RECENT QUESTIONS OF SPACE LAW

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The space adventure began on October 4, 1957 when the first artificial satellite Sputnik I was sent into orbit round the earth. A few years later, on April 12, 1961, Yuri Gagarin of the Soviet Union made the first manned space flight. On July 20, 1969, in the course of the most elaborate space mission so far, Apollo 11, the American astronauts Neil A. Armstrong and Edwin E. Aldrin became the first men to set foot on the surface of the moon. In 1971 the Soviet space probes Mars 2 and Mars 3 landed capsules on the surface of Mars, and on June 22, 1972 the unmanned Soviet space probe Venus 8 landed on Venus. The American space probe Pioneer F 10 passed within 140,000 kilometres of the planet Jupiter.

Scarcely two decades after man first broke through the denser layers of the earth's atmosphere into outer space and opened up this new field of activity, space has become a sphere of interest for the great powers, both strategically and economically, and it is being developed with the whole range of sophisticated modern technology. At the same time the emphasis in space activity has shifted from an initial phase of bold pioneering in the service of purely scientific space exploration to a new, less spectacular, phase of economic exploitation through the means of applied space technology. The central features of the present stage of development of space activities are space meteorology (weather research, weather forecasting and catastrophe warnings by means of satellites), remote sensing of the earth's resources, particularly minerals, by satellite and space communications,

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certainly the most fruitful and most advanced application of space technology[1].

The conquest of space has not only opened up new scientific and technological possibilities but has also given new dimensions both to national and to international law. Some of the reasons for this are obvious: the danger of political, military and economic misuse of the complex technology puts new meaning into the dominant question of state security and self defence. The considerable progress made in the fields of mineral exploration and telecommunications necessitates a new approach to some of the fundamental problems of international law – those of state sovereignty and the principle of non-intervention in the domestic affairs of States. There are palpable dangers from the opening up of space for the balance of the natural environment, a balance which the unrestrained growth of contemporary civilisation has so seriously threatened. Finally the ever increasing scientific, technological, cultural and economic interdependence of States requires a greater degree of international cooperation; the principle of an equitable sharing of the advantages and benefits of new technologies, once no more than a political doctrine asserted by the economically weak members of the international community, has become a more and more universally recognised requirement of State practice which helps to overcome traditional social, cultural and political differences.

The complexity and interdependence of the research efforts of individual States on the one hand, and the justified apprehension of nations on the other hand that the projection of territorial imperialism into space would be bound to lead to catastrophes of cosmic proportions, resulted in a search for new objectives in international cooperation. Happily, for the first time in the history of international law, this cooperation is characterised by the fact that it gives priority to the principle of the well-being of all States – even if only in respect of a spatially limited sphere of application – over national self interest.

I. *Sources of Space Law*

After an initial period of vigorous growth of the literature in the past decade[2], the international law of space is currently undergoing a process of codification which is without parallel in legal history. This is reflected in a considerable number of conventions, dealing both with general principles and with questions of international cooperation, some global, some regional and some bilateral in nature. There can be no viable space law

without the agreement of the two space superpowers, the United States and the Soviet Union. On the other hand, it is obvious that any legal solutions based exclusively on the excessive influence of the two nations actually engaged in space activities will sooner or later run into objections on the part of others.

1. *The Space Treaty of 1967*

The most significant contribution by the community of States to the continuing development of space law has so far been the so-called Magna Charta of Space ("Charte de l'espace et des corps célestes": Paul de La Pradelle) – the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, of January 27, 1967. The Treaty was drafted by the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and recommended to States for signature by the General Assembly as an Annex to Resolution 2222 (XXI) of December 19, 1966. It entered into force on October 10, 1967; at that date more than 90 States had signed, including the Federal Republic of Germany.

The Treaty is the fruit of the efforts of States over many years to avoid the extension of national rivalries into space from the very beginning. In recognition of the common interest of all mankind in the progress of the exploration and use of space for peaceful purposes (Preamble) it marks out the fundamental principles of international cooperation in the field of space exploration and use. These principles rank as international constitutional law and require supplementation and interpretation. It is the great merit of the Treaty to set out in positive form the views of the members of the United Nations as to what the law is, views which had been formed in the early sixties and had found expression in a number of resolutions on the subject.

The Treaty, the text of which was adopted by the General Assembly of the United Nations with no votes against and few abstentions, contains the following principles. The call for international cooperation and solidarity, sounded in general terms in the Preamble and in Article 3, finds practical expression in definite duties to provide information and to consult as well as in rights of inspection for the parties with regard to space activities (Art. 9–12). The exploration and use of space, including the moon and other celestial bodies, are declared to be the "province of all mankind" (Art. 1 (1)). The core of the whole Treaty lies in the prohibition of "national appropriation" (Art. 2), which is supplemented by a – regrettably incomplete – ban on military activities in space and on celestial

bodies (Art. 4). The principle of the international responsibility of the parties for their national activities in space (Art. 6) brings with it international liability of the parties for any damage arising from these activities (Art. 7).

The signature of the Treaty was greeted on all sides as an important step towards securing international peace and the relaxation of tension which established new milestones along the way begun by the Antarctic Treaty of 1959 and the Moscow Nuclear Test Ban Treaty of 1963[3]. The Treaty is substantially the product of an American draft and a Soviet alternative draft of June 1966[4]. Although the final version of the Treaty retains the positive features of both drafts, it does not succeed in closing the gaps which exist in them and in the earlier resolutions of the United Nations on which they were based. A welcome feature of the final Treaty is that it does not follow the American draft by limiting its application to the moon and other celestial bodies, but, in line with the Soviet draft, extends to all extra-terrestrial space. The Treaty does not purport to codify the law of space at one stroke; the promoters of the Treaty could not have laid down rules covering all eventualities in the development of space science even if they had wished. On the contrary, they took the view that, considering the lack of relevant experience and the difficulty of foreseeing future developments, an early or hasty codification could turn out later to be an unwelcome obstacle.

2. *Conventions on particular questions of space law*

The Space Treaty of 1967 marks the end of the first phase in the development of space law, during which the efforts of nations were directed towards the creation of as comprehensive a framework as possible for this new-born area of the law. A second phase of the codification of space law is marked by the conclusion of a number of conventions dealing with new problems arising from the increased activity in the exploration and use of space.

The second convention to be signed was the humanitarian Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects launched into Outer Space, which was signed on January 16, 1968. It was also drafted by COPUOS and was recommended to States for acceptance by the General Assembly of the United Nations as an Annex to Resolution 2345 (XXII) of December 19, 1967. It regulates the technical and procedural aspects of the rescue and return of astronauts following emergency landings and the return of spacecraft forced by accident or emergency to land in the territory of a foreign state or on the high seas.

The Convention on International Liability for Damage Caused by Space Objects of March 29, 1972[5] was likewise drafted by COPUOS and recommended to States for acceptance by the General Assembly of the United Nations as an Annex to Resolution 2777 (XXVI) of November 29, 1971. It is intended to remove any remaining gaps and uncertainties on the question of liability, a question which had been on the agenda of the Legal Sub-Committee of COPUOS for nearly a decade and which had received only a preliminary solution in the Space Treaty of 1967.

The new technology, which advances in space telecommunications, in particular in direct television broadcasting by satellite, had made possible, called for the creation of rules of law to provide effective protection for the industrial property rights of artists and performers. A committee of experts from UNESCO and from the World Intellectual Property Organisation produced a draft convention in 1971 governing the illicit transmission of satellite signals which became the Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite of May 21, 1974[6]. Art 2 (1) of the Convention calls on each party "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."

The most recent convention dealing with questions of space law is the Convention on Registration of Objects Launched into Outer Space of January 14, 1975, passed by the General Assembly of the United Nations as an Annex to Resolution 3235 (XXIX) of November 12, 1974. The first committee of the General Assembly had discussed the question of registration as long ago as December 1961 and Resolution 1721 (XVI) called upon States launching objects into orbit round the earth and beyond to provide COPUOS, through the Secretary General, with information for the registration of the launchings. The Secretary General has to maintain a public registry of the relevant information. The Legal Sub-Committee of COPUOS studied a French Draft Convention Concerning the Registration of Space Objects Launched into Outer Space for the Exploration or Use of Outer Space in the summer of 1968 and this formed the basis of the 1975 Convention[7].

Provisions of relevance to space law are also contained in the Moscow Nuclear Test Ban Treaty of August 5, 1963, which bans the testing and all other explosions of nuclear devices not only in the atmosphere and under water but also in space, in the Final Acts of the Geneva Extraordinary Administrative Radio Conference on the allocation of frequency bans for space communications of November 8, 1963 and in a Protocol to the Geneva Telecommunications Convention of December 21, 1959,

which allocated approximately 15 % of the whole available frequency spectrum – about 6000 MHz – to space communications. A considerable number of bilateral and multilateral treaties of cooperation regulate the planning and execution of common space research and development projects. As examples of those we may cite the treaty of April 15, 1975[8] setting up the European Space Agency (ESA), the treaty setting up the International Telecommunications Satellite Consortium (INTELSAT) signed on August 20, 1964 in the revised version of August 20, 1971, the treaty of November 15, 1971[9] establishing the Communist counterpart INTERSPUTNIK and the American-Soviet agreement on cooperation in space research and technology of June 24, 1972[10].

