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Article

**\*311 INTERNATIONAL LAW OF OUTER SPACE AND THE PROTECTION OF INTELLECTUAL PROPERTY RIGHTS**

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**\*312 I. Introduction**

[O]uter space ... shall be the province of all mankind. [\[FN1\]](#)

The historic launch by the then Union of Soviet Socialist Republics (öUSSRö) of Sputnik I on October 4, 1957 signaled the beginning of the space race. The following years witnessed such seminal events as the placing of men in orbit and eventually on the Moon, the landing of vehicles on various celestial bodies, the launch of telecommunications satellites and space stations, the placing of space stations into orbit, and the development of space-based technologies such as remote viewing. It is **\*313** estimated that since 1957, approximately 14,000 objects have been sent into outer space. Five thousand of these are still in orbit, the rest having been recovered or burned up in the atmosphere.

Given the rapid expansion of operations in space, much international effort, both multilateral and bilateral, has been made for the guidance and regulation of activities in outer space. During the initial stages of space exploration, the UN played a dominant role in the regulation of these activities. However, these efforts are no longer adequate to deal with present issues relating to the use of outer space, largely for their failure to keep abreast with the rapid technological advances.

These technological advances raise issues affecting the rights of states and the rights of individuals. One key issue is the protection of intellectual creations and inventions in outer space. The present article gives a brief background on the relatively new international legal regime of outer space and evaluates relevant international legal instruments in the specific context of protecting intellectual property rights. Part I of the article is an introduction to the topic. Part II of the article defines the jurisdictional boundaries of outer space by presenting the issue of delimitation. Part III of the article gives a comprehensive overview of the legal and policy regime of outer space by discussing the historical evolution of international space law, the present law-making process, the sources of international space law, and the fundamental principles of

outer space law. Part IV of the article discusses basic concepts of intellectual property rights and its application to outer space activities. Part V of the article serves as a conclusion.

## II. The Jurisdictional Boundaries of Outer Space

### A. Where is the Outer Space?

During the early years of international space law, one of the hotly debated issues was the determination of the vertical boundaries of outer space. [\[FN2\]](#) Under the prevailing law [\[FN3\]](#) of the air at that time, the sub-adjacent state exercises complete control and exclusive sovereignty in the air space above its territory. In 1944, the Chicago Convention [\[FN4\]](#) affirmed this absolute right. However, with the launching of the first orbital satellite in 1957, the principles of the Chicago Convention proved to be inadequate. The signing of the Outer Space Treaty [\[FN5\]](#) in 1967 aimed to correct this inadequacy.\***314** While the 1967 Outer Space Treaty enunciated the principle of freedom and non-appropriation of the outer space, it did not define outer space. [\[FN6\]](#)

On December 13, 1958, the Committee on the Peaceful Uses of Outer Space (COPUOS) was established through United Nations General Assembly Resolution 1348 (XII). During the meeting of the ad hoc COPUOS in 1959, the body considered a number of proposals to define outer space including those based upon the physical characteristics of the air and the aircraft. The COPUOS declared: δ[t]he determination of precise limits for air space and outer space did not present a legal problem at this moment [and that] the solution of the problem which it had identified as susceptible of priority treatment was not dependent upon the establishment of such limits.ö [\[FN7\]](#)

This finding notwithstanding, any legal attempt to define outer space must take into consideration the scientific characteristics of the atmosphere and the dynamic nature of the processes which maintain the atmosphere in its present state and their spatial variability—including the dynamics of orbital flight with special consideration for the factors constraining low-altitude orbits. [\[FN8\]](#)

This section is an outline of the scientific characteristics of the atmosphere and some of the commonly proposed criteria of delimitation.

### 1. Scientific Characteristics of the Atmosphere

The atmosphere is chemically composed of two noble gases, nitrogen (78%) and argon (1%), two active gases, oxygen (20%) and carbon dioxide (0.03%), and varying amounts of water. There are also very small amounts of other gases. [\[FN9\]](#) Physically, it can be compared to five concentric shells, the lowest of which contains a mixture of gases, the homosphere, with the other four shells containing one element each. The homosphere is the most important part of the atmosphere. It makes up 97% of the atmosphere's mass and contains the energy transfer process that controls atmospheric thermal structure. [\[FN10\]](#)

Thermal gradients control the physical structure of the atmosphere. Its physical structure is divided into zones, or strata, which are separated from each other by a thermal barrier, or inversion. [\[FN11\]](#) If a given volume of \***315** air is warmer than its environment, this air tends to rise until the air above it is warmer. Where the temperature of a particular part of the atmosphere does not decrease with altitude, such part becomes a barrier to the vertical movement of the air. [\[FN12\]](#) Each zone has an upper inversion [\[FN13\]](#) that separates it from other zones, because of relatively sharp reversals in thermal gradient.

The electromagnetic structure of the atmosphere is a result of the interaction of the magnetic field of the earth with the atmosphere, the bombardment by the radiation of the sun, the solar wind and cosmic radiation. The action of cosmic radiation upon isolated atoms and molecules in the upper layers of the atmosphere produces the ionosphere within the atmosphere itself. [\[FN14\]](#) However, the Van Allen's radiation belts are outside of the atmosphere of the Earth because of the magnetic belts of the Earth. [\[FN15\]](#)

The variability of the atmosphere depends upon its size and density. The long-term distribution of temperature and pressure within the atmosphere results in its adjustment to the long-term averages in the heat and moisture balance over the

surface of the earth. This variability,

result[s] largely from two sources: the long term distribution of temperature and pressure in the atmosphere and variations in the solar output. The former is simply the adjustment of the atmosphere to the long term averages in the heat and moisture balance over the surface of the earth. For example, the poles, because they are much cooler than the equator, have a much sharper vertical pressure gradient, that is, a given pressure (or density) is found at a lower level over the poles than at the equator. Thus, if the boundary between the atmosphere and space was specified in terms of a certain pressure or atmospheric density (for example one-thousandth of the pressure at sea level) the boundary would be lower at the poles than at the equator. On the other hand, the difference at an altitude of \*316 one hundred kilometers, for example, would be quite small, probably less than one kilometer. [\[FN16\]](#)

The variations in solar output indicate that any definition of the atmosphere based upon pressure, density and temperature will not be the same for all states. Hence, a different standard is needed.

## 2. Proposed Criteria of Delimitation [\[FN17\]](#)

Advocates of the effective control of air space standard submit a functionalist approach based on the ability of the subjacent state to exercise control over the air-space above its territory. [\[FN18\]](#) Ness argued that using this standard would result in unequal or different criteria for most states. [\[FN19\]](#)

Advocates for the gravitational balance criteria, such as Joseph Kroell, advance that a definition should be based upon balance in gravitational attraction between the Earth and neighboring celestial bodies. [\[FN20\]](#) This argument is easily discounted, however, by observing that the balance between the gravitational attraction of the Earth and the moon is approximately 300,000 kilometers from the Earth, a distance far beyond what is customarily acceptable as the atmosphere. [\[FN21\]](#)

Another criterion proposed was to use the upper reaches of the atmosphere-- the exosphere--as the boundary. [\[FN22\]](#) Here, atmospheric molecules collide, rebound, and travel at around 20,000 kilometers per hour (although the actual distance traveled by each molecule is generally less than a micron). [\[FN23\]](#) The mean free path is the average distance that a given volume of air molecules travels in the atmosphere. [\[FN24\]](#) In the upper layers of the atmosphere, as the volume of molecules decreases, the mean free path becomes longer. [\[FN25\]](#) In this so-called spray region of the exosphere, which is approximately 1000 kilometers from the surface, the gravitational pull becomes weaker, allowing hydrogen atoms to escape from Earth's gravity. [\[FN26\]](#) However, the exosphere may not be a suitable delimitation\*317 of atmospheric boundary, because it varies with season, latitude, and solar activity. [\[FN27\]](#)

Others have proposed that a particular layer of the atmosphere be deemed as its boundary. [\[FN28\]](#) However, this was objected to because the position of a selected layer as a boundary varies over time at different latitudes. [\[FN29\]](#) A specified pressure or density was also proposed but was argued against on the basis of the resulting variability of the interface. [\[FN30\]](#) Other proposals include the maximum altitude of aircraft flight, the maximum altitude of satellite perigee, and the delineation of an intermediate zone. [\[FN31\]](#) The plausibility of all of these criteria was questioned on the basis on atmospheric variability over time, altitude, density, solar impact, and temperature, among others. [\[FN32\]](#)

Perhaps the most preferred method is the functional approach, predicated on the purpose of a particular aeronautical and astronomical endeavor rather than physical criteria. [\[FN33\]](#) Functional demarcation refers to the nature of the activity conducted, independent of the boundaries of outer space. The critical point, therefore, is the objective and purpose of a particular mission.

## 3. The Future of the Delimitation Issue

On December 19, 1966, the U.N. General Assembly adopted Resolution 2222 (XXI) requesting the COPUOS to begin the study of the question relative to the definition of outer space and the utilization of outer space and celestial bodies, including the various implications of space communications. [\[FN34\]](#) COPUOS then invited the Scientific and Technical Sub-Committee on Outer Space to draw up a list of scientific criteria which would help define outer space. The Committee, however, returned with a report indicating the impossibility of identifying the scientific or technical criteria. [\[FN35\]](#) This

notwithstanding, the UN General Assembly instructed the COPUOS to actively pursue its study on the question of delimitation. At present, delimitation is the subject of further study, research, and discussion within the Legal Sub-Committee. [\[FN36\]](#)

The issue of delimitation has always been the battleground among spatialists and functionalists, although the latter seems to be at the losing end \*318 of the boardroom war. [\[FN37\]](#) In 1976, Belgium, which had been an advocate of the functionalist approach, switched sides and proposed a 100-kilometer boundary. [\[FN38\]](#) The USSR, originally opposed to the Belgian proposal, submitted in 1979 a substantially similar proposal. [\[FN39\]](#) The only remaining functionalist is Japan, [\[FN40\]](#) while the United States, the former Federal Republic of Germany, and the United Kingdom are of the position that there is no immediacy for boundary delimitation. [\[FN41\]](#)

With the advent of the space shuttle, the issue of outer space delimitation probably assumes a different dimension. This is because a space shuttle takes off like any other spacecraft but lands like an aircraft. Furthermore, the space shuttle's main engines are among the most powerful, most sophisticated devices ever invented allowing human travel to places never before considered possible.

### III. The Legal and Policy Regime of the Outer Space

#### A. Evolution of International Space Law

Outer space, the great unknown, proved an irresistible challenge to conquer. And try man did--from Icarus' tragic winged flight, to the Chinese kite and French balloons, to the present obsession with unidentified flying objects (öUFOsö). Undeniably, outer space has fascinated mankind for centuries. No less than Plato, Cicero and Plutarch alluded to it in their writings. [\[FN42\]](#) Lucian Samos, writing in 160 A.D., described an \*319 imagined visit to the moon. [\[FN43\]](#) A more recent crop of fictional writers in the 19th century produced literary accounts of space travel - Edgar Allan Poe, Jules Verne, H.G. Wells, and C.S. Lewis to name a few. [\[FN44\]](#)

#### 1. Space Law Literature Before 1957

Writings on the legal ramifications of outer space only emerged in the early part of the 20th century. In 1932, Vladimir Mandl, in his work, *Das Weltraumrecht - Ein Problem der Raumfahrt*, touted as the earliest literature of space law, argued that it was not premature to examine the legal problems which space travel would pose. [\[FN45\]](#) In 1951, high altitude rocket flight was developed. Predictably, the succeeding early literature reflected discussions on the legal status of outer space and the corresponding extent and limitation of jurisdiction and sovereignty of individual actor-states. Oscar Schachter, in *Who Owns the Universe*, published in 1952, öenvisaged that outer space and the celestial bodies would be common property of all mankind, over which no nation would be permitted to exercise dominationø and that a legal order would be developed on the principle of free and equal use, with the object of furthering scientific research and investigation.ö ø [\[FN46\]](#) This view would be re-echoed three years later when C. Wilfred Jenks argued that space beyond the atmosphere be considered extra commercium for three reasons: 1) exercising territorial sovereignty by a state beyond the atmosphere above the territory would be wholly out of relation to the scale of the universe as to be ridiculous; 2) it is inconsistent with basic astronomical facts. [\[FN47\]](#) Jenks wrote:

The revolution of the Earth on its own axis, its rotation around the sun, and the motions of the sun and the planets through the galaxy all require that the relationship of particular sovereignties on the surface of the Earth to space beyond the atmosphere is never constant for the smallest conceivable fraction of time. Such a projection into space of sovereignties based on particular areas of the Earth's surface would give us a series of adjacent irregularly shaped cones with a constantly changing content. [\[FN48\]](#)

Alex Meyer, addressing the International Astronomical Federation in 1952, was of the view that the concept of sovereignty does not apply to outer space, outer space being a setting without determinable borders where effective sovereignty can be exercised. [\[FN49\]](#) Largely influenced by \*320 Meyer, Welf Heinrich, Prince of Hanover, argued that space beyond the atmosphere be considered free by reason of technical grounds founded on the law of nature and reasons of legal construction and policy. [\[FN50\]](#) Space vehicles should be subject to the law of the flag and its pilot should conduct himself in a manner not injurious to third parties or things and in accordance with principles common to both national and inter-

national laws. [\[FN51\]](#)

From these early writings emerged a notable consensus that outer space is a totally different and a totally new physical setting over which tried and tested rules and principles on sovereignty and jurisdiction would have no basis for application. However, there was collective opinion on several important points, among which are: 1) outer space is not susceptible to appropriation by any state; 2) that space installations are subject to the sovereignty of the country which constructed them; and 3) that jurisdiction over activities in space beyond the atmosphere as well as unoccupied territory in the moon and other satellites be vested in the United Nations Organization--maxims that form part of the space law as we know it today. [\[FN52\]](#)

While it was acknowledged that Outer Space is a legal entity and that future space activities would have implications in relations among states which need to be defined under international law, discussions on the matter were dismissed as largely speculative, and therefore, not a matter of urgency.

The launching of Sputnik I by the USSR on October 4, 1957, followed three months later by Explorer I of the US, jolted everyone to action. [\[FN53\]](#) Formerly regarded as purely speculative, the political, military and economic implications of space activities became a major preoccupation. [\[FN54\]](#) A frenzy in the policy-making and consensus-building processes, mostly under the auspices of the UN, followed, [\[FN55\]](#) but it was not until a decade later that a breakthrough was reached.

On October 10, 1967, the 1967 Outer Space Treaty was adopted and entered into force. [\[FN56\]](#) Called the "Magna Carta of Space," [\[FN57\]](#) being the first **\*321** international document covering space law, the 1967 Outer Space Treaty lays down the basis in which space law may be further developed. [\[FN58\]](#) It establishes broad general principles for the use and exploration of outer space. Containing 17 articles, its provisions are divided into five different areas: 1) exploration and use of outer space; 2) weapons in space; 3) treatment of astronauts; 4) state responsibility; and 5) cooperation.

## 2. Contributions of Authorities in Air Law to the Evolution of Space Law

It is inevitable that the acknowledged authorities on air law should be among the leading contributors to the pioneer discussion of space law. These discussions centered in general on the formation of a legal regime in outer space and specifically on outer space and celestial bodies, particularly on the issue of its status, the limitation of the sovereignty of nations, the status of satellites, and spacecraft. The discussions analogized space law to the rules that govern air law. Air law has the distinct advantage of more established and defined concepts and a legal regime that has withstood the test of practicality and application.

