive, Padova 1994, p. 204.

¹²BALSANO, Industrial Property Rights in outer space: The space Station International Governmental Agreement (IGA) and the European Partener, in Proc. 35th Colloquium on the law of outer space , 1992, p. 216.

¹³For a Convention on "outer space patent"see OOSTERLINCK, The intergovernmental space station agreement and intellectual property rights, in Journal of space law, 1989, p. 25, MURPHY, Les solutions possibles, in Les stations spatiales habitées , ESA SP-305, 1990, p.123; MARCELLI, note 11.

¹⁴TRAMPOSCH, Importance of intellectual property rights for space activities in general: In particular the protection of inventions made and used in relations to space activities, in Proc. of the first ECSL/Spanish Centre...note 12. For the other treaties see MARCHETTI UBERTAZZI, Commentario breve alla legislazione sulla proprietà industriale ed intellettuale, Padova, 1987, p. 113.

¹⁵For the texts of Conventions see CHIA-JUI CHENG, Basic Documents on International Trade Law, Dordrecht 1986; FABIANI, Codice della Proprietà industriale e del diritto di autore, Milano 1982.

¹⁶The Convention is in force in Italy from I December 1978, in Gazz. Uff. 27 oct. 1978, n. 302, p. 7754.

¹⁷RAVA ,Diritto industriale , II, Torino 1988, p. 67.

¹⁸SENA, "Brevetto comunitario", "Brevetto europeo", in Novissimo Digesto Italiano, Appendice A-COD, Torino 1980, p.904; SCORDAMAGLIA, L'accordo sul brevetto comunitario, in TIZZANO, Problematica del diritto delle Comunità Europee, Roma 1992, p.744.

¹⁹LAFFERRANDERIE, La station spatiale, in DUTHEIL DE LA ROCHERE, Droit de l'espace - aspects récents, Paris 1989, p. 184.

²⁰LAFFERRANDERIE, Les accords relatifs à la station spatiale internationale, in Revue gén. de droit intern. publ. 1989, p. 374; MARTIN, Droit des activités spatiales, note 7, p. 203.

²¹OOSTERLINCK, The Intergovernmental space station Agreement and intellectual property rights, in Journal of Space Law, 1989, p. 25.

²²In BOCKSTIEGEL and BENKO, Space Law - Basic Legal Documents, vol II, Dordrecht 1990.

²³Germany, the Netherlands, Norway, Denmark, Spain and Italy.

²⁴FARAND, La station spatiale et son regime juridique, in Annales de droit aérien et spatial 1990, p. 309.

²⁵The Patent in Space Legislation, S.459, on november 16, 1990 as Public Law 101-580,35 U.S.C.105.

²⁶GANTT, Space Station Intellectual Property Rights and U:S: Patent Law, in Les Stations spatiales habitées , ESA SP- 305,1990, p.107.

²⁷LAFFERRANDERIE, The United States proposed Patent in Space Legislation - An International Perspective, in *Journal of Space Law*, 1990, p. 7.

²⁸National Aeronautics and Space Act 1958 and following modifications, PL 85-563 § 102/c (5) 42 U.S.C. 2451 (1984).

²⁹LINGL, Joint endeavor agreement with NASA in the area of materials processing in space, in *Proc. 27th Colloquium on the law of space 1984*, p 161; LUXENBERG, Protecting intellectual property in space, in *Proc. 27th Colloquium on the law of outer space*, 1984, p. 174.

³⁰MARTIN, droit des activités spatiales, note 7, p. 198.

³¹HERMITTE, Découvertes et inventions en microgravité, note 4, p. 364.

³²For this agreement and the Technical Exchange Agreement, the Industrial Guest Investigator, see CATALANO SGROSSO , *La responsabilità degli Stati*, note 1 , p. 125.

³³BALSANO, Intellectual property within public international research organizations. The example of the European Space Agency, in *Proc. 36th Colloquium on the law of outer space*, 1993, p. 9.