3. *Resolutions of the United Nations*

Although there is general agreement that resolutions of governmental international organisations do not of themselves create binding rules of international law, writers on space law are inclined to recognise that at least unanimously adopted rules of conduct on matters of space law may coalesce into binding rules of international law when they develop and apply customary rules in the process of formation which are consistent with generally recognised principles of international law and are confirmed by a general, if not necessarily universal, practice of States. Since the establishment of a new legal principle is generally translated directly into State practice, every resolution of this kind, though in itself jus imperfectum, may be turned into binding law by "sedimentation"[11].

In view of the increasing importance of the new field of space activity the General Assembly of the United Nations had set up an ad hoc Committee on the Peaceful Uses of Space as long ago as 1958[12] which in 1961 was converted into a permanent committee under the same name of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). COPUOS is divided into a Scientific and Technical Sub-Committee and a Legal Sub-Committee, and since 1958 has prepared more than 20 resolutions on matters affecting space law which have been subsequently adopted by the General Assembly. In them the United Nations stated their view of the legal principles governing man's advance into space and demanded that space should be used exclusively for peaceful purposes, as well as calling for increasing international cooperation for the benefit of mankind as a whole on the basis of the equality of all States. At first the United Nations resolutions on matters affecting space law were limited to generalised statements of policy, but gradually they progressed to the

formulation of directly applicable rules of law in the form of the Space Treaty of 1967 and the three space law Conventions mentioned.

4. *The question of international customary law of space*

Participation by member States in the space law Conventions drafted by the United Nations has been virtually universal. A great majority of States has signed the Space Treaty of 1967, the 1968 Agreement on the Rescue and Return of Astronauts and the 1972 Convention on International Liability for Damage Caused by Space Objects, all multilateral agreements of the new type of so-called open treaties; it is to be expected that participation in the Satellite Convention, open for signature since 1974, and the Registration Convention, open since the beginning of 1975, will be at a similarly high level. Nevertheless the question of the extent to which, notwithstanding the treaty provisions, certain elementary principles of space law have become established as rules of universal international customary law is not merely of theoretical interest but also of great practical importance.

Although treaties are an immediate and positive expression of the consent of States to be bound and thus are the best indication of what the law is thought to be, it must not be forgotten that since they rest on the consensus of the parties they are binding only between the parties and do not affect the rights and duties of third States[13]. By contrast, the view is gaining ground, though not yet dominant, that the binding force of rules of universal international customary law extends also to States which have not themselves followed the practice, so long as the predominant majority of States has adopted it expressly or by implication and the remaining States do not oppose it[14].

So far the space powers have put more than 3000 payloads through the denser layers of the earth's atmosphere, mostly into orbit round the earth. It is noticeable that no State has ever requested permission for its space vehicles to overfly the territory of another State. On the other hand, no nation has to date protested at the overflight of its territory by foreign space objects, so that it may be assumed that the members of the international community as a whole have given the space powers tacit consent to overfly their territory[15].

As a large number of official declarations by individual States and international organisations show, this tacit consent on the part of the community of States is never understood as an act merely of comity, but is always seen as necessary in fact and required by law (opinio juris sive necessitatis). In this connection particular importance attaches to the 20-

odd resolutions of the General Assembly of the United Nations on matters affecting space law, which have expressed with ever-increasing determination the fundamental conviction that as a matter of law space must remain free from claims to national sovereignty and be available to mankind as a whole in every State for the use and benefit of all peoples and that it must be for exploration and use for exclusively peaceful purposes[16].

It is questionable, however, whether at this moment the minimum period of time traditionally required for the creation of customary law between the commencement of the relevant usage and its consolidation as a legal principle has already elapsed so that we may properly speak of principles of customary law of space. The question continues to be controversial, although much of the heat has gone out of the debate in the literature since the entry into force of the Space Treaty. The majority view is still that insufficient time has elapsed[17]. It is submitted however that this view can no longer be supported. Even though the spontaneous or quasi-spontaneous creation of international customary law must be regarded as a contradiction in terms, nevertheless the chronological element should not be given equal value with the strength of the opinio juris expressed in a consistent usage, and the more universal, spontaneous and intensive the opinio juris, the less weight needs to be given to the time factor and the shorter the period required during which the rules in question need to have been observed in practice. Furthermore, it is necessary to take account of the fact that the pace of modern scientific, technical and cultural change no longer permits us to limit the process of creation of rules of international customary law by linking it to usage over many years in the way that was done in the past. On the contrary, the proper legal regulation of the newly developed field of space activity requires that the process of creation of new principles of law should as far as possible reflect the pace which modern progress has forced upon our lives[18].

We should therefore follow the view, which, while still a minority view, is gaining increased support, that the obviously short period of time which has elapsed since the beginning of space flight is not an objection to the existence of rules of customary space law at the present moment of time[19]. Such rules are above all to be found, it is suggested, in the principle that space beyond a limit which has yet to be determined is a free area not subject to any national claims of sovereignty or other exclusive rights (the principle of the freedom of space), and in the principles that the exploration and use of space are to be for all States in mutual cooperation for the benefit and advantage of mankind (principle of the common good of mankind and international cooperation) for exclusively peaceful purposes (principle of the demilitarisation of space)[20].

II. *The Main Features of Present Space Law*

The function of space law is to define the limits of the freedom of exploration and use of space and in space and to establish orderly rules for the conduct of such activities, on the basis of the space Conventions and the evidence of customary space law. The following matters in particular have been subjected to legal regulation: the prohibition on appropriation of space, the demilitarisation of space, the requirement of international cooperation, the question of international liability and the registration of space objects.

1. *The prohibition of national appropriation*

The prohibition of national appropriation in space and on celestial bodies, which has for some time received detailed consideration in the literature[21], has already become a general principle of international law. It was recognised as such by the general opinio juris before its adoption by the General Assembly of the United Nations in Resolution 1962 (XVIII) of December 13, 1963 (the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space) and its subsequent incorporation into the Space Treaty of 1967[22]. Article 2 is the crucial provision of the whole Treaty and reads: "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." The language is controversial and, from the point of view of legal terminology, unhappily chosen. It differs in particular from the wording of Article 4 of the Antarctic Treaty of 1959, where the prohibition is limited to the establishment of "territorial sovereignty". "Appropriation" is of course a narrower concept than that of "national sovereignty", which includes all the prerogatives of a State as a subject of international law, so that it seems questionable from a theoretical point of view to make "claim of sovereignty" into a subdivision of the concept of national appropriation as one method of acquisition.

The prohibition of national appropriation is to be understood as the antithesis of the principle of "complete and exclusive sovereignty" of States in their territorial air space which the Paris Convention on Aerial Navigation of 1919 (Art. 1) and the Chicago Civil Aviation Convention of 1944 proclaim. Article 2 of the Space Treaty can therefore only be interpreted as prohibiting the assertion of comprehensive rights of exclusion, but not every exercise of public or private powers[23]. This also follows from the fact that by Article 8 States retain jurisdiction and control over

their objects such as space vehicles or space stations and their personnel while in space or on celestial bodies. On the other hand the dividing line between the exploration and use permitted by Article 1 (2) and (3) and a prohibited appropriation "by means of use" is very imprecise and raises problems of interpretation and application which can only be satisfactorily resolved by further more detailed regulation in a future special convention.

There is unanimous recognition in the literature of the subject at the present day that the prohibition of national appropriation is not limited to a ban on rights of sovereignty, as some early writers had suggested, but embraces also private rights of ownership[24]. This broad interpretation follows from the fact that private ownership can only exist within the framework of a system of government which guarantees it – non-appropriation by virtue of private law (exclusion of proprietary rights) is therefore only the logical consequence of non-appropriation by virtue of public law (exclusion of sovereign rights). On the other hand, it also follows from a consideration of the Space Treaty as a whole, for the rules of liability in Articles 6 and 7 use the concept of "national activities" to include non-public activity. This interpretation was adopted by the Institut de Droit International at its Brussels Conference in 1963, on the recommendation contained in Gerald Fitzmaurice's report. Paragraph 1 of the resolution passed there provides that "l'espace ainsi que les corps célestes ne peuvent faire l'objet d'aucune appropriation". Fitzmaurice had further proposed that it should be made clear that space and celestial bodies "ne sont pas susceptibles d'appropriation nationale ou d'utilisation de caractère exclusif" so as to bring within the scope of the provision any use of a proprietary nature to the exclusion of third parties[25].