The analogy notwithstanding, air and space as two different physical settings have been consistently recognized. In *The Law of the Air*, Lord Arnold McNair said:

There is no question that air and airspace are two different things. Air is certainly capable of ownership if you can capture it and confine it in a closed space such as a bottle, just as sea-water becomes the property of a shipping company when it is pumped up into a bath on one of its steamers... But can space,--whatever space may be--become the subject of ownership? ... Certainly the "ownable" contents of space may be owned ... I am not persuaded that the common law is committed to the view that mere abstract space can be the subject of ownership apart from its contents. [\[FN59\]](#)

Maurice Lemoine, sharing McNair's view, regarded airspace as "unsusceptible of proprietary appropriation." [\[FN60\]](#) While it can be occupied, such occupation is only to the extent to which it is possible. [\[FN61\]](#)

**\*322** Among air law authorities, Eugène Pépin made the most exhaustive analysis on space law concerns. Pépin traced the development of space law until 1961, and made an analysis of the legal problems of space. [\[FN62\]](#) He discussed in turn the legal problems of cosmic space, the exploration and utilization of space and celestial bodies, liability for damage arising from activities in space, and the future of space law. [\[FN63\]](#) He argued for the application of the principles of the UN General Assembly resolutions and international law, including the UN Charter, to outer space and celestial bodies. [\[FN64\]](#) Moreover, Mr. Pépin asserted that outer space and celestial bodies should be free for exploration and use by all states in accordance with international law. [\[FN65\]](#) However, he did not believe that the UN should maintain sovereignty or trust-

teeship over celestial bodies. Instead, Mr. Pépin called for an outer space treaty analogous to the Antarctic Treaty. [\[FN66\]](#) As to space law in general, he regarded it as an autonomous branch of law which must be based on scientific reality. [\[FN67\]](#)

John Cobb Cooper's discussions were mainly concerned with arriving at a basis of demarcation of airspace and outer space boundaries, something which Pépin regarded as unnecessary and which was twice rejected by the COPUOS. [\[FN68\]](#) While Cooper's view on demarcation has continuously changed (from 300 miles above the earth's surface to 600 miles), in keeping pace with the rapid technological changes of his time, his original statement remains important:

Perhaps, the rule should be, in the absence of an international agreement, that the territory of every State extends upward as far into space as it is physically and scientifically possible for any one State to control the regions of space directly above it.

...

To insist that a states' territory is limited by the ability of that state to make its law effective is harsh considering that power and allocation of resources vary from one state to another. [\[FN69\]](#)

Andrew Haley made significant contributions to the discussion of space telecommunications and his work was characterized by a thorough \*323 knowledge of relevant technology. [\[FN70\]](#) Julian G. Verplaetse attempted to establish relation among air law, space law and telecommunications law. [\[FN71\]](#) However, some of Verplaetse's views did not gain popular adherence and were attacked in subsequent legal instruments. [\[FN72\]](#) He considers, for instance, the definition of the legal status of space on the basis of power politics, contends that artificial satellites are not subject to international law, and that satellites and planets, being *res nullius*, are subject to appropriation by effective possession and continuous physical occupation. [\[FN73\]](#)

Daniel Goedhuis accepts the applicability of international law and the UN Charter to outer space. [\[FN74\]](#) He concedes that the legal principle of freedom of outer space for exploration and use of all states, while having positive consequences in that it confers on all states the right to draw benefits from outer space and celestial bodies, has negative consequences as well in that it requires states to refrain from actions that adversely influence its use. [\[FN75\]](#)

While it would be ungracious not to acknowledge the major contributions of these air law authorities to the early stages of development of space law, a number of writers on space law have emphasized its autonomy from air law. This is understandable. The future increasingly poses a whole series of questions going beyond the scope of air law. It is but natural that the growing literature of space law reflects this broader approach to an ever-increasing extent.

### 3. Works of Writers and Publicists

Before 1957, literature on space law can be described as fairly commendable, in that the postulate writers were more often than not anticipatory of the trend of problems and issues we are now facing. This is quite impressive, considering that prior to 1957, space law in particular and space concerns in general were then considered novel, in not an entirely speculative subject matter.

\*324 During the period between 1957 and 1967, the literature of space law tremendously increased, owing to writers notably from the US, [\[FN76\]](#) the USSR, [\[FN77\]](#) Europe, [\[FN78\]](#) the United Kingdom (UK) [\[FN79\]](#) and its former Commonwealth\*325 countries, [\[FN80\]](#) Asia, [\[FN81\]](#) and Latin America. [\[FN82\]](#)

### \*326 4. Summary of Space Law Literature

The literature of space law ranged from the cautious to the fanciful, although much of it was balanced by realism tempered with practicality and a sense of timing.

It can be observed that writers from countries with the most immediate opportunities and responsibilities in space were most apt to take a cautious and pragmatic view compared to those with no immediate responsibility. The latter escaped the compulsion of having to weigh political, military and scientific considerations of a crucial nature. However, they did tend

to take a longer and broader view of what, subject to the immediate but reasonable requirements of military security, the long-range interest of international security may require. In the end, a balance between the two approaches is probably necessary.

Among these early writers, a trend of consensus on outer space as free for exploitation and use by all states in accordance with the UN Charter and with international law and its not being subject to appropriation has been achieved. However, the same consensus is lacking among pre-1967 writers on the legal status of celestial bodies. Divergence on this issue gave rise to three differing schools of thought: the school which held that celestial bodies are not subject to national appropriation, the school which held it premature to decide on the matter until more is known of the probable nature of activities in space, and the school which considered the possibility of appropriating celestial bodies according to some variant of the principles of discovery, inchoate title and occupation. The 1967 Outer Space Treaty, however, settled the controversy by prohibiting the appropriation of celestial bodies by a nation. [\[FN83\]](#)

Divergence of views among early writers also existed on other issues, such as the basis and incidence of liability for injury, loss of life or damage resulting from activities in space. Existing literature on these issues proved to be a valuable starting point for the future process of formulating the Convention on International Liability for Damage Caused by Space Objects [\[FN84\]](#) and the Convention on Registration of Objects Launched into Outer Space. [\[FN85\]](#)

At present, the initial phases of space law have long passed. The role of literature in the development of space law inevitably changes as the outline of the law hardens. However, this does not mean that scholars lose their relevance. Jenks, in describing the continuing role played by scholars, puts it succinctly:

**\*327** [The] subject is still, and will long remain, a body of law in the initial phase of its development, but he now has an authoritative point of departure to guide and discipline his future work. The range, effectiveness and constructive nature of his influence will be determined by his willingness to accept the decisions which have now been taken by governments with so impressive unanimity as the framework within which the independent scholar must in future work, by his grasp of the scientific and technological settling of the problems which pose legal questions, by his awareness of the political (and at times military) context in which their solution must be sought, and by the extent to which his contribution to their solution reflects dynamically the preoccupations, tendencies and growth of contemporary international law.... [[W]hile a beginning has now been made in establishing the rule of law in space, there still remains unanswered the fundamental question of chaos or international control.... The world still has a choice between allowing outer space to become subject to the same power struggle which has in history characterised the demarcation of national territories on the map of the world and taking time by the forelock by evolving a radical international solution for the problem of the control of space. This choice involves questions of policy on which lawyers as such may have no special professional qualification to speak, but it will nevertheless affect fundamentally the whole future of international law and of the rule of law as such, and indeed the whole future of man, not only in space but equally on Earth. In these circumstances the independent scholar has a continuing responsibility to take as the keynote of all his work the importance for the rule of law of the exclusive dedication of space to peaceful purposes, symbolized and stimulated by the elimination of barriers to the fullest ... possible pooling of space activities on the basis of the widest possible international co-operation, and guaranteed as soon as may be by an effective international control of space taking the form of institutional arrangements devised by a vigour of political imagination corresponding to the magnitude of the challenge. While it is important not to act prematurely in regard to space matters in the absence of fuller knowledge of the probable consequences of various possible courses of action, it is equally necessary to avoid the danger that, by always emphasizing the importance of not taking action which might be considered premature, we may forget that developments in space will not wait for us to get our thinking straight about the way in which they should be dealt with and may reach a point at which there is no longer any real possibility of rational control unless effective action is taken without undue delay. It is not the scholar's role to **\*328** shrink with nervous hesitation from the increasing boldness of practical statesmen. [\[FN86\]](#)

## B. The Space Law Creation Process

In the years since 1957, space law has progressively evolved into a more defined set of legal rules and principles, mostly owing to the efforts of the UN. Undeniably, the UN has been the ideal forum where the crystallization of views and opinion, consensus building, and compromise agreements is reached.

### 1. The Role of the United Nations in the Evolution of Space Law [\[FN87\]](#)

It has been established from the very beginning that the regulation of outer space activities requires the cooperation of all members of the international community. The UN was quick enough to realize the international importance of the prospect of conquest of outer space and the need for international cooperation in an arena that clearly transcends national boundaries.

Inevitably, the UN played a vital role in the evolution of the present body of laws governing the outer space regime. It was understandably the only logical forum under which norms and principles regulating space activities would be formulated.

Initially, however, the concerns of the UN were a knee-jerk reaction to the military utilization of space in an arms race spawned by an ideological battle between the US and the USSR. [\[FN88\]](#) The intensification of the Cold War between the two superpowers had spurred an arms race that extended to space. It was against this backdrop that the UN General Assembly established the COPUOS. [\[FN89\]](#) The COPUOS was tasked to review the area of international cooperation and to study practical and feasible means for giving effect to programs in the peaceful uses of outer space which could appropriately be undertaken under the auspices of the UN. [\[FN90\]](#)

Approximately four decades after its formation, the COPUOS is to be commended for an impressive performance in the formulation of legal principles that govern space activities. As a result of its efforts, a number of treaties on outer space have been negotiated, commended to the UN General Assembly, and are presently in force.

### \*329 2. The Space Law-Making Process in the UN

Generally, a law-making process is comprised of three distinct basic phases: 1) decision-making, which involves the prioritization of values of a particular group; 2) the formulation of mechanisms for implementation; and 3) application, which usually involves interpretation of the law in the light of the policy it wishes to implement.

The space law-making process in the UN is no different, although it is more complicated. This is to be expected. Space concerns transcend national borders and deal with a totally different sphere that involves the general interests of humankind. This complex process involves inter-governmental organizations created by international agreements, UN organizations that deliberate upon and draft commentaries, or UN organizations with activities not directly related to space but which, nevertheless, contribute to the emergence of international customary law.

At present, space law-making is confined to the COPUOS. The COPUOS was established by UN General Assembly Resolution No. 1472 (XIV) in 1959 to succeed the eighteen nation ad hoc committee of the same name organized by Resolution 1348 of 1958. At its inception, the COPUOS' Assembly outlined the parameters by which member states would be guided in studying the legal problems in the exploration of outer space: 1) application of international law and the UN Charter to outer space and celestial bodies; 2) freedom for exploration and use by all states in outer space in conformity with international law; and 3) the exclusion of outer space from appropriation by any nation. [\[FN91\]](#)

Eighteen nations, including the United States and the USSR, chosen on the basis of their advanced level of space technology and on the basis of geographical representation, composed the committee. [\[FN92\]](#) However, with the Cold War, the members of the committee were reduced to factions. Of the twenty-four member states, twelve fell into the Western Bloc, seven fell into the Soviet Bloc, and five were non-aligned. [\[FN93\]](#) The Soviet Bloc favored the adoption of a strict, unanimous decision-making procedure for the COPUOS, while the Western Bloc favored a majority decision-making process. [\[FN94\]](#) It was only in 1961 that the stalemate was broken with the decided adherence to rule of consensus. [\[FN95\]](#) This consensus rule would later prove to be useful to the COPUOS in its future decision-making processes. [\[FN96\]](#)

The essence of the consensus rule is the absence of voting and an attempt to reach a unanimous agreement. The chairperson of the meeting\*330 ascertains whether there is unanimous assent. [\[FN97\]](#) If there is, he terminates the discussion and declares the issue decided. [\[FN98\]](#) This consensus-rule, while not regarded by some as pure unanimous decision-making, is seen as more flexible, as it allows member states to voice their reservations, and to arrive at a compromise. [\[FN99\]](#) This is more preferable to a majority decision that is unacceptable to a minority, especially if such minorities are

space powers. Defending the consensus process against criticisms that it is too detailed, laborious, time-consuming and involving too many informal discussions, Nandasiri Jasentuliyana, Deputy Chief for the Outer Space Division, said the process is more productive than open discussions. [FN100] Since voting has to be avoided, strenuous efforts have to be made in negotiations to accommodate a range of positions. [FN101] Compromise is necessary and trade-offs have to be made on all sides. This has resulted in widely accepted space treaties, since the process considers all shades of views and interests and ensures in particular the concurrence of major space powers without which legal rules have little significance. [FN102] In short, according to Jasentuliyana, the consensus rule accommodates differing interests of both space powers and non-space powers. [FN103]

The COPUOS is composed of two sub-committees: the Scientific and Technical Sub-committee and the Legal Sub-committee. [FN104] On the whole, the operation of the COPUOS can be characterized as an inter-action among scientists, lawyers and diplomats. [FN105] Some observers, however, are not that optimistic. The increase in membership of the COPUOS, which at present has reached 53 states, [FN106] is allegedly making the decision-making process more complex. Compromise among 53 different states with different political views, socio-economic interests, and different levels of technological development is increasingly difficult to attain.

### 3. The Evolution of Space Law: An Inverted Process

In its early beginnings, there has been little or no dispute over the fact that space law is a part of a larger and more cohesive system of international law. [FN107] However, space law deviates from the evolutionary path taken by general international law. The evolution of general international law followed the trend of centuries-old, state-observed practices gradually hardening into its present form of well-defined, generally accepted customary law. [FN108] In contrast, the most important precepts of space law, such as the non-susceptibility of space for appropriation and the exclusivity of its use for peaceful purposes, emerged at a time when no single space activity was yet undertaken.

A perusal of the present bodies of treaties on outer space would reveal that they are generally anticipatory in nature and mostly dealing with subjects that remain at their speculative, or at most at their preparatory, phases. To illustrate, the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, [FN109] which mainly outlines the rules on the exploration, exploitation and allocation of mineral resources on the moon, was formulated in 1979, a time when such activity was yet to be undertaken. At present, more than 20 years later, extraction of minerals from the moon is still a distant reality.

The trend is clear--any future development of customary law in space would be largely the result of treaty law and not the other way around. This predominance of treaty law over custom is owing to the unique character of space and space activities. This unique character is shaped primarily by technology. As technology continuously grows more and more sophisticated, space activities never before thought possible become commonplace. In this light, it is perhaps best to formulate anticipatory rules than be caught flat-footed when urgent issues call for immediate solutions.

However, the task presents a number of difficulties. The same problem aptly described by Jenks in 1965 remains true today:

The space lawyer has been confronted from the earliest speculative stages of the development of the subject with an inescapable dilemma - that of weighing the possible dangers of attempting to crystallize the law too soon against the certain dangers of waiting too long. This dilemma remains acute ... The problem of how far and how fast will therefore remain with us for some considerable time to come. How far should we anticipate and systematise? How far should we be empirical and await further knowledge and experience? Some reasonable compromise between these contrasted approaches is clearly desirable. [FN110]

While it is healthy that the evolution of the law should follow rather than anticipate that of life, there are circumstances in which \*332 the possibility of developing the law on sound principles depends primarily on an initiative being taken in the matter before de facto situations have crystallised too far ... Law and policy on the subject will necessarily interact upon each other from the earliest stages of development, and the future of the law on the matter, in addition to being profoundly influenced by, may also exercise some influence upon, the general course of international politics. [FN111]

The responsibility of the international lawyer ... is to ... enabl[e] a new world to be born. While he cannot create law by imagining it, he can prevent or disastrously retard its creation by failing to be imaginative. When he cannot advise with confidence that a firm legal obligation exists he can at least refrain from asserting that no such obligation exists in such a manner as to destroy or greatly delay its coming into being. [\[FN112\]](#)

## C. Sources of Space Law

### 1. Sources of International Law

#### a. Treaty

A treaty is a formal agreement, which is entered into by states or entities possessing treaty-making capacity for regulating their mutual relations under the law of nations. [\[FN113\]](#) Essential requisites of a valid treaty include the possession of the parties with treaty-making capacity, action through duly authorized representatives, the absence of duress, fraud, mistake or other vice of consent, the legality or lawfulness of the subject matter and the constitutionality of the process. [\[FN114\]](#) The treaty-making process involves negotiation, signature, ratification and exchange of the instruments of ratification. [\[FN115\]](#)

Treaty as a source of international law has been subject to controversy. Some experts are of the opinion that treaties are to be considered a source of obligation rather than a source of law. In their contractual aspect, they are no more a source of law than an ordinary private law contract that simply creates rights and obligations. [\[FN116\]](#) Obligation is not in itself law. [\[FN117\]](#) A statute is always, from its inception, law; a treaty may \*333 reflect or lead to law but is not, as such, law. [\[FN118\]](#) Where it reflects existing law, non-parties may conform to the same rules but they do so by virtue of the treaty itself. [\[FN119\]](#) At best, a treaty is not formally a source of law but only an evidence of it.

#### b. Custom

It has been said that general international law is primarily customary law. Fenwick defines custom as ða practice which has grown between states and has come to be accepted as binding by the mere fact of persistent usage over a long period of time.÷ [\[FN120\]](#) Material sources of custom include diplomatic correspondence, policy statements, the opinions of official legal advisers, official manuals on legal questions, and national and international judicial decisions. [\[FN121\]](#) The value of each of these sources varies and depends on the circumstances of each case. [\[FN122\]](#)

Although used interchangeably, customs and usage have different meanings. The latter, like custom, is characterized as a general practice, but unlike it, does not reflect a legal obligation [\[FN123\]](#) nor is coupled with the conviction that it is obligatory and right. [\[FN124\]](#) A body of state practices can only be regarded as having attained the status of custom under international law when measured against the different tests of duration, uniformity and consistency of the practice and opinio juris sive necessitatis. Each of these tests would be further discussed below.

#### i. Duration

Duration, in some cases, is regarded as merely evidentiary of the existence of customary law and, as such, is a dispensable test. To quote Brownlie, ð[p]rovided the consistency and generality of a practice are proved, no particular duration is required: the passage of time will of course be a part of the evidence of generality and consistency.ö [\[FN125\]](#) Brownlie also notes that the International Court of Justice (ICJ) does not emphasize the time element in ascertaining the existence of custom. [\[FN126\]](#)

\*334 The North Sea Continental Shelf Cases [\[FN127\]](#) was one of the relatively few cases where the international court discussed extensively the elements of customary law. The ICJ established that ðeven without the passage of any considerable period of time, a very widespread and representative participation in the convention might suffice of itself, provided it included that of States whose interests were specially affected.ö [\[FN128\]](#)

#### ii. Uniformity or Consistency in Practice

The requisite of uniformity and consistency does not mean that a particular practice should be exercised by a majority number of states in order to qualify as custom. Substantial uniformity, rather than complete uniformity, is all that is required. [\[FN129\]](#) Manfred Lachs, in his dissenting opinion in the North Sea Continental Cases, opines that to become binding, a rule or principle of international law need not pass the test of universal acceptance. [\[FN130\]](#) Not all states have the opportunity of applying a given rule. The evidence should be sought in the behavior of a great number of states, or in any case, the great majority of the interested states.

Moreover, there are situations when the uniformity and consistency rule would be inapplicable to particular states, as in the case of the persistent objector. [\[FN131\]](#) A persistently objecting state is not bound by the eventual customary rule if it fulfills two conditions. First, the objections must have been maintained from the early stages of the rule onwards, up to its formation and beyond. [\[FN132\]](#) Second, the objections must be maintained consistently, seeing that the position of other states, which may have come to rely on the position of objectors, has to be protected. [\[FN133\]](#) Under this persistent objector principle, evidence of objection must be clear and there should exist a presumption of acceptance to be rebutted to enable a state to contract out of a custom in the process of formation. [\[FN134\]](#)

In the case of the subsequent objector or of a state which dissents from a customary rule after its formation, the effect of the objection may be determined by the speed of the process of defection. [\[FN135\]](#) If a substantially large number of states assert a new rule, the momentum of increased \*335 defection, complemented by acquiescence may result in a new rule. But if the process of defection is slower and neither the old nor the new rule can boast of drawing the majority of adherents to its ranks, Brownlie concludes that "the consequence is a network of special relations based on opposability, acquiescence, and historic title." [\[FN136\]](#)

### iii. Generality

Generality is one aspect that complements consistency. [\[FN137\]](#) While universality is not required, the real problem is to determine the value of abstention from protest by a substantial number of states in the face of a practice followed by some others. [\[FN138\]](#) Silence may denote either tacit agreement or a simple lack of interest in the issue. [\[FN139\]](#)

There are times when a general custom does not apply to a group of states within a region because of a special custom that conflicts with the general custom, which applies to the group. Michael Akehurst neatly summarizes the rules on special custom: "As between the States bound by the special custom, the special custom prevails over the general custom ... (unless the general custom is jus cogens). As between a State bound by the special custom and a State not so bound, the general custom applies." [\[FN140\]](#)

### iv. Opinio juris sive necessitatis

As enunciated by the ICJ in the North Sea Continental Shelf Cases, no prevalence of state action could qualify practice of states into opinio juris unless two conditions concur: "[n]ot only must the acts concerned amount to a settled practice, but they must also be such, or be carried out in such a way, as to be evidence of a belief that this practice is rendered obligatory by the existence of a rule of law requiring it." [\[FN141\]](#)

The problem in the determination of the existence of opinio juris is essentially one of proof, especially the incidence of the burden of proof. The ICJ decisions involving the evidentiary aspect of opinio juris have followed two trends. In many cases, the court was willing to assume the existence of opinio juris on the basis of general practice, or a consensus in the literature, or the previous determination of the court or other international tribunals. [\[FN142\]](#) On the other hand, in a significant minority of cases, the court has adopted a more rigorous approach and has called for more \*336 positive evidence of the recognition of the validity of the rules in question in the practice of states. [\[FN143\]](#)

The difficulty in the appreciation and in the determination of the evidentiary nature of opinio juris is due to its essentially psychological and subjective character. The intent underlying a state's compliance or non-compliance of a particular practice is difficult to ascertain. Considering the diverse legislative and executive organs of a government participating in an internal process of decision-making in respect to ratification of state acts, the underlying motive becomes difficult to determine.

It is not unexpected that with the absence of a more concrete and defined rule on custom as a primary source of international law, its status has been heavily questioned, especially if applied to the present trend of circumstances characterized by the increase in the number of international personalities and inter-state transactions brought about by the rapid advancement of technology. [\[FN144\]](#) W. Friedmann concretely summarizes this present state of affairs and the inadequacy of custom to maintain its status as a primary source of law adequate to respond to such changes:

Custom can no longer be as predominant and important source of law as it was in the formative period of international law. . . . Custom is too clumsy and slow-moving a criterion to accommodate the evolution of international law in our time, and the difficulties are increased as the number of subjects of the law of nations from a small club of Western Powers rose to 120 or more sovereign states. More importantly, custom is an unsuitable vehicle for international welfare or co-operative law. The latter demands the positive regulation of economic, social, cultural and administrative matters, a regulation that can be effective by specific formulation and enactment. [\[FN145\]](#)

Furthermore, one defect of customary international law is the difficulty in determining when practice can be considered to have hardened into custom and thus acquired an obligatory character. It cannot be promulgated or struck off at a definite time. It is also unable to adjust to the swiftly moving developments of the international society it is supposed to regulate. [\[FN146\]](#) State activities cease to crystallize into general practice accepted as law owing to the acceleration of history and above all the diminishing homogeneity of the moral and legal ideas that have long governed the formation of law. [\[FN147\]](#)

**\*337** However, it is erroneous to easily dismiss custom as a source of law. What gives international custom its special value and its superiority over conventional institutions, in spite of the inherent imprecision of its expression, is the fact that, developing by spontaneous practice, it reflects a deeply felt community of law. Hence, the density and the stability of its rules. [\[FN148\]](#)

## 2. The Interplay of Sources of International Law in International Space Law

The same rules that characterize and the same problems that beset treaty and custom law under international law find their way into the custom and treaty that constitute the legal regime governing outer space activities. This is to be expected. Space activities, notwithstanding the element of setting, are not much different from terrestrial activities. Both are undertaken by the same actors from earth with the same values, goals and objectives. [\[FN149\]](#) The major difference is the time and geographical features of interaction. [\[FN150\]](#) However, the strategies employed by participants in the management of base values may change in modality as access to space increases, but are still conveniently categorized as diplomatic, ideological, economic and military. [\[FN151\]](#)

An analysis of the practice of states before the conclusion of the 1967 Outer Space Treaty shows that, historically, custom was the first source of the international law of outer space. [\[FN152\]](#) The state practice in the field of exploration and use of outer space has led to the emergence of a number of important principles and rules of international space law. [\[FN153\]](#) Among the general principles and rules generally established and accepted even before the formulation of the 1967 Outer Space Treaty are the following: 1) outer space is open and free for exploration and use by all states; 2) the sovereignty of states does not extend to outer space; 3) outer space is not subject to national appropriation; and 4) states retain jurisdiction over space objects launched into outer space. [\[FN154\]](#) Thus, it has been argued that the 1967 Outer Space Treaty may also be taken as a codification of these principles. [\[FN155\]](#) Consequently, even if the terms of the treaty will be abrogated, **\*338** those rules and all subsequent rules of space law would still be binding as custom. [\[FN156\]](#)

However, unlike ordinary customary law, which undergoes the normal long process of codification into treaty form, space customs have not developed over a period of decades or centuries, but rather in a period of less than ten years. Nowhere is the maxim laid down in the North Sea Continental Shelf Cases, disregarding time as an indispensable element of customary law, more true than in the context of space law. In the formation of customary space law, the essential criteria, apart from acceptance, is not time, but context. [\[FN157\]](#) The context of rapid changes in technology that dominate the earth-space arena suggests that the stage of consensus omnium may be reached faster than before. [\[FN158\]](#)

Thus, time is not a crucial ingredient in the creation of customary space law as long as states agree on what to do. [\[FN159\]](#) Agreement does not necessarily mean constant practice. It is not only unnecessary that usage be prolonged, but that there also be no need for usage at all in the sense of repeated state practice, provided that opinio juris of the states

concerned be established. [\[FN160\]](#) Seen in this light, the element of time may be dispensable, but *opinio juris* is not. *Opinio juris* as a single constitutive element of custom is never more accentuated than in the context of space law.

However, treaty law proved to predominate over custom in the formation of international space law. This may be due to a number of factors:

The first factor is the number of states participating in the exploration and use of outer space and in the norm-creating processes that produce legal norms for the regulation of the activities of states in this field [has increased]. . . Participating states were able to reach a consensus on a number of problems within a very short period of time, and this has led to the conclusion of universal legal documents establishing the existing system of the treaty principles and rules of space law.

...

The second factor favoring treaty as a source of international law of outer space is the specific character of the problems which arise in the field of space-related activities ... [usually from] various fields of technical cooperation in the use of outer space and, as a result, require the creation of detailed rules which could clearly spell out \*339 the rights and obligations of the states concerned. It is obvious that only international treaties can serve as a source of the specific and detailed legal regulation of the relations of states. In this case, custom remains in the background because, as a source of international law, it can produce only general and broad legal obligations.

The third factor is a tendency to the more rapid development of legal regulation of space activities as compared with the development of the actual practice of states in the exploration, use and exploitation of outer space. This tendency dominated the early stages of the formation of outer space law. During the formation of this branch of international law, a number of treaty rules were being created and became legally binding before the problems governed by these rules could be realized in space activities. [\[FN161\]](#)

Treaty, unlike custom which is based on practice of states, can be used as an instrument of anticipatory legal regulation of future types of activities or future situations which do not exist at the moment of the conclusion of a treaty. [\[FN162\]](#)

However, this is not to say that treaty-dominated law-making process is without its problems. Several basic issues concerning outer space have not been adequately treated by treaty law primarily due to a lack of consensus in the international community, among which are the delimitation of air space and outer space and the right of passage over national territories for space objects. [\[FN163\]](#)

Nor should it be understood that the role of custom in space law should be completely disregarded. Custom has laid the basis and the source of the creation of the international law of outer space. More specifically, custom serves as a source of legal rights and obligations of states in those fields of their mutual relations, in which treaty regulation is absent for one reason or another. [\[FN164\]](#) Custom regulates the relations of states which are non-parties to a codifying convention, as well as the relations between party states and non-party states to a convention. [\[FN165\]](#)

It has been recognized that in the context of space law, treaty and custom interrelate on the following two main levels. [\[FN166\]](#) First, a treaty may incorporate and confirm existing customary law. This means that treaty rules reflecting existing customary law are legally binding on all states independent of their participation in the treaty containing these rules. Second, a treaty may also contain new rules that regulate new problems or change the existing norms. New rules of conduct contained in a treaty can become rules of customary law binding on all states if there is a general,\*340 constant and uniform state practice accepted as law. The possibility of the extension of the scope of application of treaty rules via custom is recognized by the Vienna Convention on the Law of Treaties, specifically Article 38 thereof which provides that a rule set forth in a treaty could become binding upon a third state as a customary rule of law, recognized as such. [\[FN167\]](#)

It, therefore, can be argued that notwithstanding the fact that the 1967 Outer Space Treaty formally binds a little more than 80 states, [\[FN168\]](#) all the members of the international community are bound by the fundamental principles and rules contained in it because of their status as general customary law.

### 3. The Status of General Assembly Resolutions

Not being included as one of the sources of international law in Article 38 of the Statute of the ICJ, the legal effect of UN General Assembly resolutions has been the subject of constant debate among scholars. Most legal writers are of the opinion that such resolutions may be evidentiary weight of customary international law. [\[FN169\]](#) Akehurst defines state practice as any act or statement by a state from which views about customary law can be inferred; it includes physical acts, claims, declarations in abstract (such as General Assembly resolutions), national laws, national judgments and omissions. [\[FN170\]](#)

In determining the weight of resolutions as evidence of state practice, Blaine Sloan lists the following factors: the terms of the resolution (Is it drafted in a precise legal language? Do the words employed make the terms mandatory?), intent, unanimity of its adoption, its acceptance by states whose support may be necessary for its effective implementation, the number of abstentions and the reasons therefore, their repetition or recitation in subsequent resolutions, and state practice or subsequent conduct of the state outside the organization. [\[FN171\]](#)

The traditional view is that the Resolutions of the General Assembly are not binding, as they are only recommendations. Malvina Halberstam <sup>\*341</sup> rejects the notion of the Assembly having any legislative authority on four grounds: 1) state practice does not necessarily reflect the implementation of a resolution supported unanimously or otherwise; 2) votes in the Assembly are political; 3) Assembly decisions are sometimes (mostly) unjust, reflecting a double standard; and 4) a proposal to give the Assembly legislative powers was rejected. [\[FN172\]](#) However, Halberstam's points were disputed by some international scholars who contend that not only do space resolutions reflect state practice, states have never violated them. While it is of course true that voting in the Assembly is political, this neither adds to nor diminishes its effectiveness since all voting in all legislatures is political. Representatives in national parliaments and in international forums are all politicians representing a constituency to whom they have responsibility.

Manfred Lachs went beyond regarding resolutions as evidence of custom:

Resolutions are also regarded as steppingstone, a stage in the political and legal processes. They pave the way to new principles and rules of law, which in due course take the shape of binding international instruments. One can therefore hold that they initiate the law-making processes by taking us across the threshold into the realm of law: imperfect or even perfect. [\[FN173\]](#)

When the matter was considered by states in the General Assembly 6th Committee in 1974, there was a general agreement that General Assembly Resolutions were not to be seen as a new source of international law, additional to those listed in Article 38.

The issue on the status of resolutions has an added importance in the context of resolutions concerning space activities. [\[FN174\]](#) This is due to two factors considered as features peculiarly unique to the space law-making process. First is the little importance given to time and actual state practice as elements of custom. Second is the consensus process, which characterizes the formulation of space legislation adopted by the COPUOS.