The Space Treaty and Resolution 1962 (XVIII) which preceded it leave unresolved the question which has been most keenly debated in the literature, namely, whether national appropriation should only be prohibited in relation to celestial bodies as such, that is in relation to the surface and subsoil, or should extend to separable parts, above all to economically exploitable mineral resources. Most writers have favoured the view that at least appropriation by consumption of mineral resources on or beneath the surface of celestial bodies should be permitted, as a means of rewarding the scientific and economic efforts of the States who bear the cost of exploration and exploitation of space by granting them the right to the fruits of their activities[26]. However, the interest of certain States in possible future economic exploitation of the mineral resources on celestial bodies resulted in the problem being deliberately shelved during the preparatory work on the Space Treaty.

The question of the acquisition and exercise of jurisdiction is one of the first raised by every extension of man's activity into a previously unknown area. Through this issue run two opposing basic principles of the international legal system, namely the sovereign power of individual States on the one hand and the collective interest of the international community on the other. The theory and practice of international law have attempted various solutions in different ages and differing power relationships. With regard to territorial occupation, classical international law has for centuries followed the principle "res nullius cedit occupanti" so that the act of occupation establishes sovereignty and enjoys the protection of international law, insofar as a sufficient government apparatus is developed, setting up a certain minimum standard of legal order internally and capable externally of discharging the international obligations of the State in relation to the territory and preventing interference by third States[27]. The international law of space has rejected the analogy of the principle of occupation, and, following the almost unanimous view of writers[28], has declined to apply the traditional concept of the acquisition of State jurisdiction. Not only has the entire body of rules of space law thereby obtained a new dimension, but the principle of non-appropriation leads furthermore to a transformation of the legal bases of the concept of State jurisdiction.

2. *The demilitarisation of space*

In the early years after the first sputnik was launched into orbit efforts were made towards securing the complete demilitarisation of space. These efforts were unsuccessful because the United States – by contrast with the Soviet Union – took the view that it was not realistic to separate the demilitarisation of space from the question of general disarmament. The General Assembly of the United Nations in Resolution 1884 (XVIII) of October 17, 1963 (Question of General and Complete Disarmament) considered only partial demilitarisation, citing the Moscow Nuclear Test Ban Treaty signed a few weeks earlier, welcomed the intention of the Soviet Union and the United States not to station objects carrying nuclear weapons or other weapons of mass destruction in space, and called upon States not to place such weapons into orbit around the earth, or to install such weapons on celestial bodies, or otherwise station them in space, and to refrain from causing, encouraging or participating in the conduct of such activities. The Moscow Nuclear Test Ban Treaty of 1963 had provided in Article 1 that the parties undertook "to prohibit, to prevent and not to carry out any nuclear weapon test explosion, or any other nuclear explosion, at any place under its jurisdiction or control in the atmosphere,

beyond its limits, including outer space; or under water including territorial waters or the high seas". The wording of Resolution 1884 (XVIII) is substantially repeated in Article 4 (1) of the Space Treaty. The non-aligned nations sharply attacked this limited demilitarisation in the discussions on the draft treaty and pressed for the inclusion of a general prohibition of non-peaceful use of space and celestial bodies. Thanks to the influence of the United States the demilitarisation clause was limited by Article 4(2) to the moon and other celestial bodies and space as such – including in particular that part of space near the earth used by satellites – was not covered.

These defective provisions of Article 4 of the Space Treaty, which can only be explained by the history of the negotiations leading up to them[29], lack the precision which lengthy legal argument has given to the remaining Articles. In some respects this had led to undesirable interpretations of the provisions. While representatives of the Soviet Union argued that launching nuclear weapons and other weapons of mass destruction into partial orbit did not constitute "placing (them) in orbit around the earth" so that the use of intercontinental missiles with atomic warheads in partial orbit would be lawful, the United States claimed that military use of space as such did not fall within the scope of the prohibition at all[30]. Both views express the military interests of the superpowers in space, seeking to guarantee the maximum possible legal protection and security for the integrity of their space undertakings. Differences of interpretation exist moreover with regard to the meaning of the terms "peaceful" and "military". Whereas Marcoff and Soviet international lawyers consider all military activity to be non-peaceful[31] – no doubt not least because the Russian language has the same word for "military" and "warlike" (voennyi) – the predominant view among Western international lawyers is that only aggressive activities are non-peaceful and therefore unlawful[32]. It is a disturbing fact that at least half the space activities of the superpowers are in the military field[33], an aspect which reduces the chances of attaining genuinely fruitful international cooperation.

The principal field of application of military activities in space may be assumed to be, though no precise evidence is available, intelligence and reconnaissance by satellite. The Americans first succeeded in launching a reconnaissance satellite in August 1960. Since its declared mission was to gather information on military activities on Soviet territory, the launching brought forth protests on the part of the Soviet Union. The American satellite espionage system has probably been operational since about 1965[34]. Today American satellites watch over the far-flung territories of the Soviet Union and China, the Middle East and North Vietnam seeking

launching sites for ballistic missiles, airbases and other military installations and registering troop movements[35]. It has been shown that, in spite of its well-known initial protests against the use of American reconnaissance satellites, the Soviet Union also uses space espionage at least with its Cosmos series[36].

In the view of the United States there is no appreciable difference between observation of a foreign country through the legally recognised means of espionage agents and observation through air or space reconnaissance: the justification in both cases is said to be the necessity for the free world to prevent surprise attacks coming from behind the frontiers of closed societies[37]. By contrast, the Soviet Union asserts that all reconnaissance and espionage activities by satellite represent a violation of principles of international law. In 1962 the Soviet Union did indeed attempt, at the General Assembly of the United Nations, to have a passage inserted in a delcaration of space law principles which would have prohibited reconnaissance activities in space[38], but it has never made an official diplomatic protest against American satellite espionage. The American view seems to be the better one, namely that space reconnaissance is contrary neither to general international law, including the Charter of the United Nations, nor to Article 4 of the Space Treaty. Espionage as such, being an indispensable accompaniment of the political and military confrontation between nations, is legally neither good nor bad. In the nuclear age it is justified by the need of States for defence and self-preservation; since surprise attacks, especially with contemporary thermonuclear weapons, can only be prevented by thorough knowledge of the enemy's potential, espionage of any kind is a sine qua non of survival in liberty and human dignity for the free world. Not least it makes an effective contribution to the maintenance of international peace[39].

The change in the nature of war during and after the Second World War and the possibility of the use of weapons of mass destruction call for new principles of international law on the duty to maintain peace and the prohibition of military force. The international law of space has strengthened the peace-keeping function of the law. Although the development of space law can be regarded as a positive sign on the way to the desired containment of military escalation, nevertheless one should not be too optimistic as to the effects of this development in the foreseeable future.

3. *Common good and cooperation*

The concept of community is still little developed in contemporary international law, although the postwar period has brought about an in-

creasing interdependence of the members of the international community in technological, cultural and economic matters. Space law to-day professes the principle of international cooperation in the Preamble and in Article 1 (3) of the Space Treaty. The rule of cooperation is spelled out in more detail in Article 9. The rationale of these provisions lies in the fact that the success or failure of the peaceful exploration and use of space depends upon whether we succeed in putting an end to existing power rivalries and acknowledge the need for a sensible system of space law[40]. The idea of cooperation and solidarity has already found expression in documents in other areas of international law – in the Charter of the United Nations and in Resolution 2625 (XXV) of the General Assembly of October 24, 1970 (Principles of International Law concerning Friendly Relations and Cooperation among States) for example – but Article 1 (3) of the Space Treaty uses it for the first time for a specific humanitarian aim, the maxim of the common good of mankind. Writers on space law have rightly emphasised that with the expressive term "province of all mankind" ("apanage de l'humanité tout entière"), difficult as it may be to handle in a legal context, international law has for the first time placed a duty on states to conduct the exploration and use of a newly opened up area for the benefit and advantage of all members of the international community without discrimination of any kind[41].

The function of the interpretation of the ideas of cooperation and community in the Space Treaty is, on the one hand, to complement the existing rules of space law with a view to their application and, on the other hand, to help establish guidelines for further codification of special areas in space law. New solutions, for example in the field of direct television broadcasting by satellite, must take proper account of the basic principles. In the opinion of most writers they have binding force in accordance with their nature as treaty provisions, notwithstanding the fact that as general principles they are not directly applicable[42].

Concrete expressions of the ideas of cooperation and world community are to be found in Article 5 of the Space Treaty and the 1968 Agreement on Rescue and Return of Astronauts which develops the Treaty in this respect. They call on the parties to give all possible assistance to astronauts "as envoys of mankind in outer space" in the event of accident, distress or emergency landing.