Time and actual state practice are only directory elements, *opinio juris* being the single constitutive element of customary law of space. It therefore follows that UN General Assembly resolutions - a product of the COPUOS deliberations characterized by the unanimous process of consensus<sup>\*342</sup> already constitute *opinio juris* and can therefore qualify as custom or as evidence of it. However, the binding effect of UN resolutions are a result of the fact that they may be merely codifying pre-existing customary international law. [\[FN175\]](#)

#### D. Fundamental Principles of Space Law

##### 1. The Common Heritage of Mankind Principle

The status of outer space as *res communis*, or as an environment not subject to a particular state's exclusive jurisdiction but one the utilization of which is open to every member of the international community, is well-entrenched in international law. The same status has been conferred to other environments - the Antarctic and the International Seabed.

It was not until recently that the res communis status of these environments became subject to controversy. With the present improvement of technology, man has ventured into and discovered bounty in areas once regarded as no-man's land. Seemingly limitless mineral deposits are being tapped in the international seabed [\[FN176\]](#) and in the Antarctic. [\[FN177\]](#) Mining possibilities on the moon are now under consideration. [\[FN178\]](#) The data-gathering and military potentials of outer space are now realized.

All these have raised issues, which would not have been thought of decades ago. Who has the right to resources extracted from these environments? Does the fact that these areas are subject to no particular state's jurisdiction mean that any state with the necessary capability to extract resources owns the said resources? Or does it mean that these resources are subject to equal co-ownership among the members of the community of nations?

Perhaps these issues are better appreciated if understood under the premise that there is an unequal level of development among states. Necessary technology and high capital outlay for exploitation of these resources are confined to a few developed states. It follows that these few developed states, equipped with these advantages, are in the sole position to exploit these resources. This advantage is absent among developing countries comprising the majority in the international community which are burdened with backward technology and scarce financial resources.

\*343 The Common Heritage of Mankind Principle is advocated by developing countries to contain their position in connection with these issues. [\[FN179\]](#) The Principle was first applied to the international seabed. By analogy and later by repeated practice, the Principle was later applied to outer space. Even if not expressly mentioned, the Principle is intrinsically linked to the core clause of the 1967 Outer Space Treaty, particularly in paragraph 1 providing that the use of outer space must be for the benefit and the interest of mankind as a whole. [\[FN180\]](#)

The Principle, as interpreted by developing countries, maintains that the deep seabed (and by analogy, outer space) does not belong to any one state. [\[FN181\]](#) Rather, it belongs to all nations and any benefit derived therefrom should serve all nations. [\[FN182\]](#)

Developed nations present a contrary interpretation: "anyone can exploit these natural resources as long as no single nation will claim exclusive jurisdiction over the area from which they are recovered." [\[FN183\]](#) To this, the developing countries contend that under this interpretation, benefit will only go to industrialized countries, because inter-state relations remain inequitable. By placing developed and developing nations on an equal access and equal opportunity basis, inequality remains. Developed nations still exclusively possess the technology and capital necessary to exploit these resources. [\[FN184\]](#) Furthermore, developing nations assert that they constitute the nations and peoples having the greatest need and therefore, they should be given an equitable share in the decision-making, control, and benefits of exploitation. [\[FN185\]](#)

Developed countries on the other hand, argue that it is unfair that they, having developed the technology capable of recovering these resources, must lose control of the rewards of their efforts to developing countries which have contributed little or nothing at all to the risks of the venture. [\[FN186\]](#) The developing countries' argument is thereby perceived as unfair because it seeks equality through preferential treatment of disadvantaged nations. [\[FN187\]](#)

Despite conflicting positions on the issue, general agreement seems to have been reached on some of the crucial points under the Principle. As noted by one publicist, the Principle is composed of four essential elements:\*344 1) the area under consideration cannot be subject to appropriation; 2) all countries must share in its management; 3) there must be an active sharing of benefits reaped from the exploitation of these resources; and 4) the area must be utilized exclusively for peaceful purposes. [\[FN188\]](#)

## 2. Freedom of Exploration and Use

The 1967 Outer Space Treaty provides:

The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.

Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.

There shall be freedom of scientific investigation in outer space, including the moon and other celestial bodies, and States shall facilitate and encourage international co-operation in such investigation. [\[FN189\]](#)

Under such provision, outer space, including the moon and other celestial bodies, shall be free for exploration and use by all states. There is a distinction between exploration and use because the latter is more limited than the former. Exploration refers to scientific and non-scientific researches, and for military or non-military purpose. The common benefit and interest clause [\[FN190\]](#) and the proscription of nuclear weapons clause [\[FN191\]](#) limit both exploration and use. Free exploration is limited further by the non-discrimination and equality clause, [\[FN192\]](#) the non-appropriation clause, [\[FN193\]](#) the international law clause, [\[FN194\]](#) the responsibility and liability clause, [\[FN195\]](#) and the consultation, observation, and information clause. [\[FN196\]](#)

Use includes space flights for exploration and scientific research and space applications covering telecommunications, remote sensing, and <sup>345</sup> weather observation satellites. [\[FN197\]](#) It covers any utilization of space outside of the coverage of exploration, irrespective of the means--be it by satellite, space laboratory, lunar or other celestial bodies--and irrespective of the means employed--be it through radiation or electromagnetic waves. Likewise, the observation of space through certain instruments, such as telescopes or antennae from the earth, is not considered use of space.

### 3. The Non-Appropriation Principle [\[FN198\]](#)

Appropriation is the permanent taking of property for one's exclusive use or the exercise of exclusive control or exclusive use on a permanent basis. The principle of non-appropriation is embodied in international space law and hence, in the absence of any treaty provision, binds non-parties to the 1967 Outer Space Treaty. The non-appropriation principle is necessarily related to the common interest and benefit clause. [\[FN199\]](#)

Presently, there are two schools of thought on the coverage of the non-appropriation principle. One view, supported by the major powers, submits that a distinction should be made between the appropriation of areas in outer space prohibited expressly by the treaty and the appropriation of resources in outer space on which the treaty is silent. As to the latter circumstance, a regime similar to freedom of the high seas and exhaustible resources should govern. This view advances that no distinction is necessary as legal title does not vest on outer space resources. [\[FN200\]](#) Another controversy is whether the prohibition against the appropriation of outer space resources, applicable to states, extends to private entities as well. A perusal of Article VI and Article VII of the 1967 Outer Space Treaty reveals that the treaty covers all activities, whether pursued by governmental or non-governmental entities. Consequently, private appropriation of space resources is likewise proscribed. [\[FN201\]](#)

<sup>346</sup> In the Bogota Declaration, [\[FN202\]](#) equatorial states claimed a portion of the geostationary orbit because of the special physical relationship between the orbit and the sub-adjacent state, and also because the limited number of slots to operate within the geostationary orbit results in the unavailability of slots to late applicants. A great majority of states, however, views the Bogota Declaration as contrary to Article II of the 1967 Outer Space Treaty. [\[FN203\]](#)

### 4. Peaceful Uses of the Outer Space

Under Article IV of the 1967 Outer Space Treaty, states are prohibited from installing on celestial bodies, stationing in outer space and placing in orbit around the Earth any objects with nuclear weapons and other weapons of mass destruction. Under the second paragraph of the same article, the moon and other celestial bodies must be used by states exclusively for peaceful purposes. Hence, it is forbidden to establish military bases, installations, and fortifications, to test any type of weapon and to conduct any military maneuver on celestial bodies. However, it is permissible to use any military personnel for scientific research or for any other peaceful purpose, and any equipment or facility necessary for peaceful exploration of the Moon and other celestial bodies.

With respect to the Moon and other celestial bodies, a more restrictive view of publicists is that the treaty permits the

stationing and utilization of weapons other than those of mass destruction. [\[FN204\]](#) If the rule is otherwise, according to a liberal view, the common interest and benefit clause will be violated. [\[FN205\]](#)

## 5. International Cooperation

To further the common interest and benefit clause, states are required to carry out their outer space activities in accordance with international law, including the UN Charter, in order to promote international cooperation and understanding. [\[FN206\]](#) In the exploration and use of outer space, including the Moon and other celestial bodies, states must be guided by the principle of cooperation and mutual assistance. [\[FN207\]](#) States are also \*347 obliged to render possible assistance to astronauts, [\[FN208\]](#) the opportunity for observation of the launching of space flights, [\[FN209\]](#) and the encouragement of international cooperation in scientific investigations in outer space. [\[FN210\]](#)

### E. Analogous Legal Regimes

The analogy between space law and international regulations for analogous environments has been the subject of many debates. However, while it may be argued that such analogies have insufficient ground to permit valid conclusions, it appears that such analogies serve as auxiliary means in interpreting important notions and concepts in the legal regime of outer space.

For instance, the freedom of scientific investigation provided for Antarctica in the Antarctic Treaty of 1959 [\[FN211\]](#) served to inspire negotiators and drafters of the 1967 Outer Space Treaty in including the freedom-of-exploration-and-use clause among its provisions. Any examination of state conduct with regard to Antarctica in view of the Antarctic Treaty and any interpretation of the said treaty may assist in clarifying the exact meaning of the principle of freedom of use and exploration of outer space in the 1967 Outer Space Treaty. The demilitarized status of Antarctica was also the basis for the partly demilitarized status of outer space under the 1967 Outer Space Treaty and a totally demilitarized status of the Moon and other celestial bodies under the Moon Treaty.

While it is true that some issues in analogous environments may receive different treatment and consideration, depending on economic, military and other factors, analogies are generally meritorious. It is for this reason that a study of international regulations governing these analogous environments-- the Antarctic, Airspace and Neutral Zones--is in order for one to have a thorough understanding of the issues that confront the formulation of a legal regime for outer space.

During the International Geophysical Year (1957-1958), several scientific projects and experiments were carried out in Antarctica by states acting alone or on the basis of international cooperation. For the entire duration, participant states accorded each other a limited freedom of scientific investigation and sovereignty issues were disregarded in favor of international cooperation.

However, in 1959, the United States, with the aim of extending the demilitarized status enjoyed by the Antarctic during the Geophysical Year as well as to rule out possible sovereignty disputes over the area and \*348 to make it more suitable as a testing site for nuclear weapons, pushed for the drafting of an Antarctic Treaty. [\[FN212\]](#)

The treaty was finally signed on December 1, 1959. Its provisions mainly provided for a demilitarized status for Antarctica. It emphasizes that any use is solely for peaceful purposes and any measures of military nature, including nuclear testing, are prohibited. [\[FN213\]](#) The treaty, however, does not prevent the use of military personnel or equipment for scientific research or other peaceful purposes. [\[FN214\]](#) Pursuant to this, the treaty further provides for plans and exchanges for scientific programs, scientific personnel and scientific observations and results. [\[FN215\]](#)

A controversial provision in the treaty is the freeze provision, which provides that while there is no renunciation by any contracting party of previously asserted rights or clamor to territorial sovereignty over some areas in the Antarctic, nor would there be prejudice to any party as regards its recognition or non-recognition of any other state's claim, no new claim or an enlargement of an existing claim can be asserted while the treaty is in force. [\[FN216\]](#)

A major breakthrough is the principle of mutual inspection, providing each designated observer complete freedom of access at all times and at all areas of the Antarctic. [\[FN217\]](#) Information exchange, meetings at regular intervals and

consultations are but few of the treaty provisions that proved useful in the management of all questions of common interest pertaining to Antarctica.

#### IV. The Protection of Intellectual Property Rights in Outer Space Endeavors

It is the prevailing opinion within the international legal community that the exploration and use of the outer space is not limited to public and governmental entities, whether alone or in close cooperation with others, but somehow extends to private and commercial enterprises. Such view finds legal justification in Article VI of the 1967 Outer Space Treaty which provides, in part, that states "shall bear international responsibility for national activities in outer space . . . whether such activities are carried on by governmental agencies or by non-governmental entities, and that the activities of the latter shall require authorization and continuing supervision" by the state. In fact, in the past decade and with the advent of the space shuttle, commercial exploration of outer space by the private sector increased. These activities include remote \*349 sensing from space, direct broadcasting, and launch and space vehicle services, manufacturing in space and microgravity research, among others.

The future development of these activities in outer space depends much on sufficient incentives given to private entities so that a certain and sufficiently fair return to their investments can be realized. One of the tested incentives is the presence of a legal order that protects the product of one's creativity or the product of one's intellectual creation - that is, the protection of one's intellectual property, whether copyright, patent or trademark. While the scientific community considers the outer space as the "Great Unknown," so too does the legal community consider the protection of intellectual property in outer space. The nearest legal regime that can be resorted to is the provision in outer space treaties and resolutions of the UN General Assembly, including the contractual agreements among the space partners. At most, the treaties and resolutions serve as general guidelines in resolving issues on intellectual property rights (hereinafter "IPR") resulting from space endeavors. While the contractual undertaking of the parties is the law among them, it obviously does not bind third parties. This peculiar consideration brings the issue back to the provisions of the outer space treaties and resolutions.

This section of the paper discusses areas of IPR protection relating to space activities and the relevant legal regime. An examination of the present legal regime on IPR protection, in the light of the needs of underdeveloped states to promote their involvement in the free exploration and use of the outer space environment, is provided at the end of this section.

The importance of having a legal regime that protects IPR in space activities cannot be overemphasized. The lack of such regime impedes the efficient international cooperation among states and other entities engaged in space research. [FN218] IPR protection intends to stimulate the creativity of the human mind for the benefit of the public in such a way that the creator and the investor will be encouraged to be more active in space research and exploration. [FN219] Such protection likewise "encourages the publication, distribution and disclosure of the creation to the public, rather than keeping it secret which at the same time encourages commercial enterprises to select creative works for exploitation." [FN220]

\*350 Efforts to protect IPR began on a national scale through the elaboration of national laws in most individual states. The first patent law was institutionalized by the city of Venice in 1474, followed by the English Statute of Monopolies (1628), French Patent Law (1791) and then the US Patent Act (1790). [FN221] It is significant to note that the legal frameworks of IPR were as diverse as the number of states that enacted them. Hence, this diversity raises many of issues when international activities like the exploration of the outer space are involved.

A number of treaties have been formulated to provide a legal regime of IPR protection on the international level: Berne Convention (1886), [FN222] Geneva Universal Copyright Convention (1962), [FN223] Rome Convention (1961), [FN224] Paris Convention (1883) [FN225] and the Patent Cooperation Treaty (1979). [FN226] Whether these treaties are sufficient measures to protect IPR related to space endeavors remains to be seen.

#### A. The Concept and Role of Intellectual Property Rights

##### 1. Intellectual Property Rights

Intellectual property relates to the protection of creations of the human mind. IPR laws generally provide protection by way of state grant of a title, under which the grantee enjoys exclusive rights, though limited in scope, duration and

geographical extension, for the exploitation and benefit from this creation. [\[FN227\]](#) Simply stated, it is the right of owners of such mental creation to use their property freely and to prevent others from using the same without authorization. [\[FN228\]](#)

Intellectual property is divided into two branches: Industrial and Copyright. [\[FN229\]](#) The Convention Establishing the World Intellectual Property Organization [\[FN230\]](#) provides that IPR relates to:

Éliterary, artistic and scientific works (copyrights);

\***351** Éperformances of performing artists, phonograms and broadcasts (neighboring rights);

Éinventions in all fields of human endeavor (industrial property);

Éscientific discoveries;

Éindustrial designs (industrial property);

Étrademarks, service marks, and commercial names and designations (industrial property);

Éprotection against unfair competition (industrial property). [\[FN231\]](#)

and all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields. [\[FN232\]](#)

Scientific discoveries do not belong to any of the branches and accordingly should not have been included in the enumeration because no national law or treaty gives any property rights over it. [\[FN233\]](#)

Among the different forms of IPR, there are three that appropriately apply to space activities: 1) the protection of technical innovations and inventions by patents; 2) copyright protection of satellite broadcasts and remote sensing data; and 3) the protection of a satellite's or space project's name as a trademark that strengthens an image.