4. *International liability for space activities*

The Space Treaty and the 1972 Convention on International Liability for Damage Caused by Space Objects proceed on the principle of the

liability of the launching state. The doctrine of State responsibility imposes liability upon States for the acts and omissions of organs of the State and also for those of natural and juridical persons subject to their jurisdiction who, though not exercising sovereign power, are involved in the affairs and objectives of the state in some other way in the exercise of their functions[43].

The principle of international responsibility is laid down in Article 6 of the Space Treaty, by which States bear international responsibility for ensuring that their activities in space and on celestial bodies are carried out in conformity with the provisions of the treaty, regardless of whether these activities are carried on by governmental agencies or by non-governmental entities. From this principle of responsibility there follows the rule of liability contained in Article 7 of the Space Treaty, by which States Parties to the Treaty which launch or procure the launching of objects into outer space, including the moon and other celestial bodies, as well as States from whose territory or facility such launchings take place, are internationally liable for damage to other States Parties to the Treaty or their natural or juridical persons by such an object or its component parts on the earth, in air space or in outer space, including the moon and other celestial bodies[44].

The 1972 Convention completes and brings into sharper focus the general rule laid down in the Space Treaty's provisions on the nature and manner of liability. The rule is that of "strict" or "absolute" liability (Article 2), the Convention thereby adopting the principle recognised in the literature that for "ultra-hazardous activities"[45] the traditional rule of liability based on fault must give way to a purely causal liability. It is in accordance with equity, however, for the rule of absolute liability to be replaced by liability based on fault when damage is caused in a place other than upon the earth's surface to a space object of one launching State or to persons or things on board such an object by a space object of another launching State (Art. 3)[46]. The draftsmen had in mind principally the case of collision between two space vehicles of different nationality.

5. *Registration of space objects*

The registration of space objects has several purposes. It is necessary in the first place in order to assign a particular space object to a particular State, in other words to determine the nationality of the object. It further assists in the recognition and identification of space objects for example in the event of damage being caused or with regard to the rescue or return of the objects and their personnel. A distinction must be drawn between

entry in a national registry and entry in an international central registry[47]. Both the Space Treaty and the Registration Convention of 1975 are based on entry in a national registry as the normal case. This system corresponds essentially to the fundamental principle of air law contained in Article 18 of the Chicago Civil Aviation Convention of 1944. It is the starting point for the jurisdiction and control of space objects and their personnel while in space or on celestial bodies laid down in Article of the Space Treaty.

The Registration Convention raises entry in an appropriate national registry to the status of an international obligation (Art. 2 (1)). The content and other requirement of entry in the registry are determined by the State by which the registry is maintained (Art. 2 (3)). In addition to the national registries there is to be established an international registry maintained by the Secretary General of the United Nations, which is to be open and accessible to all, to record all the relevant information made available (Art. 3). Each registry State must deliver to the Secretary General certain minimum information concerning every space object registered by it, to which further information may be added (Art. 4 (1) and (2)). Some information was made available to the Secretary General even before the conclusion of the Registration Convention. While the United States reported the international markings, launch vehicle, satellite category, launch date, nodal period, inclination, apogee and perigee, the Soviet Union communicated the name of the satellite or other space object, the purpose of the launching, the launch date and the basic astronomical data (perigee, apogee and inclination)[48].

The core of the Registration Convention is the definition of space object, on which no agreement had previously been possible. The working group drafting the Convention in the Legal Sub-Committee of COPUOS had proposed a relatively detailed definition[49]. The definition in the Convention itself (Art. 1 (b)) however fails to provide the sort of guidance one would wish for. It is restricted to the statement that the term "space object" includes "component parts of a space object as well as its launch vehicle and parts thereof".

The United States and the Soviet Union have been unforthcoming in the discussions leading up to the Convention. The reasons are obvious, since roughly half the space activities of each of the superpowers is in the military field. Hence the fear among writers on the subject that contrary to the duty which the treaty may impose, the space powers may not be prepared to make public all relevant data concerning their space activities so long as there is no agreement on complete demilitarisation of outer space[50].

III. *Developing Areas of Space Law*

Following the adoption by the General Assembly of the United Nations of the text of the Registration Convention as an Annex to Resolution 3235 (XXIX) of November 12, 1974, the subjects currently under discussion in COPUOS, which we may hope will be dealt with within a few years by the drafting and adoption of appropriate conventions, are as follows: the legal status of the moon, direct television broadcasting by satellite, remote sensing of mineral and other resources, and the definition and limits of space. In the Resolution the General Assembly at the same time established the priorities for the further work of the Legal Sub-Committee of COPUOS. It is to consider the first three of the above topics first, but only start on the fourth if time permits.

1. *The legal status of the moon*

Writers on space law have considered a Convention on the legal status of the moon and other celestial bodies to be essential ever since the conclusion of the Space Treaty, since the Treaty fails to deal properly with many of the questions raised, such as the prohibition of private activities and the legal status of the mineral resources on celestial bodies[51].

In the same way as Article 1 (1) of the Space Treaty Article 4 (1) of the COPUOS Draft Moon Treaty declares the exploration and use of the moon (and other celestial bodies) to be "the province of all mankind". They are to be carried on for the benefit and in the interest of all countries, irrespective of the degree of their economic and scientific development, and proper regard should be had to the interests of present and future generations. The cooperative character of moon law (Art. 4 (2), corresponding to Art. 9 of the Space Treaty) corresponds to the duty of states to provide information about their activities in the exploration and use of the moon and other celestial bodies (Art. 4 (3) and (4) of the Draft, corresponding to Article 11 of the Space Treaty). As is already provided by Article 1 (3) of the Space Treaty, there is freedom of scientific investigation on the moon and other celestial bodies on the basis of equality of all States and in accordance with international law (Art. 5 (1) of the Draft). The freedom of scientific investigation includes in particular (a) the right of States to collect samples of minerals and other substances on the moon (and other celestial bodies) for use for scientific purposes at their discretion (Art. 5 (2); although the draft regards it as "desirable" for parts of such samples to be made available to other interested parties to the treaty it does not lay down a legal duty in this respect); (b) the right

of States to land their space objects on the moon (and other celestial bodies) or to put space objects into orbit around the moon (and other celestial bodies), as well as the right of States to station personnel, spacecraft, equipment, stations and installations on or under the surface of the moon (and other celestial bodies) or the surrounding space, insofar as the lawful activities of third States are not thereby impeded (Art. 7 (1)–(3)).

The controversial central point of the Draft Moon Treaty is formed by the prohibition of national appropriation and the provision for exploitation of the mineral resources on celestial bodies. This part of the draft has been rewritten several times. The exclusion of national appropriation in Article 10 (1) follows the corresponding provision of the Space Treaty almost word for word. However, the draft makes clear that the prohibition also extends to the acquisition of private rights of ownership on the moon and other celestial bodies (Art. 10 (2) of the draft). Accordingly every transfer or conveyance of areas or zones on or under the surface, whether for value or not, is prohibited (Art. 10 (3) of the draft), thus confirming the unanimous view of writers, that celestial bodies are res extra commercium in the Roman Law sense. Article 10 (4) of the draft, in terms which have been criticised, declares the moon and its mineral resources to be the "common heritage of all mankind". The concept comes from the law of the sea and Resolution 2749 (XXV) of the United Nations of December 17, 1970 on the legal regime of the sea-bed, and it was put into the draft at the suggestion of Argentina and the United States. The Soviet Union attacked the proposal in the committee, on the ground that the concept lacked any precise legal meaning[52].

Although the Draft Treaty does not attempt to establish an international regime for exploitation of the mineral resources of the moon (and other celestial bodies), it obliges the parties to the treaty to establish such a regime as soon as the exploitation of mineral resources becomes practically feasible. The aim of internationalising the mineral resources, which would be the work of a special international conference to be called at the appropriate time, is to secure the development and rational administration of the mineral resources as well as a just distribution of them having particular regard to the needs of the developing countries (Art. 10 of the draft).

The United Nations Draft Moon Treaty contains valuable provisions putting into practical form and clarifying the general provisions of the Space Treaty, and meets the specific needs of the exploration and use of celestial bodies. As one example we may cite the prohibition of national appropriation, which is understood in the sense of the exclusion of all claims to exclusive powers whether on the basis of sovereignty or of

private rights. A further advance in the draft is that for the first time a clear distinction has been drawn between the surface and subsoil of the moon on the one hand and the mineral resources contained therein on the other, by providing that the prohibition of national appropriation does not apply to the mineral and other natural resources of celestial bodies. Nevertheless it does not make clear how mineral resources on celestial bodies can be exploited without asserting rights of ownership or sovereignty over the surface and the subsoil[53].