## 2. The Role of IPR Protection

Industrial property is an important ingredient in the technological and economic development of underdeveloped states. Laws that protect IPR give statutory recognition to the moral and economic rights of owners, the promotion of creativity, and the free access of results that create economic prosperity. In general, patents for inventions encourage more investments on research and development and add to the increasing abundance of documented sources of technical information. Trademarks deter unfair competition so that returns to investment will be assured of the legitimate commercial enterprises. [\[FN234\]](#)

The patent system enables the disclosure of the technical information of an invention. This availability avoids ÷wasteful duplication of effort and the multiplication of costs that research aimed at finding solutions to technical problems÷ can create. [\[FN235\]](#) Underdeveloped states can have access to this available information taking into consideration that patents have temporal and territorial limitation. Specifically, the patent system provides technological information for research activities, identifies alternative technologies, evaluates a specific appropriate technology, identifies\***352** active fields of technological enterprises, and identifies solutions to a specific technical problem. [\[FN236\]](#)

Trademarks are substantial assets of economic value because they seek ÷to establish a market position.÷ [\[FN237\]](#) Through this system, the consumption patterns and needs of consumers would most likely be identified which would become the basis of a national plan of production.

Copyright protection promotes, enriches and disseminates the national treasure. [\[FN238\]](#) The higher the protection of IPR, the greater the encouragement for authors to create more works. The result is that as a country yields a greater number of creations - books, productions, movies, records, etc. - the country experiences a higher level of social, economic, and

cultural development. [\[FN239\]](#)

## B. Issues on Copyright Protection in Outer Space Activities

### 1. Communications in Outer Space

Copyright issues may find their way into activities relating to space communications more than any other activity conducted in space, as recognized by many experts and interested parties as early as the 1960s, largely because of the improvement of technologies for transmission and reception via the artificial satellites.

This recognition resulted in the identification and resolution [\[FN240\]](#) of issues in the context of unauthorized interception and use of copyrighted works transmitted via satellite by the United International Bureau for Protection of Intellectual Property (BIRPI), the World Intellectual Property Organization (WIPO) and the UNESCO. [\[FN241\]](#)

#### a. Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite

The efforts of the BIRPI, WIPO, and UNESCO find concrete expression in the Convention Relating to the Distribution of Programme Carrying\***353** Signals Transmitted by Satellite, popularly known as the Brussels Satellite Convention of 1974, [\[FN242\]](#) which is the only existing international agreement directly referring to the protection of IPR and works relating to satellite communications.

The main objective of this convention is expressed in Article 2(1) of the Brussels Satellite Convention: "Each Contracting State undertakes to take adequate measures to prevent the distribution on, or from its territory, of any programme-carrying signal by any distributor for whom the signal emitted to or passing through the satellite, is not intended." This convention deals with the protection of the rights of the original satellite broadcasters. While preventive measures are mandatory against unauthorized redistribution, it is explicitly left to the discretion of each relevant state to decide on the appropriate measures to be taken.

The subject matter covered by the protection is the signal, being the medium to transmit programmes. However, it seems that the contents of the programme itself, the message transmitted by those signals, are not protected by the Article. The effect of this gap left the owners of copyright, the authors, with no individual protection whatsoever.

Likewise, an analysis of the coverage of the Brussels Satellite Convention shows express exclusion of specific areas from its coverage. The stipulation of Article 2(3) left re-broadcasting beyond its coverage after at least one authorized transmission to a terrestrial station. Nevertheless, such situation considered as terrestrial broadcasting properly belongs to the coverage of the Rome Convention on neighboring rights.

The provision in Article 3 of the Brussels Satellite Convention seems to refer to direct broadcasting satellites. [\[FN243\]](#)

#### b. Direct Broadcasting by Satellite

Direct broadcasting satellites enable direct transmission to the public without the use of land stations. The vastness of the prospective audience and the uncontrollability of the broadcaster threaten the legal interests of the original copyright owner, the author. The central and ultimate issue \***354** revolves around the identity as to who is liable for the payment of royalties. [\[FN244\]](#)

An examination of the relevant international law yields a conclusion from Article 11bis of the Berne Convention [\[FN245\]](#) in combination with the relevant definition of radio diffusion under Section 20 of Article I of the Radio Regulations annexed to the International Telecommunication Convention. [\[FN246\]](#) It appears to protect the interests of the author in the case of direct satellite broadcasting, but the effective realization of its protection needs extensive amplification through international cooperation.

The procedure of licensing copyrighted material for use in different countries in the context of direct satellite broad-

casting, the subsequent responsibilities for royalties, and distribution thereof to the original copyright owner, proves to be a very complicated matter that needs to be evaluated extensively. A number of proposals have been forwarded: to set up an international clearing house in order to collect and distribute among authors fees levied on broadcast or televised transmissions from space, along the lines of a similar institution created in the field of small performing rights; the possibility of concluding standard agreements between organizations representing the interests of the copyright owners and television broadcast organizations; and the proposal to pay additional fees when direct broadcasting via satellite takes place. [\[FN247\]](#) This assumes that a general compulsory license obtainable against a statutory fee, a solution that has already served national purposes in the field of cable television, is in place.

#### c. Indirect Satellite Broadcasting

Prevailing opinion [\[FN248\]](#) denies protection to the broadcast quality of transmission of programme-carrying signals via Fixed Satellite Services \*355 (FSS) because broadcasting starts only at the receiving end of FSS transmission, and results in no copyright liability of the originating organization. [\[FN249\]](#)

Based on the studies undertaken by the Committee of Legal Experts of the Council of Europe, it is the overall observation that the distribution of a broadcast by cable within the area in which the broadcast is intended to be received does not represent a genuinely new or separate communication to the public, and should therefore be permitted to take place without further clearance of rights. Consequently, rights owners are paid in respect to the cable audience within such area when rights are cleared for the broadcast itself.

Likewise, it should be emphasized that there are limits of cable distribution rights in favor of the exclusive right of the author to authorize any communication to the public by wire or by re-broadcasting of the broadcast of the work, when this communication is made by an organization other than the original one as stipulated in Article 11bis (ii) of the Berne Convention.

#### d. Applicability of Non-Voluntary Licensing to DBS

Furthermore, problems arise with respect to the practical realization of the rights of the author for direct satellite broadcasting because of the principle of national treatment. Article 11bis of the Berne Convention established the exclusive right of the author in part and stipulates in part that the conditions for such rights are to be determined by the individual countries of the Union, but that these conditions shall apply only in the countries where they have been prescribed.

The application of the provisions of this article facilitates the introduction of non-voluntary licenses to direct satellite broadcasting. Nevertheless, its potential will be frustrated by the limitation of its effect to the territory of the country that granted such license, leaving territories of third states reached by the broadcasts beyond its scope of application.

#### \*356 2. Remote Sensing Activities from Outer Space

Although a predominant role was played by states during the initial stages of remote sensing, [\[FN250\]](#) recent remote sensing activities within a commercial framework undertaken by various countries show particular interest in the protection of intellectual property rights resulting from remote sensing activities. This is because of the large amount of capital necessary to fund space programs and partly due to the exploratory nature of these programs. States exercised virtual monopoly over space activities in those early stages. The participation of private enterprises in these activities was limited to that of industrial partners as manufacturers of rockets or satellites for exclusive government use and under a government license. [\[FN251\]](#)

Gradually, these private companies [\[FN252\]](#) showed a strong interest and increased participation in space ventures. [\[FN253\]](#) At present, the private sector is a primary actor in commercial remote sensing activities. Questions as to the legality of private activities by enterprises and the consequential liability of these enterprises under international law began to emerge in the light of Article 6 of the 1967 Outer Space Treaty, which provides that

States parties to the treaty shall bear international responsibility for national activities which are carried on by government agencies or by non-government entities, the activities of non-governmental entities in outer space, including the

moon and other celestial bodies, shall require the continuing supervision by the appropriate state party to the treaty . . . .  
[\[FN254\]](#)

This article shows that the participation of private entities in space activities was within the contemplation of the treaty, although liability attaches \*357 with the states. This trend [\[FN255\]](#) reveals that satellite remote sensing programs,\*358 though initiated and initially funded by their respective governments for exclusive government use, are gradually transferred to private entities. Commercialization in this sense means that remote sensing data would be available to the public under ordinary rules of supply and demand, with profit as an end for the private operator.

The commercialization of remote sensing data must be considered as an irreversible, though only a recent characteristic, of space activities throughout the world. [\[FN256\]](#) It appears to be a logical consequence of the Open Skies Policy adopted by the US. This position enables states to widely disseminate data obtained by satellites except data of military relevance. [\[FN257\]](#)

Many developments are taking place in most countries, which at the same time raise a number of questions both nationally and internationally. This is because commercialization calls for a certain protection of commercial interests in order to provide incentives for further developments in that direction. Remote sensing from space is not an exception. It is obvious, therefore, that countries which have developed a remote sensing capability and which have free market economies are determined to protect IPR resulting from remote sensing activities. In fact, as the United States entered the process of commercializing its remote sensing capability via a phased transition to the private sector, these commercial institutions were offered a certain degree of protection of their business interests through the insurance of proprietary rights connected with data acquired from remote sensing activities. [\[FN258\]](#)

\*360 As countries engaged themselves in remote sensing activities, various national approaches to protect IPR in the field of satellite remote sensing activities were asserted. Nevertheless, it is likely that international implications will soon stimulate intellectual property issues on an international level due to the expanded role of commercial remote sensing activities. However, national regulation remains central when international implications have to be examined because international space law does not provide for the protection of private rights and even less for the protection of intellectual property rights in particular.

However, Article VIII of the 1967 Outer Space Treaty provides for the retention of jurisdiction and control by the State of Registry over its space objects and personnel while in outer space. Thus, such a State is offered the possibility of extending its national law to space activities performed in outer space. Therefore, it will depend solely on the action of the individual state whether it will act to protect the intellectual property interests of its nationals and others in relation to space activities. [\[FN259\]](#) This \*361 in itself can create numerous problems since the private law systems, including private international law of the different countries are far from equal.

### C. Issues in the Protection of Industrial Property Rights in Outer Space

Another aspect of IPR in space activities refers to inventions and trademarks, including data and products. [\[FN260\]](#) It should be observed that \*362 the US, Canada, and the Philippines are the only countries in the world which apply a first-to-invent system, the rest of the world applying the \*363 first-to-file system to prove first inventorship, resulting in the right to protection.

In fact, the policy of the US towards commercialization of a range of space activities has been focused recently on this issue. The policy of the NASA was to encourage the commercialization of technology developed through its financial resources. Efforts are now being undertaken to guarantee more proprietary rights protection for private aerospace industries as manifested through a number of joint agreements. Likewise, Section 305 of the NASA Act [\[FN261\]](#) provides that although title to such invention rests with the government, NASA includes a broad waiver policy. It retains only a non-exclusive royalty free license for government use and the right to use it if the contractor does not develop the invention.

The International Space Station raises relatively new issues regarding the protection of industrial property among the state and non-state participants. Nevertheless, these issues were addressed in various provisions of the International Government Agreement (IGA) on the Space Station. [\[FN262\]](#) Article 16 provides for a cross-waiver of liability and

Article 3(d)(4) provides that intellectual property claims do not fall within the scope of application of the Agreement. Article 21 deals explicitly with intellectual property. It defines intellectual property in its first paragraph by reference to the terminology used in Article 2 of the Convention Establishing the World Intellectual Property Organization. [\[FN263\]](#)

Because intellectual property rights are generally based on territoriality, their application to situations in outer space may cause problems, because outer space can not be the subject of national appropriation. Hence, paragraph 2 of Article 21 applies the fiction of territoriality over activities taking place in or on a specific space station element, the space segment where the invention was developed. Moreover, inventions in any space segment of any European Space Agency (ESA) Member State are deemed to have occurred within the territory of any European Partner State. Therefore, the territoriality concept can be applied by the state concerned, while in relation to ESA registered elements, the regulation facilitates the application of each individual nation's law on intellectual\*[364](#) property. Such a conclusion results from the application of the principles of jurisdiction and control of the state of registry over the individual flight element. [\[FN264\]](#)

National laws on patents differ from state to state, in that the law may be based either on filing or the fact of invention itself. In the space law context, this problem is partially answered through Article 21 of the IGA with respect to inventions made by non-nationals or non-residents by restricting the application of national laws concerning secrecy of invention. This prevents the filing of a patent application. If patent protection exists in more than one European partner state, Article 21 prohibits, through paragraph 4, recovery in more than one of those states for the same rights in such invention for infringement, which occurs in or on an ESA registered element. In paragraph 5, the European partner states are prohibited from refusing the recognition of a license [\[FN265\]](#) in relation to patents if that patent is enforceable under the laws of any European partner state. This likewise also bars recovery for infringement in any European partner state.

#### V. Conclusion

The problem of protecting intellectual and industrial property rights in outer space endeavors will partially be addressed through the efforts of space countries towards international cooperation. The construction and full operation of the International Space Station is a step towards this end. Efforts towards international space cooperation are nothing new to the space countries. Their experience with INTELSAT, INMARSAT, EUTELSAT and ESA may become a solid foundation in the future endeavors. From this experience, rules can be improved while concepts can balance various competing interests. The perspective of such efforts to forge international space cooperation is the establishment of uniform IPR protection laws among national law systems. Priority must be set on new areas of use and exploration of outer space, such as direct broadcasting and remote sensing. The active presence of the WIPO would certainly make such effort less difficult.

Similarly, the presence of the WIPO assures that there would be representation of the various views and opinions of the world community not only in IPR protection but also in international space law as well. It is hoped that the presence of underdeveloped states in this international \*[365](#) effort could stimulate and coordinate a rather relevant and developmental legal regime of IPR protection resulting from outer space endeavors.

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[\[FN1\]](#). Treaty on Principles Governing the Activities of States in the Exploration and Use of the Outer Space, Including the Moon and Other Celestial Bodies, art. I, opened for signature [Jan. 27, 1967, 18 U.S.T. 2410](#), 610 U.N.T.S. 206 [hereinafter 1967 Outer Space Treaty].

[\[FN2\]](#). See Space Activities and Emerging International Law 357 (Nicholas Matte, ed., McGill University 1984) [hereinafter Matte].

[\[FN3\]](#). See Convention Relating to the Regulation of Aerial Navigation, Oct. 13, 1919, art. I, 11 L.N.T.S. 173 [hereinafter

Paris Convention Relating to the Regulation of Air Navigation of 1919].

[FN4]. Convention on International Civil Aviation, Dec. 7, 1944, art. I, 61 Stat. 1180, 15 U.N.T.S. 295.

[FN5]. 1967 Outer Space Treaty, *supra* note 1.

[FN6]. See Matte, *supra* note 2, at 358.

[FN7]. United Nations, General Assembly, Report of the Ad Hoc Committee on the Peaceful Uses of Outer Space, UN Doc. A/4141 at 68 (1959).

[FN8]. See Matte, *supra* note 2, at 361.

[FN9]. See *id.* at 362.

[FN10]. See *id.* at 365.

[FN11]. Technically, the atmosphere is divided into several strata:

    ÉThe troposphere, which lies at the height of approximately 16 kilometers above the earth's surface.

    ÉThe stratosphere, which lies at the height of approximately 50 kilometers above the earth's surface.

    ÉThe mesosphere, which lies at the height of approximately 80 kilometers above the earth's surface.

    ÉThe ionosphere, which lies at the height of approximately 500 kilometers above the earth's surface.

    ÉThe exosphere, which lies at the height of approximately 2000-3000 kilometers above the earth's surface.

See *id.* at 366-7.

[FN12]. See *id.* at 366. This atmospheric phenomenon is termed as inversion because of the inversion of the normal temperature of the gradient. See *id.*

[FN13]. See *id.* The upper inversions are called the mesopause, the stratopause, the tropopause, and so on.

[FN14]. See Samuel Glasstone, Sourcebook on the Space Sciences 18 (1965) [hereinafter Sourcebook].

[FN15]. Matte, *supra* note 2, at 370.

[FN16]. *Id.* at 370-371 citing generally William D. Sellers, *Physical Climatology* (1965).

[FN17]. The following section follows generally Matte, *supra* note 2, at 372-380.

[FN18]. *Id.* at 372.