2. *Space telecommunications*

Telecommunications provide the most promising application of modern space technology from the economic point of view. They include telephone communications, satellite television and the transmission of information for various purposes, among them maritime and aerial navigation. To date two communications organisations have been established: the world-wide organisation INTELSAT which is a global system of point-to-point transmission by satellite having at present over 80 members (including Yugoslavia) – the system is managed by COMSAT, a partially private company incorporated under American Law and established by Act of Congress of the United States; and the parallel communist organisation INTERSPUTNIK, to which apart from the Soviet Union eight other communist countries belong (including Mongolia and Cuba). More far-reaching plans by the Soviet Union, to have a universal satellite communications organisation established under the same name by the United Nations, collapsed in 1968[54].

The traditional method of space communications is the point-to-point transmission by which the signal is received through a ground station located close to the individual receiver and passed on by it. This transmission technique enables the receiving State, through its control of the ground stations, to exercise control at the same time over unwanted transmissions from other States. This opportunity for control disappears in the case of the legally controversial technology now being developed of "direct television broadcasting". In this system programmes transmitted by satellite can be picked up directly by the individual receiver. Direct television satellites are still at an experimental stage of development, but it is expected that they will become operational in the mid-eighties. The use of direct television satellites raises financial and organisational as well as social and cultural questions; the new technology also has implications for questions of legal liability and copyright. The fact that transmissions are taken out of the control of the receiving State gives a new perspective

to the relationship between state sovereignty and the individual right to the free flow of information across national frontiers.

As early as Resolution 1721 (XVI) of December 20, 1961, in which the United Nations declared itself to be the centre of international cooperation in the peaceful exploration and use of space, the General Assembly expressed the wish that satellite communications should be made available to the nations of the world as soon as possible on a global basis and without discrimination. Resolution 2453 B (XXIII) of December 20, 1968 called on COPUOS to set up a working group to consider questions raised by direct television broadcasting. In Resolution 2916 (XXVII) of November 9, 1972 COPUOS was instructed to draft principles governing direct television broadcasting in the form of a convention. This Resolution emphasises that direct television broadcasting by satellite should bring peoples closer together, promote informational and cultural exchange and raise the level of education, and that television should be used exclusively to serve the cause of peace and friendship among peoples. It recognises further that these technological developments could present significant problems which would make it necessary to guarantee the free flow of information on the basis of strict observance of the sovereign rights of States[55].

The discussions which followed in COPUOS on the political and legal implications of direct television broadcasting were based on working papers submitted by the Soviet Union[56], the United States[57], Canada and Sweden[58] and Argentina[59]. The Soviet draft reflects the fears of the communist States and various developing countries that they will be left behind by the rapid advance of space science and technology. It does not recognise the right to freedom of information, and argues that direct television broadcasts by satellite to the territory of foreign States should only be permitted with their express consent. It also argues that the transmission of certain types of material, for example incitements to war or material harmful to friendship between peoples, should be prohibited, and that advertisements and other commercial broadcasts should only take place by special agreement between the States concerned. The American proposals do not accept the need for prior consent. The requirement of consent is rejected by the United States principally because of resistance to the possibility of censorship by States and out of regard for the principle of freedom of information, which is in turn made the yardstick. Nevertheless, the American draft also assumes that only programmes which serve the cause of international cooperation and understanding between peoples should be legally permissible. The proposals by Canada and Sweden and by Argentina attempt to find a compromise: the principle

of freedom of information is recognised but linked with the need for prior consent. They also suggest certain limitations on programme content in direct television broadcasting. The discussions which took place on the basis of these working documents in the COPUOS working group revealed disagreement over the need for consent[60] and the question of programme content[61].

In the spring of 1975 agreement was reached on a number of points concerning direct television broadcasting, following the creation of a special Drafting Group within the Legal Sub-Committee of COPUOS and the formulation by this group of principles relating to five topics, namely the application of international law, the rights and benefits of States, international cooperation, State responsibility and peaceful settlement of disputes. The Drafting Group was compelled to restrict itself to preparing alternative drafts with regard to the controversial issues of the need for consent, including programme planning, and of programme content[62].

Parallel with the work of the United Nations, UNESCO has also considered the legal and moral issues of direct television broadcasting. The General Assembly of UNESCO passed a Resolution containing eleven Articles on November 15, 1972, which deals with the principle of freedom of information, the spread of education, the promotion of cultural exchange and the encouragement of cooperation in this field[63].

3. *Remote sensing of earth resources*

Processes of remote sensing of the earth by satellite, which are being used on an experimental basis, will probably open up new perspectives of man's knowledge of the natural environment in the years to come. The most significant application of this new space technology will be the remote sensing of mineral resources by means of Earth Resources Technology Satellites, the first of which (ERTS-1) was placed in orbit by the United States on July 23, 1972. Countries of the Third World, which depend upon the exploitation of their natural resources as a condition of their economic development, observe the progress of this work with anxiety, since until the end of the decade at least the United States will in all probability be the only country providing information on the data gathered[64].

The United Nations Organisation has been considering the question of remote sensing of natural resources since 1969. The General Assembly requested member States in Resolution 2600 (XXIV) of December 16, 1969 to make the results of their work available to other members and to give them information on this new field, and in Resolution 2733 C (XXV) of

December 16, 1970 it requested the Scientific and Technical Sub-Committee of COPUOS to set up a Working Group on remote sensing of the earth by satellite. The Working Group was established on July 13, 1971[65]; its terms of reference are principally to consider the technical and economic aspects of remote sensing, while the Legal Sub-Committee is charged with the examination of the legal implications in the light of the Working Group's findings[66].

The most important documents considered in the Legal Sub-Committee and the Working Group in 1974 and 1975 were a joint working paper by France and the Soviet Union on government activities in the field of remote sensing of the natural resources of the earth by means of space technology[67], a joint draft treaty by Argentina and Brazil on remote sensing of natural resources by means of space technology[68] and a working paper by the United States on the development of additional guidelines on the remote sensing of the natural environment of the earth from space[69]. The working documents all agree that in spite of the far-reaching possibilities for incursion into the sovereign sphere of third States the collection of data from space is permissible on the principle of freedom of space exploration. By contrast there is disagreement on the economically explosive question what rules should govern the use to be made of the information gathered.

The Working Group formulated the following guiding principles on the basis of the working documents[70]: (a) remote sensing by means of space technology must be carried on for the benefit and in the interest of mankind as a whole (the new technology is of particular importance for the developing countries in their national development plans and programmes); (b) remote sensing by means of space technology must be carried on in accordance with international law, including the Charter of the United Nations and the Space Treaty of 1967; (c) the maximum benefit for all countries can only be obtained by international cooperation in all areas, particularly on a regional basis; (d) States with remote sensing programmes should encourage international participation in them; (e) measures should be taken to promote efforts to protect the natural environment of the earth during the conduct of remote sensing by space technology. No agreement was possible on the question of the rights to the data obtained by remote sensing or on the establishment of an international authority for the co-ordination of remote sensing and the dissemination of data.

The question of who should be entitled to the data gained by remote sensing can be looked at both from a positive and from an negative aspect. The positive aspect is whether and to what extent the State obtaining in-

formation by remote sensing on the natural resources in the territory of another State should be obliged to make the information available to the latter State, to international organisations or to the public; the negative aspect is whether and to what extent the State obtaining such information by remote sensing is entitled to disseminate it without the express or implied consent of the State concerned.

4. *Definition and limits of space*

There has to date been no definition in space law of the legal concept or topographical limits of space itself as the area in which space law is applicable. Manfred Lachs commented on this: "The lack of an established frontier between airspace and outer space has not so far created any special difficulties nor has it constituted an obstacle to the formation and development of principles and rules of outer space law"[71]. We cannot, however, dispense with an authentic definition of the spatial limits of the application of international space law, since the danger would then exist that the line would be drawn solely on the basis of power politics and not in the light of a proper evaluation of the competing interests.

The United Nations have long had the question of the boundary between airspace and outer space under consideration but, because of the pressure of the military and political interests of the superpowers, they have not succeeded in producing a draft treaty. COPUOS adjourned its discussion of the question in 1959 as one "not requiring an early solution"[72]. In Resolution 2222 (XXI) of December 19, 1966 the General Assembly called on the Committee to examine the definition of space, and proposals were made as a result in the following year by France and Italy[73]. The French representative asked for the Scientific and Technical Sub-Committee to draw up criteria which would be helpful to the Legal Sub-Committee in its examination of the definition of space and to give its assessment of the advantages and disadvantages of the scientific and technical criteria. The Italian representative asked the Sub-Committee to consider whether it would be possible to establish a demarcation line or zone between airspace and outer space; to consider the height above sea level of the demarcation line or zone and whether it would be scientifically difficult or impossible to determine such a line or zone precisely, or whether it would be preferable to draw the boundary arbitrarily, without affecting the right of freedom of space and territorial security.

The Scientific and Technical Sub-Committee, in its final report, recorded its agreement "that it was not possible at the present time to identify scientific or technical criteria admitting a precise and lasting definition of

outer space"[74]. In the Legal Sub-Committee views on the definition of space at the 7th session in 1968 were so divergent that it was not possible to make any recommendation to the General Assembly[75]. In 1973 COPUOS repeated its request to the Legal Sub-Committee to examine the definition and limits of space and space activities[76].

There will scarcely be any dissent from the proposition that the legal boundary between airspace and outer space can only be clarified by an authoritative decision. The view still sometimes expressed, that any spatial separation between airspace and outer space, and any legal disinction between air navigation and space flight, is arbitrary and therefore not acceptable, seems to be irreconcilable with the 1967 Space Treaty. Charles Chaumont argued against a definition of space on these lines "puisque ce terme, dans sa généralité, exclut toute qualification ou spécification de zones"[77]. Other writers argue, taking the functional distinction between aircraft and spacecraft, that airspace and outer space should not be treated as spatial concepts but distinguished functionally, so that in Rolando Quadi's words we should free ourselves from any "complesso 'zonale' o 'spaziale', da ogni idea di localizzazione 'diretta' o 'indiretta'"[78].

On the other hand, writers are agreed that the boundary between airspace and outer space is not a scientific but a legal boundary[79]. The proposed figures for the height of the upper limit of airspace range from a few kilometres above the earth's surface up to the furthest limit of the earth's gravitational attraction in space, the so-called gravopause or satellitopause, which lies at a distance of approximately 256,000 km from the earth's centre of gravity[80]. The view has been gaining ground, and may now be regarded as generally accepted, that in view of the law-making force of international custom the upper limit of airspace cannot be placed lower than the maximum altitude of traditional aircraft, which are subject to the "complete and exclusive sovereignty" of the territorial state over which they are passing at any point of the flight[81]. On the other hand, the limit cannot be placed any higher than the lowest perigee of a satellite in orbit round the earth, if it is to be based on State practice, which has hitherto been to tolerate without objection overflight by a satellite in orbit round the earth. Any extension beyond this point would conflict with the principle of the freedom of space from claims of national sovereignty[82]. This consideration lies behind the resolution on space law passed by the International Law Association at Buenos Aires in 1968[83].

In recent years more and more writers have adopted the view that the limit ought to be set at around 80 kilometres above sea level. This altitude would on the one hand form an appropriate half way mark between the upper limit of the regime of traditional aviation and the lower limit of the

satellite regime, and on the other hand would coincide with the aerological boundary between the lower atmosphere, the homosphere (comprising troposphere, stratosphere and mesosphere) and the upper atmosphere, or heterosphere (comprising ionosphere, thermosphere and exosphere). Since it is at this altitude that the most fundamental altitude-related changes take place in the atmospheric continuum, such as rising temperature, dissociation, ionisation and diffusion, it would be appropriate to take it as the starting point for the legal distinction between the area subject to the sovereignty of the territorial state and the free area of space[84].

IV. *Conclusions*

At the opening of the 15th session of COPUOS on September 5, 1972 United Nations Secretary General Waldheim declared that the first two decades of space exploration had introduced a prosperous era of international cooperation and that the progress achieved by the international community bore witness to the process of transforming an area of potential rivalry and conflict in international affairs into a fruitful and cooperative effort for the benefit of mankind[85]. In 1968 his predecessor U Thant had expressed his regret in a memorandum to the Vienna Conference on the Exploration and Peaceful Uses of Outer Space: "The developments in space science and technology have thus far benefited most those countries which are already far ahead in the economic and social timetable of the world. The space age is increasing the gap between developed and developing areas of the world at an alarming rate"[86]. In a similar vein the conclusion drawn by space law experts from an analysis of cooperation conventions was that in spite of considerable advances in space science and technology new opportunities for strengthening international cooperation had been neglected, so that the advantages in the new area continued as before to fall to the most advanced and affluent countries[87]. In spite of the increasing degree of interdependence of international space activities and a growing convergence of the interests of the developed and the developing countries, space activities are at present and in the foreseeable future almost exclusively contained in a contest between the technical capacities of two superpowers, the United States and the Soviet Union.

Many have expressed regret and concern that the law lags so far behind the reality of the situation. One can only hope that the facts will follow the path indicated by the law when the law has been established in advance; it is essential therefore that the process of development of this new branch of international law, space law, should keep pace with the advances in science and technology. On the other hand, if the law is to be

effective it must not get so far ahead of the constantly changing factual subject-matter as to become out of touch with reality. In the view of Wilfred C. Jenks the aim in the evolution of space law should be "... to establish firmly the common interest of mankind in space and the rule of law in space before 'de facto' situations have crystallized too far to permit of any bold initiative, while avoiding crystallizing the law prematurely before enough is known of the facts to which it will apply"[88].

So far the development of space law has taken account of this view. After an initial period in which a constitutional foundation of guiding principles was laid in the Space Treaty of 1967 there followed a step by step process of concluding special conventions to fill out the basic principles in relation to particular issues of technical, economic or political importance in accordance with the needs of scientific and technical advances at the time. In this way it has been possible to establish a sensible and practical legal regime in an area characterised by rapid change.

NOTES

[1] W. von Kries, Zur Fortentwicklung des Weltraumrechts (Developments in Space Law). Zeitschrift für Luftrecht und Weltraumrechtsfragen (ZLW), vol. 23 (1974) 89 ff. (99 ff.).

[2] On this, see I. von Münch, Grundfragen des Weltraumrechts (Fundamentals of Space Law). Archiv des Völkerrechts, vol. 8 (1959/60) 151 ff.; on the definition of space law, see ibid. at 154 ff. and, for a systematic classification of the topics covered by it, 157 ff. Further literature: Alex Meyer, Der Weltraumvertrag (The Space Treaty), ZLW, vol. 16 (1967) 65 ff.; N. M. Matte, Le traité du 27 janvier 1967 et la réglementation des activités spatiales, Revue Générale de l'Air et de l'Espace (RGAE) 1968 No. 1 pp. 9 ff.; A.-B. Papacostas, Quelques remarques sur le Traité sur les principes devant régir l'activité des Etats dans le domaine de l'exploration et de l'utilisation de l'espace extra-atmosphérique, y compris la Lune et les autres corps célestes, Revue Française de Droit Aérien (RFDA) 1967 No. 2 pp. 123 ff.; A. Bueckling, Weltraumvertrag und nationale Folgegesetzgebung (The Space Treaty and consequential national legislation), ZLW, vol. 17 (1968) 225 ff.; G. Jacquemin, Le Traité du 27 janvier 1967 sur les principes devant régir l'exploration de l'espace et celui du 22 avril 1968 sur l'assistance aux astronautes, leur signification et leur portée, RFDA 1971 No. 4 pp. 257 ff.; P. de La Pradelle, La charte de l'espace et des corps célestes, RGAE 1967 No. 2 pp. 131 ff.; I. A. Vlasic, The Space Treaty, A Preliminary Evaluation, (1967) 55 California Law Review 507.

[3] Cf. Peaceful Uses of Outer Space: Assembly Adopts Three Resolutions, UN Monthly Chronicle, 1967 No. 1 pp. 34 ff.

[4] UN Doc. A/6352 and UN Doc. A/AC. 105/32 respectively.

[5] Cf. also A. Bueckling, Die völkerrechtliche Haftung für Schäden, die durch Weltraumgegenstände verursacht werden (International liability for damage caused by space objects), ZLW, vol. 21 (1972) 213 ff.

[6] See A. Bueckling, Satellitensignal-Schutzabkommen unterzeichnet (Convention signed for the protection of signals transmitted by satellite), ZLW, vol. 24 (1975) 411 ff. On the preparatory work see J.-D. Théraulaz, Propriété intellectuelle et droit de l'espace, Journal du Droit International, vol. 99 (1972) 534 ff.

[7] Report of the Legal Sub-Committee on the Work of its Seventh Session (4–28 June 1968) to the Committee on the Peaceful Uses of Outer Space in UN Doc. A/AC 105/45 (11 July 1968) Annex II.

[8] The ESA was formed by the amalgamation of the two European space organisations ESRO (European Space Research Organisation), founded by treaty of 14. 6. 1962, and ELDO (European Launcher Development Organisation), founded by treaty of 29. 3. 1962. See A. Bueckling, Bemerkungen zur organisationsrechtlichen Struktur der Europäischen Weltraumorganisation (Comments on the legal structure of ESA), ZLW, vol. 24 (1975) 106 ff.

[9] See C. Patermann, Intelsat – Neue Gesichtspunkte für die Struktur internationaler Organisationen (Intelsat – new approaches to the structure of international organisations), ZLW, vol. 21 (1972) 10 ff.; W. von Kries, Intersputnik – Sozialistisches Gegenstück zu Intelsat? (Intersputnik – a communist counterpart to Intelsat?), ZLW, vol. 22 (1973) 12 ff.