[FN19]. *Id.* at 372 citing Ness, *The Magnetosphere and Its Boundary Layer*, in *Second Symposium on Protection Against Radiation in Space*, NASA SP-71, 31 (1964).

[FN20]. See Matte, *supra* note 2, at 373 citing Joseph Kroell, *Eléments Créateurs d'un Droit Astronautique*, 16 *Rév. Gén. de l'air* 222, 233 (1953).

[FN21]. See Matte, *supra* note 2, at 373 citing Joseph Kroell, *Elements Createurs d'un Droit Astronautique*, 16 *Rev. En. De L'Air* 222, 223 (1953).

[FN22]. See Matte, *supra* note 2, at 373.

[FN23]. See *id.*

[\[FN24\]](#). See id.

[\[FN25\]](#). See id. at 374.

[\[FN26\]](#). See id.

[\[FN27\]](#). See id.

[\[FN28\]](#). See id. at 375.

[\[FN29\]](#). See id.

[\[FN30\]](#). See id. at 376

[\[FN31\]](#). See id. at 377-9.

[\[FN32\]](#). See id.

[\[FN33\]](#). See id. at 380.

[\[FN34\]](#). G.A. Res. 2222(XXI), U.N. GAOR (1966).

[\[FN35\]](#). See United Nations, General Assembly, UN Doc. A/6804 Annex II para. 36 (1967).

[\[FN36\]](#). See Matte, *supra* note 2, at 384.

[\[FN37\]](#). See id.

[\[FN38\]](#). See United Nations, General Assembly, Committee on the Peaceful Uses of Outer Space, Scientific and Technical Sub-Committee, Natural Boundaries in Space, UN Doc. A/AC.105/C.1/L.76 at 13 (1976).

[\[FN39\]](#). See United Nations, General Assembly, Committee on the Peaceful Uses of Outer Space, Legal Sub-Committee, Matters Relating to the Definition and/or Delimitation of Outer Space Activities, UN Doc. A/AC.105/C.2/L.121 (1979). The former USSR submitted a working paper of substantially the same tenor in 1983. See United Nations, General Assembly, Committee on the Peaceful Uses of Outer Space, Legal Sub-Committee, Matters Relating to the Definition and/or Delimitation of Outer Space and Outer Space Activities, UN Doc. A/AC.105/C.2/L.139 (1983).

[\[FN40\]](#). See United Nations, General Assembly, Committee on the Peaceful Uses of Outer Space, Legal Sub-Committee, Summary Record of the 314th Meeting, UN Doc. A/AC.105/C.2/SR.314 at 3 (1979).

[\[FN41\]](#). The reasons given by the U.S. delegate were:

(1) The inability of most countries to monitor such an altitude boundary; (2) The lack of adequate examination of relevant scientific, legal, technical and political factors; and (3) The possible inhibiting and even stifling effect of such a boundary on future efforts to explore and use outer space.

Matte, *supra* note 2, at 385 citing United Nations, General Assembly, Committee on the Peaceful Uses of Outer Space, Legal Sub-Committee, Summary Record of the 314th Meeting, UN Doc. A/AC.105/C.2/SR.316 at 2 (1979).

[\[FN42\]](#). See C. Wilfred Jenks, *Space Law 10* (1965) [hereinafter Jenks].

[\[FN43\]](#). See id.

[\[FN44\]](#). See id.

[\[FN45\]](#). See *id.* at 97.

[\[FN46\]](#). *Id.* at 97 citing Oscar Schachter, *Who Owns the Universe?*, *Collier's*, Mar. 22, 1952, at 36.

[\[FN47\]](#). See Jenks, *supra* note 42, at 99.

[\[FN48\]](#). *Id.*

[\[FN49\]](#). See *id.* at 97-98 citing *Legal Problems of Space Exploration -A Symposium* 9-19 (1961).

[\[FN50\]](#). See Jenks, *supra* note 42, at 98 citing *Luftrecht und Weltraum, Hanover* (1953) with English translation in *Space Law - A Symposium* 18-76 (1963).

[\[FN51\]](#). See Jenks, *supra* note 42, at 97-98 citing *Legal Problems of Space Exploration - A Symposium* 9-19 (1961).

[\[FN52\]](#). See Jenks, *supra* note 42, at 100-1. See also Vladlen S. Vereshchetin & Gennady M. Danilenko, *Custom as a Source of International Law of Outer Space*, 13 *J. Space L.* 22, 25 (1985) [hereinafter *Danilenko*].

[\[FN53\]](#). See Jenks, *supra* note 42, at 21.

[\[FN54\]](#). See *id.*

[\[FN55\]](#). For an extensive listing of conventions, regulations, and events concerning outer space prior to the formulation of the Outer Space Treaty in 1967 see *id.* at 3-6, 21-25.

[\[FN56\]](#). See 1967 Outer Space Treaty, *supra* note 1.

[\[FN57\]](#). Edwin W. Paxson III, [Sharing the Benefits of Outer Space Exploration: Space Law and Economic Development](#), 14 *Mich. J. Int'l L.* 487, 489 (1993).

[\[FN58\]](#). See Malcolm Russell, *Military Activities in Outer Space: Soviet Legal Views*, 25 *Harv. Int'l L.J.* 153, 160 (1984) [hereinafter *Russell*]. Other succeeding space treaties that incorporated the 1967 Outer Space Treaty in its provisions are: *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space* and the *Convention on International Liability for Damages Caused by Space Objects*. See UN Office for Outer Space Affairs, *Treaties and Principles on Outer Space* (Vienna, 1994).

[\[FN59\]](#). Arnold McNair, *The Law of the Air* 33 (2nd ed., Kerr & McCrindle eds.) (1953).

[\[FN60\]](#). Jenks, *supra* note 42, at 105.

[\[FN61\]](#). See *id.* citing Maurice Lemoine, *Traité du Droit Aérien* 113-116 (1947).

[\[FN62\]](#). See Jenks, *supra* note 42, at 106.

[\[FN63\]](#). See *id.*

[\[FN64\]](#). See *id.*

[\[FN65\]](#). See *id.*

[\[FN66\]](#). See *id.*

[\[FN67\]](#). See *id.* at 107.

[\[FN68\]](#). See *id.* at 108, 109 citing *Legal Aspects of Space Exploration - A Symposium*, S. Doc. No. 26 at 236 (1st Sess. 1961).

[\[FN69\]](#). John C. Cooper, *High Altitude Flight and National Sovereignty*, reprinted in *Legal Aspects of Space Exploration - A Symposium*, S. Doc. No. 26 at 5-7 (1st Sess. 1961).

[\[FN70\]](#). See Jenks, *supra* note 42, at 112 citing generally Andrew Haley, *Space Law and Government* (1963).

[\[FN71\]](#). See Jenks, *supra* note 42, at 114 citing generally Julian G. Verplaetse, *International Law in Vertical Space* (1960).

[\[FN72\]](#). See Jenks, *supra* note 42, at 115.

[\[FN73\]](#). See *id.* citing Verplaetse, *supra* note 71, at 156, 159, 161-4.

[\[FN74\]](#). See Jenks, *supra* note 42, at 116.

[\[FN75\]](#). See *id.* at 116-117 citing generally Daniel Goedhuis, *Conflicts of Law and Divergencies in the Legal Regime of Air and Space Law*, *Recueil des Cours de l'Academie de Droit International* (1963).

[\[FN76\]](#). Prominent and pioneering writers from the US were Philip C. Jessup and Howard J. Taubenfeld. Their work *Controls for Outer Space and the Antarctic Analogy* (1959), is a showcase of a thorough grasp of scientific and technological factors affecting the new problems now confronting the law. It discusses international controls of widely varying types in retrospect and international controls for the Antarctic. The physical setting of the problem, the military considerations involved, and the potential uses of outer space for peaceful purposes, are all clearly and sufficiently described to place essentials in perspective and in relation to each other. An exhaustive definition of demarcation between air space and outer space was, however, not attempted. Discussion of the legal status of outer space, the analogy with maritime law and an analysis of the liability for damage and injury caused by space instrumentalities was made. This summary of *Controls for Outer Space and the Antarctic Analogy* was drawn from Jenks, *supra* note 42, at 119-122.

Myers McDougal, another prominent American authority, applied his sociological approach to the study of international law in general. He mentions the extraordinary interdependence of scientific, military, commercial and other objectives that may be advanced by the same activities in space, as the relation between space activities and the international political situation, including the structure of the earth arena, the position and the number of powers, their relative technological success, and the expectations of violence and the changing relative importance of space and time. McDougal observes that there is a tendency to diminish the importance of space in the positional sense and increase the importance of time for the planning of human affairs. McDougal also outlined suggestions to prevent the militarization of outer space, among which are the registration of satellites and the designation of outer space as a nuclear-free zone. This discussion of McDougal's work was drawn from Jenks, *supra* note 42, at 122-132 citing generally Myers S. McDougal & Leon Lipson, *Perspectives for a Law of Outer Space in Studies in World Public Order* (McDougal and Associates) (1960).

[\[FN77\]](#). From the USSR came two of the most important works on space law: *The Cosmos and International Law* (1962) and *The Way to Space Law* (1962). The author was Korovine, who rejected any mechanical extension of the concept of sovereignty from the earth to the cosmos, and thereby rejected the right of any country to put cosmic order under its legislation, administration, or jurisdiction. However, Korovine did not consider space a legal vacuum where complete freedom of action prevailed. "Freedom of space" or "open space" was defined as the right of every country to use the cosmos as it sees fit without doing harm or injury to other states. This discussion of Korovine's work was drawn from Jenks, *supra* note 42, at 133-135 citing S. Doc. No. 26 at 1070-1071 (1st Sess 1961).

[\[FN78\]](#). From Western Europe, Charles Chaumont, in his work *Le Droit de l'Espace* (1960), advanced the thesis that "space should be envisaged not as a place, but as a complex of activities.... Space is at the service of man but does not necessarily belong to him." Jenks, *supra* note 42, at 154 (describing Chaumont's thesis). On this basis, Chaumont proposed the development of international regulations for the protection of the general interests. He, however, regarded it as premature to regard the UN as having authority over space activities. This discussion of Chaumont's work was drawn from Jenks, *supra*

note 42, at 154 citing generally *Le Droit de l'Espace* (1960).

[FN79]. From Britain is an important contribution: the Draft Code of Rules on the Exploration and Uses of Outer Space (1963) and the Draft Rules Concerning Changes in the Environment of the Earth (1964), prepared by a study group of the David Davies Memorial Institute of International Studies, which defined terms such as *aircraft*, *spacecraft*, *airspace*, and *outer space*. See Jenks, *supra* note 42, at 150 (summarizing these works).

[FN80]. From India, P. K. Kartha argued that while agreement between the US and the USSR was indispensable, penetration into outer space was the concern of the international community. This discussion of Mr. Kartha's work was drawn from Jenks, *supra* note 42, at 161 citing P.K. Kartha, *Some Legal Problems Concerning Outer Space*, 3 *Indian J. Int'l L.* 1-43 (1963).

[FN81]. From Asia, Professor Yuiohi Takano of Japan made proposals for the free use of outer space, a right of innocent passage for ascending and descending space vehicles, advance notification to and registration with a special international organization of launchings and flights. Jenks, *supra* note 42, at 160 citing Yuiohi Takano, *Legal Status of Outer Space*, *Japanese Ann. Int'l L.* No. 4, 42-49 (1960). Professor Takano argued that while celestial bodies may be explored and exploited by any state or international organization, a report to the UN on the results of the exploration and exploitation should be made. See *id.*

In addition, Professor Fumio Ikedo of Japan discussed the legal status of planets. He considered that planets could be occupied and appropriated under existing international law if, in the future, a state could exercise authority over them, with the intention of acquiring sovereignty rights. Ikedo, while not excluding possible claims of inchoate title to the moon, noted that since the USSR made no such claims based on the Sputniks one can conclude that nothing has been altered in the status of the moon. Ikedo pleaded for the internationalization of outer space, arguing that the rules of occupation in international law are but European countries' mechanism for acquisition of territories. This discussion of Professor Ikedo's work was drawn from Jenks, *supra* note 42, at 160-161 citing Fumio Ikedo, *The Legal Status of Planets*, *Japanese Ann. Int'l L.* No. 5, 25-30 (1961).

[FN82]. From Latin America, Haroldo Valladao described interplanetary law as a new branch of law, including national, international and interplanetary rules. Interplanetary space is *res communis omnium universi*, meaning it is not subject to appropriation in pursuance to the common good, not just for all nations on earth but for all nations in the universe. Valladao regarded the planets and satellites as not subject to acquisition on the basis of the outworn law of discovery and conquest. This discussion of Mr. Valladao's work was drawn from Jenks, *supra* note 42, at 162 citing Haroldo Valladao, *Direito Interplanetário e Direito Inter-Gentes Planetárias*, *Separata de Revista Juridica, da Faculdade Nacional de Direito da Universidade do Brasil*, Vol. 15, 1-32 (1957). He also advanced the view that the study of interplanetary law be autonomous from air law. See Jenks, *supra* note 42, at 162 citing Haroldo Valladao, *O Direito do Espaço Interplanetario* (1959) re-published in English in *Second Colloquium on the Law of Outer Space* 156-168 (1959).

[FN83]. See 1967 Outer Space Treaty, *supra* note 1, art. II.

[FN84]. Convention on International Liability for Damage Caused by Space Objects, [Mar. 29, 1972, 24 U.S.T. 2398, T.I.A.S. No. 7762](#).

[FN85]. Convention on Registration of Objects Launched into Outer Space, [Jan. 14, 1975, 28 U.S.T. 695, T.I.A.S. No. 8480](#).

[FN86]. Jenks, *supra* note 42, at 177-179.

[FN87]. This section is drawn generally from Summary of the Introduction, UN, *The United Nations and Outer Space* (1977) [hereinafter Summary].

[FN88]. See Matte, *supra* note 2, at 55.

[FN89]. See *id.*

[\[FN90\]](#). See New Zealand Ministry of Foreign Affairs and Trade, United Nations Handbook 1987 34-35 (1987).

[\[FN91\]](#). See G.A. Res. 1962 (XVIII), U.N. GAOR, Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space (1963).

[\[FN92\]](#). See Matte, *supra* note 2, at 189.

[\[FN93\]](#). See *id.* at 190.

[\[FN94\]](#). See *id.*

[\[FN95\]](#). See generally U.N. G.A. Res. 1721 (XVI), Dec. 20, 1961.

[\[FN96\]](#). See *id.*

[\[FN97\]](#). See *id.* at 197.

[\[FN98\]](#). See *id.*

[\[FN99\]](#). See *id.*

[\[FN100\]](#). See Nandasiri Jasentuliyana, The Lawmaking Process in the United Nations, in *Space Law: Development and Scope* 36 (Nandasiri Jasentuliyana ed. 1992).

[\[FN101\]](#). See *id.*

[\[FN102\]](#). See *id.*

[\[FN103\]](#). See *id.* For a general overview of the space lawmaking process in the United Nations see *id.* at 33-36.

[\[FN104\]](#). See *id.* at 34.

[\[FN105\]](#). See *id.* at 35.

[\[FN106\]](#). See *id.* at 33.

[\[FN107\]](#). See Matte, *supra* note 2, at 72-73.

[\[FN108\]](#). See *id.* at 73.

[\[FN109\]](#). Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 18, 1979, 18 I.L.M. 1434 (1979).

[\[FN110\]](#). Jenks, *supra* note 42, at 6.

[\[FN111\]](#). C. Wilfred Jenks, *The Common Law of Mankind* 384 (1958).

[\[FN112\]](#). Jenks, *supra* note 42, at 8.

[\[FN113\]](#). See Isagani Cruz, *Public International Law* 168 (1993) [hereinafter Cruz].

[\[FN114\]](#). For a more detailed discussion on the treaty-making process see *id.* at 169-72.

[\[FN115\]](#). See *id.* at 172-75.

[\[FN116\]](#). See Gerald Fitzmaurice, *Symbolae Verzilj* in Mark Villiger, *Customary International Law and Treaties: A Study of Their Interactions and Interrelations, With Special Consideration of the 1969 Vienna Convention on the Law of Treaties* 46 (1985).