[10] Text: Astronautics and Aeronautics, July 1972, pp. 20 ff.

[11] M. G. Marcoff, Traité de Droit international public de l'espace (1973), 118.

[12] Resolution of 12. 12. 1958 (text in Archiv des Völkerrechts, vol. 8 (1959/60) 213). See I. von Münch, op. cit. 179.

[13] M. Dauses, Bestehen und Inhalt von Weltraumgewohnheitsrecht – ein Beitrag zur Lehre von den Rechtsquellen des Weltraumrechts (Formation and content of customary space law – a contribution to the study of the sources of space law), ZLW, vol. 20 (1971), 267 f.

[14] P. Guggenheim, Les principes de droit international public, Recueil des Cours de l'Académie de Droit International, vol. 80 (1952 I) 5 ff. (31). The Permanent Court of International Justice took a different view in the Lotus Case, holding that international customary law arises through the tacit agreement of States.

[15] A. Haley, Recent Developments in Space Law and Metalaw (Work of International Groups), Harvard Law Record, vol. 24 no. 2, 2nd Special Supplement (7. 2. 1957) 1 ff., at p. 2.

[16] M. Dauses, Der gegenwärtige Stand des Weltraumrechts (The present state of space law), Neue Juristische Wochenschrift (30. 1. 1973) 172 ff., at p. 175.

[17] D. Goedhuis, General Questions on the Legal Regime of Space, International Law Association (ILA) Report of the 50th Conference (Brussels), 1962, 72 ff., at p. 74; J. Verplaetse, Sur les sources du droit de l'espace extérieur, RFDA 1966 No. 3, 278 ff., at p. 286; G. P. Zhukov, Kosmicheskie polety i problema vysotnoi granitsy sovereniteta (Space flights and the problem of the upper limit of territorial sovereignty), Sovetskoe Gosudarstvo i Pravo, vol. 37 (1967) 54, at p. 62.

[18] Dauses, op. cit. (n. 13, above), 278.

[19] McDougal/Lasswell/Vlasic, Law and Public Order in Space (1963), 119 n. 245.

[20] Dauses, op. cit., 278 ff.

[21] Cf. von Münch, op. cit., 159 ff.

[22] D. Goedhuis, The Present State of Space Law, The Present State of International Law (ILA) (1974), 201 ff.

[23] Marcoff, op. cit., 650 ff.

[24] Marcoff, op. cit., 646. The same view was taken by the Belgian and French representatives in the Legal Sub-Committee of COPUOS on 4. 8. 1966 and 19. 9. 1966 respectively; cf. UN Doc. A/AC. 105/C. 2/SR. 71, p. 16.

[25] Annuaire de l'Institut de Droit International, Session de Bruxelles, vol. 50 II (1963) 93 and 362.

[26] Lafferranderie, Le régime juridique applicable aux matériaux provenant de la Lune et des autres corps célestes, Rapport introductif au Centre National pour la Recherche Scientifique (1970), 10.

[27] Cf. F.-A. von der Heydte, Discovery, Symbolic Annexation and Virtual Effectiveness in International Law (1935), AJIL 448, at 463.

[28] See von Münch, op. cit., 168 ff.

[29] On the various drafts by the USA and the USSR see UN Doc. A/C. 1/SR. 821 (14. 1. 1957), p. 41 ff. and UN Doc. A/C. 1/SR. 828 (25. 1. 1957), p. 82 ff. The final draft proposed by the USSR provided for a categorical duty of States to use space, including celestial bodies, exclusively for peaceful purposes, whereas the American alternative draft merely called upon States to use the celestial bodies peacefully: UN Doc. A/6352 (16. 6. 1966) and UN Doc. A/AC. 105/32 (17. 6. 1966).

[30] J. Verplaetse, Autour de l'article IV du Traité de droit cosmique du 27 janvier 1967, RGAE 1968 No. 1, pp. 45 ff.; M. G. Marcoff, Sur l'interprétation juridique de l'article 4 du Traité régissant les activités spatiales des Etats, RGAE 1968 No. 1, pp. 30 ff.

[31] Marcoff, op. cit., 39 ff. Also against the artificial distinction between "peaceful – military" and "peaceful – aggressive" – S. Gorove, Some Thoughts on Article IV of the Outer Space Treaty, Proceedings of the 13th Colloquium on the Law of Outer Space (International Institute of Space Law of the International Astronautical Federation) 1970, pp. 79 ff.

[32] Alex Meyer, Der Begriff "friedlich" im Lichte des Vertrags über die Grundsätze zur Regelung der Tätigkeiten der Staaten bei der Erforschung des Weltraums, einschließlich des Mondes und anderer Himmelskörper (The term "peaceful" in the light of the treaty on principles governing the activities of States in the exploration of space, including the Moon and other celestial bodies), ZLW, vol. 17 (1968) 111 ff.; Alex Meyer, Die Auslegung des Begriffs "friedlich" im Lichte des Weltraumvertrags (The interpretation of the term "peaceful" in the light of the Space Treaty) (expanded version), ZLW, vol. 18 (1969) 28 ff.

[33] Thus, in particular, B. Lovell, The Great Competition in Space, Foreign Affairs, October 1972, 137.

[34] M. Dauses/D. Wolf, L'espionnage par satellites et l'ordre international, RGAE 1973 No. 3, 283 ff.

[35] P. G. Klass, Military Satellites Gain Vital Data – U.S. Reconnaissance

Effort Yields Precise Information on Soviet, Red Chinese Strategic Weapons after Trouble-Filled Beginning, Aviation Week & Space Technology 15. 9. 1969, 55 ff.

[36] Dauses/Wolf, op. cit., 285.

[37] S. T. Possony, Reconnaissance in Time Perspective, Open Space and Peace – A Symposium on Effects of Observation (ed. Ossenbeck/Kroeck, The Hoover Institution, Stanford University, 1964) pp. 15 ff., at 31; W. R. Kintner, The Problem of Opening the Soviet System, Open Space and Peace, op. cit., at 112 ff.

[38] UN Doc. A/AC. 105/L. 2 (10. 9. 1962).

[39] Dauses/Wolf, op. cit., 295; Q. Wright, The Prevention of Aggression (1956) 50 AJIL 514; McDougal/Lasswell/Vlasic, op. cit., 433; Jessup/Taubenfeld, Control of Outer Space and the Antarctic Analogy (1959), 217 ff.

[40] Cf. C. Q. Christol, The International Law of Outer Space (1966), 258, arguing for a "principle of reasonableness" as a source of space law.

[41] Marcoff, op. cit., 14.

[42] Marcoff, Implementing the Contractual Obligation of Art. 1, para. 1 of the Outer Space Treaty 1967, Proceedings of the 17th Colloquium on the Law of Outer Space, 1974.

[43] A. Bueckling, Die völkerrechtliche Haftung für Schäden, die durch Weltraumgegenstände verursacht werden (International liability for damage caused by space objects), ZLW, vol. 21 (1972) 213 ff.

[44] A. Bueckling, Die völkerrechtliche Haftungsklausel des Weltraumvertrages (The liability clause in the Space Treaty), ZLW, vol. 17 (1968) 3 ff.

[45] Cf. the doctrine of ultra-hazardous activities developed by the American Law Institute for activities of an extremely dangerous nature where the possibility of harm being caused to others cannot be excluded even by taking the greatest possible care: 99 Corpus Juris Secundum, paras. 519/520.

[46] On space liability in general: J.-D. Théraulaz, Le projet de Convention sur la responsabilité internationale pour les dommages causés par des objets spatiaux – Résultat des travaux du sous-comité juridique des Nations Unies, RGAE 1971 No. 3, 267 ff.; Bueckling, op. cit. and Völkerrechtliche Verantwortlichkeit internationaler Organisationen auf dem Gebiet der Weltraumforschung (Legal responsibility of international organisations in the field of space exploration), NJW (1969) 953 ff.; M. Bodenschatz, Einige Bemerkungen zum Weltraumpflichtabkommen der Vereinten Nationen aus der Sicht der Luftfahrtversicherung (Some comments on the United Nations space liability convention from the perspective of aviation insurance), ZLW, vol. 22 (1973) 67 ff.

[47] Bueckling, Bemerkungen zum Weltraumregisterabkommen (Entwurf) (Comments on the (draft) Space Registry Convention), ZLW, vol. 24 (1975) 4 ff.

[48] Isabella Diederiks-Verschoor, The United Nations and the Registration of Spacecraft, Proceedings of the 13th Colloquium on the Law of Outer Space, 1970, 142 ff.

[49] "The term 'space object' means a physical object, manned or unmanned, launched into space for purposes of exploration and use of outer

space, including the Moon and other celestial bodies. This term includes the launch or transport vehicle, whether recoverable or not, as well as the payload or artificial satellite to be placed in an outer space trajectory." See UN Doc. A/AC. 105/C. 2/L. 45.