[\[FN117\]](#). See *id.*

[\[FN118\]](#). See *id.*

[\[FN119\]](#). See *id.*

[\[FN120\]](#). Cruz, *supra* note 113, at 22.

[\[FN121\]](#). See Ian Brownlie, *The Principles of International Law* 5 (1990) [[[hereinafter Brownlie]].

[\[FN122\]](#). See *id.*

[\[FN123\]](#). See *id.*

[\[FN124\]](#). See Cruz, *supra* note 113, at 23.

[\[FN125\]](#). Brownlie, *supra* note 121, at 5.

[\[FN126\]](#). See *id.*

[\[FN127\]](#). [North Sea Continental Shelf Cases \(Federal Republic of Germany v. Denmark; Federal Republic of Germany v. The Netherlands\) 1969 I.C.J. 3 \(Feb. 20\)](#) [hereinafter *North Sea Continental Shelf Cases*].

[\[FN128\]](#). [North Sea Continental Shelf Cases, 1969 I.C.J. at 42.](#)

[\[FN129\]](#). See Brownlie, *supra* note 121, at 5.

[\[FN130\]](#). See [North Sea Continental Shelf Cases, 1969 I.C.J. at 229](#) (dissenting opinion of Judge Lachs).

[\[FN131\]](#). See Villiger, *supra* note 116, at 4.

[\[FN132\]](#). See *id.*

[\[FN133\]](#). See *id.*

[\[FN134\]](#). See Brownlie, *supra* note 121, at 10.

[\[FN135\]](#). See *id.*

[\[FN136\]](#). *Id.* at 11.

[\[FN137\]](#). See *id.* at 6.

[\[FN138\]](#). See id.

[\[FN139\]](#). See id.

[\[FN140\]](#). Michael Akehurst, Custom As A Source Of International Law in 47 British Yearbook Int'l L. 1, 29 (1974) [hereinafter Akehurst].

[\[FN141\]](#). [North Sea Continental Shelf Cases, 1969 I.C.J. at 44.](#)

[\[FN142\]](#). See Akehurst, supra note 140, at 1-2.

[\[FN143\]](#). See id.

[\[FN144\]](#). See W. Friedmann, The Changing Structure of International Law in D. J. Harris, Cases and Materials in International Law 41 (5th ed., 1998) [[hereinafter Friedmann].

[\[FN145\]](#). Id.

[\[FN146\]](#). See Cruz, supra note 113, at 23.

[\[FN147\]](#). See Friedmann, supra note 144, at 41.

[\[FN148\]](#). See id.

[\[FN149\]](#). See Myers S. McDougal, The Emerging Customary Law of Space, NASA Science and Technology Information Division, Proceedings of the Conference on the Law of Space and Satellite Communications, A Part of the 3rd National Conference on the Peaceful Uses of Outer Space 2 (1964).

[\[FN150\]](#). See id.

[\[FN151\]](#). See id.

[\[FN152\]](#). See Danilenko, supra note 52, at 25.

[\[FN153\]](#). See id.

[\[FN154\]](#). See id.

[\[FN155\]](#). See S. Bhatt, Legal Controls of Outer Space 274 (1973).

[\[FN156\]](#). See Y. Kolosov, Legal and Political Aspects of Space Exploration 88 (1979).

[\[FN157\]](#). See Surya P. Sharma, International Law of Outer Space: A Policy-Oriented Study, 17 Indian J. Int'l L. 185, 188 (1977).

[\[FN158\]](#). See id.

[\[FN159\]](#). Ogunson O. Ogunbanwo, International Law and Outer Space Activities 17 (1975).

[\[FN160\]](#). See Bing Cheng, United Nations Resolutions on Outer Space: Instant Customary International Law? 5 Indian J. Int'l L. 36 (1965) [hereinafter Bing Cheng].

[\[FN161\]](#). Danilenko, *supra*, note 52, at 22-23.

[\[FN162\]](#). See *id.* at 23.

[\[FN163\]](#). See *id.* at 25-26.

[\[FN164\]](#). See *id.* at 23-24.

[\[FN165\]](#). See *id.*

[\[FN166\]](#). See *id.* at 31-32.

[\[FN167\]](#). Vienna Convention on the Law of Treaties, May 23, 1969, art. 38, 1155 U.N.T.S. 331.

[\[FN168\]](#). See generally 1967 Outer Space Treaty, *supra* note 1.

[\[FN169\]](#). See generally Akehurst, *supra* note 140.

[\[FN170\]](#). See *id.*

[\[FN171\]](#). Sloan suggested that while an abstention may be treated as negative vote, because it shows lack of enthusiasm, it is better treated as an act of acquiescence. See Blaine Sloan, *General Assembly Resolutions Revisited*, 58 B.Y.I.L. 39 (1987) Sloan also suggested that the factor of repetition or recitation in subsequent resolutions demonstrates continuity and distinguishes those resolutions having stable support from those enjoying only an ephemeral majority, as well as strengthening evidentiary and precedent value and increasing expectations and continued interest and support. See *id.*

[\[FN172\]](#). Malvina Halberstam, *Recognition, Use of Force and the Legal Effects of UN Resolutions Under the Revised Statement of the Foreign Relations Law of the US*, 19 B.L.R. 509-522 (1984).

[\[FN173\]](#). Manfred Lachs, *Reflections on Substance and Form of International Law* 56-57 (1984).

[\[FN174\]](#). The primary UN Resolution worth noting in the context of international space law is the 1963 Declaration of Legal Principles Governing Activities of States in the Exploration and Use of Outer Space, which contained provisions similar to which and ultimately paved the way for the formulation of the 1967 Outer Space Treaty. See G.A. Res. 1962, UN GAOR, 18th Sess., Supp. No. 9, at 205, UN Doc. A/1280 (1963).

[\[FN175\]](#). See generally Bing Cheng, *supra* note 160.

[\[FN176\]](#). See Mark W. Zacher & James C. McConnel, *Down to the Sea With Stakes: The Evolving Law of the Sea and the Future of the Deep Seabed Regime*, 21 *Ocean Dev. Int'l L.* 71, 72 (1990).

[\[FN177\]](#). The Antarctic Treaty includes a Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA). The [Antarctic Treaty, Dec. 1, 1959, 12 U.S.T. 794](#), 402 U.N.T.S. 71. For a discussion of this Treaty see Christopher Joyner, *Antarctica and the Indian Ocean States: The Interplay of Law, Interests and Geopolitics*, 21 *Ocean Dev. Int'l L.* 41, 43 (1990).

[\[FN178\]](#). See 1967 Outer Space Treaty, *supra* note 1.

[\[FN179\]](#). See Mary E. Schwind, *Open Stars: An Examination of the US Push to Privatize International Telecommunications Satellites*, 10 *Suffolk Transnat'l L.J.* 93, 94 (1986).

[\[FN180\]](#). See 1967 Outer Space Treaty, *supra* note 1, para.1.

[\[FN181\]](#). See Schwind, *supra* note 179, at 94.

[\[FN182\]](#). See *id.*

[\[FN183\]](#). *Id.* at 96-97.

[\[FN184\]](#). See Stephen D. Mau, Equity, the 3rd World and the Moon Treaty, 8 *Suffolk Transnat'l L.J.* 232, 233 (1988).

[\[FN185\]](#). See *id.* at 236.

[\[FN186\]](#). See *id.*

[\[FN187\]](#). See *id.*

[\[FN188\]](#). See Daniel Goedhuis, Some Recent Trends in the Interpretation and Implementation of the Rules of Int'l Space Law, 19 *Columb. J. Transnat'l L.* 212 (1981).

[\[FN189\]](#). 1967 Outer Space Treaty, *supra* note 1, at art. I, para. 2.

[\[FN190\]](#). See *id.*

[\[FN191\]](#). See *id.* at art. IV, para. 1.

[\[FN192\]](#). *Id.* at art. I, para. 2.

[\[FN193\]](#). *Id.* at art. II.

[\[FN194\]](#). *Id.* at art. III.

[\[FN195\]](#). *Id.* at arts. VI, VII.

[\[FN196\]](#). See *id.* at arts. V, IX, XI.

[\[FN197\]](#). Research conducted inside a manned space flight, according to Matte, is covered by the term "use" because the flight path of the space laboratory is in outer space. See Matte, *supra* note 2, at 273. Stephen Gorove argues to the contrary because the treaty does not apply specifically to space stations except those on the moon under Art. VII. He reasoned that Art. VIII should instead apply, that is the law of the state of registration. See Stephen Gorove, *Studies In Space Law: Its Challenge and Prospects* 56, 211-212 (1977).

[\[FN198\]](#). Art. II of the 1967 Outer Space Treaty provides: "Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation or by any other means." 1967 Outer Space Treaty, *supra* note 1, at art. II.

[\[FN199\]](#). See Matte, *supra* note 2, at 275.

[\[FN200\]](#). See *id.* at 278.

[\[FN201\]](#). But see Stephen Gorove, Interpreting Article II of the Outer Space Treaty, 37 *Fordham L. Rev.* 349, 351 (1968-69).

[\[FN202\]](#). I.T.U. Doc. WARC-155 (1977) 81-E.

[FN203]. UN Doc. A/AC.105/248 (1979). The view was that the geostationary orbit is an integral part of the outer space and that satellites are positioned only in a very limited period. Nevertheless, the use of such orbit by the space powers may be in excess of the normal use of space, contrary to the freedom of use principle and the common interest and benefit clause. See Matte, *supra* note 2, at 283.

[FN204]. See Nicholas deB. Katzenback, *The Law in Outer Space*, in *Space: Its Impact on Man and Society* 77 (Levy, ed., 1965).

[FN205]. See Marco G. Marcoff, *Traite de Droit International Public de l'Espace* 363 (1973).

[FN206]. See 1967 Outer Space Treaty, *supra* note 1, art. III.

[FN207]. See *id.* art. IX.

[FN208]. See *id.* art. V.

[FN209]. See *id.* art. X.

[FN210]. See *id.* art. I, para. 3.

[FN211]. See generally Antarctic Treaty, *supra* note 177.

[FN212]. See Matte, *supra* note 2, at 154 citing Nicolas Matte, *Aerospace Law* 233 (1969).

[FN213]. See Antarctic Treaty, *supra* note 177, art. I.

[FN214]. See *id.* art. I para. 2.

[FN215]. See *id.* art. III.

[FN216]. See *id.* art. IV.

[FN217]. See *id.* art. VII.

[FN218]. See Anna Maria Balsano, *Intellectual Property Within Public International Research Organizations: The Example of the European Space Agency*, in *Proceedings of the Thirty-Sixth Colloquium on the Law of Outer Space* 3, 1993 International Institute of Space Law of the International Astronautical Federation [hereinafter Balsano].

[FN219]. See *id.* at 4.

[FN220]. Albert Tramposch, *Importance of Intellectual Property Rights for Space Activities in General*, *Proceedings of the First ECSL/Spanish Centre for Space Law Workshop on Intellectual Property Rights in Outer Space* 15 (1993).

[FN221]. See World Intellectual Property Organization, *Background Reading Material on Intellectual Property* 3 (1988) [hereinafter WIPO].

[FN222]. *Berne Convention for the Protection of Literary and Artistic Works*, Sept. 9, 1886, as last revised at Paris, July 24, 1971 (amended 1979), S. Treaty Doc. No. 27, 99th Cong., 2d Sess. (1986), 828 U.N.T.S. 221 [hereinafter *Berne Convention*].

[FN223]. *Universal Copyright Convention, Sept. 6, 1952, as revised at Paris on July 24, 1971, 6 U.S.T. 2731, T.I.A.S. No.*

[3324](#).

[\[FN224\]](#). International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations, Oct. 26, 1961, 496 U.N.T.S. 43.

[\[FN225\]](#). Paris Convention for the Protection of Industrial Property, Mar. 20, 1883, as last revised at [Stockholm July 14, 1967, 21 U.S.T. 1583](#), 828 U.N.T.S. 305.

[\[FN226\]](#). Patent Cooperation Treaty, June 19, 1970, [28 U.S.T. 7813, T.I.A.S. No. 8733](#).

[\[FN227\]](#). See Balsano, *supra* note 218, at 3.

[\[FN228\]](#). See WIPO, *supra* note 221.

[\[FN229\]](#). Balsano, *supra* note 218, at 4 n. 7.

[\[FN230\]](#). Convention Establishing the World Intellectual Property Association, July 14, 1967, art. 2, para. viii, 21 U.S.T. 1770, 828 U.N.T.S. 3 [hereinafter WIPO Convention].

[\[FN231\]](#). *Id.* Article 192 of the Paris Convention for the Protection of Industrial Property included "the repression of unfair competition" among the objects of "the protection of industrial property." Paris Convention, *supra* note 225 art. 192.

[\[FN232\]](#). WIPO Convention, *supra* note 230.

[\[FN233\]](#). The Elements of Industrial Property, WIPO Doc. WIPO/IP/ACC/86/1, paras. 2-9.

[\[FN234\]](#). See WIPO, *supra* note 221.

[\[FN235\]](#). *Id.* at 29.

[\[FN236\]](#). See *id.* at 29-30.

[\[FN237\]](#). *Id.* at 31.

[\[FN238\]](#). See *id.* at 14.

[\[FN239\]](#). See *id.* at 31.

[\[FN240\]](#). In order to remedy the anticipated infringements of rights by unauthorized satellite broadcasting, various options were tabled, ranging from the application of protections and measures through national legislation to the elaboration of an international convention, providing an extension of the applicability of the existing international conventions in the field of copyright and their neighboring rights, in case of transmission via satellite. See *id.* at 31.

[\[FN241\]](#). Categorization of owners of rights which might be affected by satellite broadcasting took place during a study of the pertinent problems at a working group of the BIRPI in 1968 and authors, artists, producers of programmes, broadcasting organizations, news agencies and organizers of sports events were listed as interested parties. See *id.* at 31.

[\[FN242\]](#). Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite, May 21, 1974, 13 I.L.M. 1444.

[\[FN243\]](#). It is, however, understandable that during the preparatory work of this Convention, the legal implications of direct broadcasting produced so many aspects and complications that adoption of a comprehensive approach did not appear

feasible. Moreover, direct broadcasting satellite technology was still under development at that time and the realization of practical applications did not then seem imminent. Nonetheless, a few years later in 1979, Imre Mora stressed in his paper presented at the ISSL Colloquium in Munich the seriousness of the legal vacuum and expressed his concern with direct broadcasting satellite operations in connection with proprietary rights seen from the aspect of the author. Imre Mora, *The Future of Direct Transmission Via Satellite from the Aspect of the Author*, Proceedings of the Twenty Second Colloquium on the Law of Outer Space 57 (1979) [hereinafter Mora].

[FN244]. See I.P. Diederiks-Verschoor, *The Responsibility for Space Activities*, in Proceedings of the Twenty-Sixth Colloquium on the Law of Outer Space 111 (1983).

[FN245]. The 76 Member States of the Berne Convention form the Berne Union, which intends to revise the Convention regularly to keep pace with juridical, economical, and technical developments and to which all EC member states are a party in contrast with the US and the USSR. See Berne Convention, *supra* note 222, art. 11bis.

[FN246]. International Telecommunication Convention, Oct. 25, 1973, as last revised at Nairobi on Nov. 6, 1982, [128 U.S.T. 2495, T.I.A.S. No. 8572](#) [[hereinafter Telecommunication Convention]. The Radio Regulations are promulgated and amended by World Administrative Radio Conferences (WARCs) and Regional Administrative Radio Conferences (RARCs). WARC and RARC are convened under the procedure spelled out in article 62 of the Telecommunication Convention. *Id.* at art. 62.

[FN247]. See Mora, *supra* note 243, at 58.

[FN248]. This vision is supported by Articles 11 and 11bis of the Berne Convention supplying authors with the exclusive right to authorize the communication of their works to the public. However, the same provisions may produce responsibility on the part of cable distributors of Fixed Satellite Services (FSS) transmitted signals towards the author, a possibility challenged by cable distributors. While consensus is lacking on this point between the respective interested parties, harmony is not to be expected on an international level, as a result of the principle of national treatment spelled out in Article 5 of the Berne Convention, according to which application the rights and obligations of authors and users of their work may vary according to the country where the transmitted signals are being received. See Berne Convention, *supra* note 222, arts. 5, 11, 11bis.

[FN249]. See Marie Helen Pichler, *Copyright Problems of Satellite and Cable Television in Europe* 30 (1987).

[FN250]. See Valerie Kayser, *Commercial Exploitation of Air and Space Law: Developing Domestic Regulation*, 17 *Annals Air & Space L.* 187 (1992).

[FN251]. See *id.*

[FN252]. There are several commercial civilian remote sensing systems all over the world. Foremost among them is the LANDSAT of the US, the first civilian remote sensing satellite. France has the Systeme Probatoire d' Observation de la Terre (öSPOTö), established in 1981, and heavily subsidized by the French government, which is the primary party in the project. SPOT has a 10-meter resolution, as opposed to the 30-meter capacity of the LANDSAT. Japan has the Marine Observation Satellite -1 (öMOS-1ö), with features similar to those of SPOT. Russia, successor to the USSR, which began its first remote sensing activities in the manned Soyuz 9 flight in 1970, is now broadcasting the products of Soviet satellites to an area including selected Western countries through the Soyuzkarta Company. The European Space Agency (öESAö), a joint venture of European countries and Canada, also launched its first remote sensing satellite, the ERS-1 in 1987. See Harry Feder, *The Sky's The Limit? Evaluating the Law of Remote Sensing*, 23 *N.Y.U. J. Int'l L. & Pol.* 621 (1991).

[FN253]. See *id.*

[FN254]. 1967 Outer Space Treaty, *supra* note 1, art 6.

[FN255]. There would be no better illustration of the commercialization trend than the US LANDSAT. LANDSAT is the first US remote sensing satellite, launched into space on July 23, 1972 under the Nixon administration. At that time, it was

known as the Earth Resources Technology Satellite (ERTS). Its name was changed to LANDSAT in 1975. Since 1972, the US has launched four more satellites in the LANDSAT series, all funded solely by the federal government.

LANDSAT was launched by the US government with eventual commercialization in mind. However, this commercialization plan suffered many setbacks due to several factors. Since 1981, the program has been subjected to budget cuts. Because it has been operated as an experimental system, practical applications for the technology have not been emphasized. Potential investors were also hesitant to make major investments without guarantee of government support because the LANDSAT technology has been too expensive to permit substantial profits.

Despite these setbacks, the alternative to transfer remote sensing activity to the private sector became more attractive in the face of perceived substantial benefits that would accrue to the government. The federal government lacked the skills necessary to expand the market for LANDSAT data, and to therefore make the program more efficient. The best marketing skills are available in the private sector because of its superior training in the marketplace.

On July 17, 1984, President Ronald Reagan signed the Land Remote Sensing Commercialization Act of 1984, providing the sale of the LANDSAT system to private industry. The outlined goals of the Commercialization Act include the maintenance of US worldwide leadership in commercial remote sensing, the preservation of its national security and the fulfillment of its international obligations. Its ultimate end is a viable private sector enterprise not hampered by excessive regulation. The Reagan administration listed three conditions for the transfer: 1) defense and foreign policy interests must be protected, 2) the US government must retain guaranteed access to weather data and 3) the transfer must be a good deal for the US taxpayer. Under the terms of the contract, the private owners are under the obligation to recognize government intervention in its activities. Government approval on matters pertaining to space policy and related treaty obligations, especially those set forth in the 1967 Outer Space Treaty, is mandatory. In addition, private owners would be required to provide government agencies with specific data upon request and to fulfill the requests of those foreign governments to whom the US is already distributing data.

On the other end, however, private operators are granted copyright protection for data produced by their commercial systems. Legal ownership of the data would pass from the government to private owners of LANDSAT, who would negotiate sales contracts with the government as the need arises. In addition, the federal government would safeguard the rights of owners to enter into contracts with foreign-based ground stations.

The commercialization of the LANDSAT, however, has been subject to criticisms. Heavy subsidization from the government, especially during its initial phases, cannot be eliminated by commercialization. Moreover, private operation would be detrimental to the foreign policy of the US in several ways, as profit motive would clash with the US Open Skies Policy. This entire discussion of the history of the U.S. LANDSAT was drawn generally from Christopher Joyner and Douglas Miller, *Seeing Satellites: The Commercialization of the LANDSAT*, 26 Harv. Int'l L.J. 63 (1985).

[FN256]. See Michael Bourley, *Legal Problems by the Commercialization of Data Collected by the European Remote Sensing Satellites ERS-1*, 16 J. Space L. 144 (1988).

[FN257]. See *id.*

[FN258]. Previously, as long as the US administration, via NASA, was itself involved in any satellite remote sensing operation and dissemination of the resulting data, the US government would not claim any kind of proprietary rights in the data produced. In contrast, the LANDSAT Act, which facilitates the transition of the land remote sensing system as well as the distribution of data to the civil private sector, shows definite signs of a commitment to guarantee certain proprietary rights to the contractor who will market the unenhanced data of the LANDSAT remote sensing system. Although the provisions of the LANDSAT Act provide for an open nondiscriminatory data policy of unenhanced data, its language reveals that buyers of remote sensing data will have to pay a price essentially set by the private marketing company that contracts with the US government.

The LANDSAT Act further provides that private companies will have the exclusive right to sell all unenhanced data for the duration of the marketing contract with the government, not to exceed ten years from the date the data are sensed. After that period, the data enter the public domain. As to the juridical substance of such an exclusive right, it seems that the US government recently shifted its views from a right similar to a copyright to a right being described as one similar to a trade secret. This approach would indeed solve the problem connected with the copyrighting of data, as far as traditional copyright would not protect the data itself, but only its form of expression.

A question which has been raised in connection with the language used in the LANDSAT Act is the distinction drawn between unenhanced data and enhanced data, on the basis of which the marketing company's right to sell the former data on an exclusive basis is founded.

The LANDSAT Act itself defines unenhanced data as "unprocessed or minimally processed signals or film products collected from civil remote sensing space systems." Furthermore, minimal processing is defined as including

rectification of distortions, registration with respect to features of the Earth, and calibration of spectral response. Moreover, it excludes from the term minimal processing conclusions, manipulations, or calculations derived from such signals or film products with other data or information. Thus, enhanced data, which are the domain of value added industries, are to be distinguished from the unenhanced data, belonging to the private marketing company which has contracted with the government and which will have to be dealt with in a different manner. It is still uncertain what kind of protection these enhanced data will receive. For the present, copyright protection rules would seem to apply in general.

However, in spite of the above definition of unenhanced remote sensing data, the distinction drawn between unenhanced data, on the one hand, and enhanced data, on the other, appears to lack sufficient clarity to distinguish in practice between the exclusive rights of the marketing company in unenhanced data and the rights belonging to the value added industry to enhanced data through intellectual processes.

In the meantime, it is anticipated that in order for the value added industry to market specific enhanced data, a licensing system, as perceived by the marketing company of unenhanced data will probably be worked out to protect the interests of all parties, within the restrictions of existing US legislation on the protection of proprietary rights. However, if existing legislation should prove to be inadequate to protect the various forms of intellectual property on the part of all interested parties, new legislative activity in this field is expected to be undertaken, as will be the case in any other fields of emerging technology.

When one looks at the position of the French government and its policy on the protection of intellectual property rights connected with the French remote sensing capability, the SPOT system, the following significant traits should be noted. Development and operation of the SPOT system by the French space agency, CNES, in combination with a data distribution system led by a private corporation, SPOT Images '45, stimulated the French government to develop a policy that joins a proprietary right protection system with an appropriate sales/distribution organization.

In principle, CNES holds the author's rights, and copyright fees of basic data and derived products are transferred to CNES via an entire organization consisting of agents and distributors in various countries. However, in the case of derived products, work is performed by the distributor and the copyright is shared by both the distributor and CNES. Moreover, in order to motivate the distributor to sell as much data as possible of the same kind, a system of price differentiation in copyright payable to CNES has been implemented, which is favorable to the distributor.

As far as the substance of the proprietary right is concerned in the case of the SPOT system, the established concept of copyright is being maintained for remote sensing data. When applying the copyright concept for the protection of remote sensing data in the form of a derived product, the outcome can be compared with the procedure used for translated publications, where copyright is similarly shared between the publisher of the work in the original language and the publisher of the translated work. The entire discussion of protection of IPR in connection with remote sensing activities was drawn generally from Marlo Magdoza, *Remote Sensing From Outer Space: Issues and Proposals* (1997) [hereinafter Magdoza].

[FN259]. In remote sensing, the sensors are directed towards the earth while the owners of the rights are also stationed on the earth, being nationals of various states. For example, the action to guarantee through its LANDSAT Act both a non-discriminatory and regulatory policy in the proprietary rights of the system operator, the system operator is obliged to apply for an operating license from the US government. In this context, the question remained unresolved for some time whether the SPOT system, which also uses a US-based data dissemination organization, was subject to the provisions of the LANDSAT Act. However, the fact that the SPOT system did not use the US space shuttle or any other US launching system, but was launched instead by the Ariane launcher from French Guinea, thus clearly outside US territory, meant that in this case the US could not assert its sovereignty and make the SPOT system dependent on the provisions of the US LANDSAT Act.

Other international implications relating to space activities, which are more directly connected with the regulation of the protection of intellectual property, will certainly arise in the near future and will demand firm international cooperation. For instance, ESA member states participating in the ERS-1 Programme for the use of ERS-1 data have established a legal framework facilitating the protection of copyright. By signing an ERS-1 data agreement, parties acknowledge ESA's copyright in all ERS-1 produced data, and commit themselves to respect and ensure respect for the agency's rights. The relevant provisions state that the ground station operator will mark all ERS-1 data and analyzed information with c ESA (year of reception), and that the operator will display on all ERS-1 data and analyzed information processed by the station a statement that the trademark is registered by ESA - 'ERS' - plus mentioning the entity originating the final data product. ESA's ownership and copyright, however, do not prevent the recognition of copyright on the part of the ground-station operator or a third party in respect of activities to add to and incorporate in the data product further sources of information or to produce analyzed information resulting in a different and more elaborated product, thereby making the final product fall under their own copyright title.

An additional responsibility rests on the data users to inform ESA in writing of any unlawful use by a third party

of the Agency's copyright interests and trademarks in order to enable the participating states to protect their interests through legal action. In respect of its distribution policy, ESA, being the owner of ERS-1 data, aims at public availability in a controlled way. Thus, it favors the conclusion of several non-exclusive license-use agreements, thereby facilitating access to the data products by a great number of users. For the present, ESA's pricing policy is uniform and consistent, irrespective of the facility or supplier generating those products. However, concerning the payment of royalties, its policy differentiates between users from states participating in the ERS-1 Programme and users from non-participating states. While the former will not be charged a royalty on the price of standard products, data products distributed to the latter will be charged a royalty, for which the related foreign-station operator will be credited by ESA. In line with this policy, onward distribution by a licensee of either primary or processed ERS-1 data to third parties through sub-licensing will be charged with a royalty fee to the credit of ESA based on the standard product. It should be noted, however, that ESA has retained the right to distribute ERS-1 data worldwide through a commercial distributor.

The appointed distributor will be expected to develop a commercial remote sensing data market for ERS-1 products based on fair and open competition to all value-added industries with an interest in the distribution of ERS-1 data. This distributor has adopted the form of an international consortium of companies consisting of Eurimage, SPO-Timage, and Radarsat International. In order to achieve the objectives set out above, the respective companies have been granted by ESA a non-exclusive sub-licensor regional data distribution. These rights exist in parallel with those established for operators of ground-receiving stations covering the related territories. This entire discussion of IPR in connection with remote sensing and other space activities was drawn from *Id.* at 72-85.

[\[FN260\]](#). On a national level, the US in particular, as a result of the US policy towards commercialization of a range of space activities, has been very much concerned with the regulation of this issue. Although from the beginning NASA's policy has been directed towards a patent policy to encourage the commercialization of technology developed under NASA funding, action is being undertaken to guarantee even more proprietary right protection for private industry contracting with NASA. The many joint endeavor agreements can also be seen as an example of this approach.

The US space station, which is anticipated to be constructed and used on an international basis, has raised novel questions as to the protection of proprietary interests among the various participants. Intellectual property aspects have been dealt with in various provisions of the International Government Agreement (IGA) on the Space Station. See IGA, *infra* note 262. Article 16, providing for a cross-waiver of liability, stipulates in paragraph 3 (d)(4) that intellectual property claims do not fall within the scope of application of the agreement. Article 21 deals explicitly with intellectual property. It defines intellectual property in its first paragraph by reference to the terminology used in Article 2 of the Convention Establishing the World Intellectual Property Organization.

Due to the fact that intellectual property rights are generally based on territoriality, and consequently their application to situations in outer space may cause problems, paragraph 2 of Article 21 applies the fiction of territoriality over activities taking place in or on a specific space station element. It adds, moreover, that for ESA registered elements any European partner state may deem the activity to have occurred within its territory. Hence, in combination with the principle of jurisdiction and control of the state of registry over the individual flight element, the territoriality concept can be applied by the state concerned, while in relation to ESA registered elements, the regulation facilitates the application of each individual national law on intellectual property.

Furthermore, aware of the fact that national laws on intellectual property differ from one state to another and in particular in relation to the establishment of rights of invention, which may be based either on filing or the invention itself, Article 21 offers a solution for patent application in respect of inventions made by non-nationals or non-residents by restricting the application of national laws concerning secrecy of invention so as to prevent the filing of a patent application.

In the event of intellectual property protection in more than one European partner state, Article 21 prohibits, through the provision of paragraph 4, recovery in more than one of those states for the same rights in such intellectual property for infringement which occurs in or on an ESA registered element. Subsequently, in paragraph 5, European partner states are prohibited from refusing the recognition of a license in relation to intellectual property, if that license is enforceable under the laws of any European partner state. Compliance with the provisions of such license shall also bar recovery for infringement in any European partner state.

The temporary presence in the territory of a partner state of any articles, including the components of a flight element, in transit between any place on earth and any flight element of the space station registered by another partner state or ESA shall not in itself form the basis for any proceedings in the first partner state for patent infringement. This provision, expressed in paragraph 6, prevents, e.g., that transportation of non-US flight elements by means of a US launching system might serve as a basis for a patent infringement action. Furthermore, one should notice that the US, in order to bring national legislation into conformity with the fiction of territoriality applied in the IGA, has added a new section to the existing US Patent Act. This entire discussion of patents in connection with space activities was drawn generally from Magdoza, *supra* note 258.

[FN261]. National Aeronautics and Space Act of 1958, [42 U.S.C. § 2452 \(1958\)](#) [hereinafter NASA Act].

[FN262]. [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 Utilization of the Permanently Manned Civil Space Station, Sep. 29, 1988, 1992 WL 466295](#) [hereinafter Intergovernmental Agreement (IGA)]. The IGA was superseded in 1998 by the Space Station Intergovernmental Agreement. See generally 1998 US Treaty Actions, [37 I.L.M. 1495](#); Partners Sign ISS Agreement (updated 11/22/99) <[http:// www.spaceflight.nasa.gov/station/references/partners/special/iss\\_agreement](http://www.spaceflight.nasa.gov/station/references/partners/special/iss_agreement)>.

[FN263]. WIPO Convention, *supra* note 230, at art. 2.

[FN264]. IGA, *supra* note 262, at art. 5.

[FN265]. Article 6 further states "The temporary presence in the territory of a Partner State of any articles, including the components of a flight element, in transit between any place on earth and any flight element of the space station registered by another Partner State or ESA shall not in itself form the basis for any proceedings in the first Partner State for patent infringement." This provision prevents, e.g., that transportation of non-US flight elements by means of a US launching system might serve as a basis for a patent infringement action. *Id.* at art. 21, para. 6.

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