[50] G. Gál, Space Law (1969) 211.

[51] C. Horsford, The Need for a Moon Treaty and Clarifications of the Legal Status of Space Vehicle, Proceedings of the 9th Colloquium on the Law of Outer Space (1966) 48 ff.

[52] Question of the Common Heritage of Mankind in UN Doc. PUOS/C. 2 (XII) WG. 1/Working Paper 7 (28. 3. 1973).

[53] G. Gorove, Legal Status of the Natural Resources of the Moon and Other Celestial Bodies, Proceedings of the 16th Colloquium on the Law of Outer Space (1973) 177 ff.

[54] UN Doc. A/AC. 105/72 (11. 12. 1969).

[55] See Dauses, Die Frage der Informationsfreiheit auf dem Gebiet der Fernsehdirektübertragungen durch Satelliten (The question of the freedom of information in the field of direct television broadcasting by satellite), ZLW, vol. 23 (1974) 272 ff.; Dauses, La télévision directe par satellites et le droit international, RGAE 1973 No. 4, pp. 380 ff.

[56] Draft of 9. 8. 1972 and working paper "Draft Principles Governing the Use by States of Artificial Earth Satellites for Direct Television", UN Doc. A/AC. 105/WG. 3 (V)/CRP. 1 and Corr. 1, reprinted in Annex II to UN Doc. A/AC. 105/127.

[57] "Draft Principles on Direct Broadcast Satellites", UN Doc. A/AC. 105/WG. 3 (V)/CRP. 2, reprinted in Annex IV to UN Doc. A/AC. 105/127.

[58] Joint working paper of 2. 5. 1973, UN Doc. A/AC. 105/VG. 3/L. 4, reprinted in Annex III to UN Doc. A/AC. 105/127; UN Doc. A/AC. 105/C. 2/L. 102.

[59] Working paper of 5. 7. 1974, UN Doc. A/AC. 105/WG. 3 (V)/CRP. 3, reprinted in Annex V to UN Doc. A./AC. 105/127; UN Doc. A/AC. 105/134.

[60] The overwhelming majority of the delegations emphasised the necessity for prior consent and the demand for a voice in the control of programming as part of the consent requirement. Only a minority of States supported the view that a rule requiring prior consent in every case would be contrary to the principles of the free flow of information and exchange of ideas.

[61] The question of programme content is closely bound up with that of prior consent. Whereas the proponents of the need for consent wanted an international programme code laying down the conditions under which consent would be granted or withheld, opponents of the consent requirement saw the code as a suitable instrument for filling the gap in regulation created by the lack of an internationally recognised procedure for effective control of television broadcasts by the receiving State. There was agreement, however, that broadcasts inciting to war and harming international peace and also those constituting an interference in the internal affairs of other States were in any event contrary to international law: UN Doc/AC. 105/127, paras. 49, 50.

[62] UN Doc. PUOS/C. 2 (XIV)/Add. 3 (4. 3. 1975).

[63] Declaration of Guiding Principles on the Use of Satellite Broadcasting for the Free Flow of Information, the Spread of Education and Greater Cultural Exchange – UNESCO, Final Acts of the General Conference, 17th Session, Paris, 7 October – 21 November 1972, vol. I, Resolutions-Recommendations No. 4.111; Text in UNESCO Doc. 17 C/76 (21. 6. 1972) Part II.

[64] Implementation Requirements for an International Regional Data Storage and Dissemination Centre for Earth Resources Satellite and Related Data (Report by the Secretariat) in UN Doc. A/AC. 105/137/Add. 1; see Marcoff, L'étude des resources terrestres par des objets spatiaux et le droit international, RGAE 1972 No. 4, pp. 343 ff.; Dauses, National Sovereignty and Remote Sensing of Earth Resources by Satellites, Proceedings of the 16th Colloquium on the Law of Outer Space (1973) 121 ff.; Dauses, Rechtsprobleme der Fernerkundung von Bodenschätzen durch Satelliten (Legal problems of remote sensing of mineral resources by satellite) (summary) ZLW, vol. 23 (1974) 60 ff.

[65] Draft Report of the Scientific and Technical Sub-Committee on the Work of its Eighth Session in UN Doc. A/AC. 105/C. 1/L. 42 (13. 7. 1971) para. 15.

[66] Report of the Scientific and Technical Sub-Committee on the Work of its Ninth Session in UN Doc. A/AC. 105/102 (15. 5. 1972) Annex I, Summary of the Preparatory Session of the Working Group on Remote Sensing of the Earth by Satellites, May 1972, 1 ff.

[67] UN Doc. A/AC. 105/C. 2/L. 99.

[68] UN Doc. A/C. 1/1047.

[69] UN Doc. A/AC. 105/C. 2/L. 103.

[70] UN Doc. PUOS/C/ 2/(XIV)/1/Add. 5 (5. 3. 1975) para. 7.

[71] M. Lachs, The Law of Outer Space (1972) 58.

[72] UN Doc. A/4141 (14. 7. 1959) 93 ff.

[73] International Cooperation in the Peaceful Uses of Outer Space, UN Doc. A/6804 (27. 9. 1967) Annex III 73 ff.

[74] Op. cit. 3–4.

[75] Report of the Committee on the Peaceful Uses of Outer Space, UN Doc. A/7285 (1968) 136; UN Doc. A/AC. 105/C. 2/SR. 80–83.

[76] UN Doc. A/AC. 105/PV. 120–130.

[77] C. Chaumont, La Résolution de Bruxelles de l'Institut de Droit International sur le Droit de l'Espace, Revue Belge de Droit International, vol. 1 (1965) 15 ff.

[78] R. Quadri, Introduzione al diritto cosmico, Atti del Primo Convegno Nazionale di Diritto Cosmico 13 ff.; Similarly J. Sztucki, Problemy prawne kosmosu (English summary) (1965) 161.

[79] Dauses, Die Grenze zwischen Luftraum und Weltraum als Gegenstände rechtlicher Regelung (The boundary between airspace and outer space as objects of legal regulation) (Doctoral Dissertation, Würzburg) (1969) 255 ff.; Dauses, Die Grenze des Staatsgebietes im Raum (The limit of State territory in space) (1972) 99 ff.; Alex Meyer, Rechtsprobleme des Weltraums – ein Beitrag zur UN-Weltraumkonferenz in Wien (14.–27. 8. 1968) (Legal problems of space – a contribution to the UN Conference on Outer Space in Vienna, 14–27 August 1968), ZLW, vol. 18 (1969) 10.

[80] Thus G. Rinck, Recht im Weltraum (Law in space) ZLW, vol. 9 (1960) 191 ff., at 196; J. Verplaetse, International Law in Vertical Space (1960) 143.

[81] Art. 1 of the Paris Declaration 1919; Art. 1 of the Chicago Convention 1944.

[82] Goedhuis, The Present State of Space Law, 238; to the same effect the three zone theory of John C. Cooper, who wishes to insert a contiguous zone between airspace subject to territorial sovereignty, which would end at the upper limit of air navigation, and free space, beginning at the lowest level of satellite flight: J. C. Cooper, Legal Problems of Upper Space, Journal of Air Law and Commerce, vol. 23 (1956) 308; High Altitude Flight and National Sovereignty (1951) 4 ICLQ 411 and Rechtliche Probleme des Weltraums, ZLW, vol. 5 (1956) 171.

[83] Report of the 53rd Conference of the ILA (Buenos Aires) (1968) 22: "That the term 'outer space' as used in the Space Treaty of 1967 should be interpreted so as to include all space at and above the lowest perigee achieved by the 27th January 1967, when the Treaty was opened for signature, by any satellite put into orbit, without prejudice to the question whether it may or may not later be determined to include any part of space below such perigee."

[84] Thus, especially the non-Kármán Primary Jurisdictional Boundary Line at an altitude of 275,000 feet (approximately 83 km) proposed by the former President of the International Astronautical Federation Andrew G. Haley: A. G. Haley, Space Law and Government (1963) 75 ff.; also in favour of 80 km the Draft Code of Rules on the Exploration and Uses of Outer Space of the David Davies Memorial Institute of International Studies (Art. 1), p. 5; Dauses, Die Grenze des Staatsgebiets im Raum (The limit of State territory in space) 99 ff. and 106.

[85] Report of the Committee on the Peaceful Uses of Outer Space, UN Doc. A/8720 (1972) 13.

[86] Note by UN Secretary General U Thant, UN Conference on the Exploration and Peaceful Uses of Outer Space (Vienna 14.–27. 8. 1968), UN Doc. A/AC. 105/L. 44.

[87] Goedhuis, op. cit., 203, citing Ivan Vlasic.

[88] W. C. Jenks, Space Law (1965) 303.