

**Report of the 34th Colloquium on the Law of Outer Space**  
**Montreal, Canada, 5-12 October 1991**

The 34th Colloquium on the Law of Outer Space and its first session were opened on Tuesday 8 October 1991 by *Dr. N.M. Matte* (Canada) as a representative of the host-country of the IAF Congress and a Director of the IISL. He welcomed the participants in the Colloquium, the first since 1976 to be held in North America and the first ever to be held in Canada. He also elaborated on the close interrelation of the IISL and the IISL Colloquia with the McGill Institute of Air and Space Law, of which many alumni could be found among the IISL members. Finally, *Dr. Matte* expressed his special thanks to long-time IISL President, now President Emeritus *Prof. Dr. I.H.Ph. Diederiks-Verschoor* (Netherlands) for her important role in the organization of the IISL Colloquia.

Then *Prof. Dr. I.H.Ph. Diederiks-Verschoor* took the floor and thanked *Dr. Matte* for his kind words. She also commemorated *Dr. Subrata Sarkar* who had passed away in the previous year. A moment of silence was taken.

*Judge Manfred Lachs* (Poland), as president of the IISL, introduced *Prof. S. Gorove* (USA) as the Chairman of the first session. *Mr. F.G. von der Dunk* (Netherlands) acted as Rapporteur. In his opening speech, *Prof. Gorove* dwelt on the importance of the topic of the session, which was "Definitional issues in space law". There are some fundamental issues in space law which are still unresolved as to their precise definition and interpretation. Some of those issues had already arisen from the very beginning of space law. As examples thereof he enumerated the notions of "space object", "launching" and "procurement". Later on, the notions of "space debris" and "passengers" on board spacecraft required definition.

The first paper was presented by *Prof. Dr. K.H. Böckstiegel* (Germany), on "The terms 'Appropriate State' and 'Launching State' in the Space Treaties - indicators of state responsibility and liability for State and private activities". The practical importance of defining those terms is obvious, as States, as much as private enterprise, need to know the principles according to which responsibility and liability are to be attributed. The two terms are often used inconsistently, although at least in space law a distinction was made by creating an Article VI in the Outer Space Treaty on responsibility, and an Article VII in the Outer Space Treaty, plus a Liability Convention, to deal with liability. After analysis of Article VI and VII, their history and background, and such issues as national activity and procurement, *Prof. Böckstiegel* concluded that definitions of 'Appropriate State' and 'Launching State' can hardly be said to have been elaborated to a workable extent, and a lot of work remains to be done in this respect.

The second speaker on "Review of definitional issues in space law in the light of development of space activities" was *Dr. He Qizhi* (China). He started by stating that basically, law should follow scientific and technical development in stead of vice versa. Therefore, in developing law a balance must be found between doing it "too fast" and "too slow". *Dr. He Qizhi* then discussed three categories of definitional issues. The first consisted of definitions that are incomplete, such as those concerning "space object", "astronaut" and "common heritage of mankind". The second category dealt with definitions which are inadequate from a practical point of view, such as the one of "launching State", whereas the third comprised new terms to be defined. An example of the latter was "space debris".

*Prof. Dr. V. Kopal* (Czechoslovakia), as the third speaker, spoke on "Issues involved in defining outer space, space object and space debris". The first problem of defining "outer space" arose when the possibility of activities in outer space became a reality. As a consequence, the issue of delimitation arose, because it became important to provide for a special legal status of the area in order to allow for such activities, whereas it was not clear to what area such status would or should apply. *Prof. Kopal* proposed to solve the issue by taking the lowest possible perigee of orbiting satellites as the downward borderline of outer space, since that lowest possible perigee will not change in the foreseeable future, despite technological developments. In regard of the second problem concerning "space object", the speaker suggested to distinguish three types of space objects to begin with. He called them "space debris", "space stations" and other "space objects". This led him to the third problem of "space debris", and in this respect *Prof. Kopal* suggested to elaborate a definition distinguishing "real" space debris from non-functional space objects and component parts of a space object.

The fourth speaker was *Dr. W.B. Wirin* (USA), who dealt with "Space object and space debris", and the relation between those two notions. He preferred a pragmatic approach to the definitional problem, and cited as an example how the "definition" of "space object", although incomplete and vague, had developed. The term, as used in especially the Outer Space Treaty and the Liability Convention, directly related to the fear of non-spacefaring States in those times of incurring damage caused by de-orbited or wrecked spacecraft. In other words: "space debris" was only important for them as far as there was a real danger of damage, i.e. if the space debris was large enough to pose such risks, and therefore only space objects and their component parts (or launch vehicles or their component parts) qualified as space debris. In another sense as well, "space debris" was considered to be too limited as a term, as it did not include all elements of contamination, such as biological, chemical or nuclear contamination. According to *Dr. Wirin*, these latter sorts of contamination pose a larger problem in the future than "traditional" debris. Thus, the need for a (more comprehensive) definition of "space debris" was made very clear.

Next, the paper of *Prof. Bin Cheng* (UK) was summarized by the *Chairman*. The paper dealt with "Space object and astronauts". The author provided a very comprehensive definition of "space object", covering all objects launched by humans into outer space. In this regard, he proposed to establish a clear borderline between air space and outer space, for example at 96, 110 or 130 kilometres above the Earth. In his opinion, "space object" covers functional and non-functional objects, as well as all things on board, including debris and refuse. As to "astronaut", *Prof. Cheng* suggested a definition covering all who travel to outer space; where "personnel" was already seen as encompassing all persons on board a spacecraft, that term had better be changed into "all persons on board" to avoid confusion.

Then, *Prof. Dr. V.S. Vereshchetin* (USSR) summarized the paper by *Dr. G. Silvestrov* (USSR) on "The definition of 'appropriate state'". The author explained that the most likely interpretation of "appropriate state", the central element of Article VI of the Outer Space Treaty, would be that of "State of nationality", as the nationality of the entity undertaking activities in outer space is of paramount importance. However, he conceded that such an interpretation would not be complete and precise, and he pointed at the possibility of (additionally) covering activities as if "appropriate State" read "launching State". By way of conclusion, *Dr. Silvestrov* suggested a twofold approach. With regard to the launching phase, where launching is indeed the most fundamental link with one State or

another, it seemed logical and consistent to interpret "appropriate State" as "launching State" for the purpose of apportioning international responsibility under Article VI of the Outer Space Treaty. With regard to the post-launching phase however, the jurisdiction of the registration State of the object involved in the activities or undertaking them should be exclusive, and that State should be the "appropriate State" under Article VI.

Since he had to leave the Colloquium early, *Hon. E.R. Finch* (USA) was allowed some time by the chairman to present his paper on "Future space commercialization and space debris". He stated that the problem of "space debris" was indeed a serious one; he even called it a "universal killer of outer space benefits for all". For this reason, he considered it necessary to conclude a new space debris treaty by 1994 or 1995, after the conclusion of a UN working group study which should presently be undertaken. This study should shed more light on the definition of "space debris", if it would not indeed have to formulate such a definition. The speaker then entered into the relationship between the notions of "space debris" and "space object", dealt with the uselessness of freedom of use and exploration of outer space if the debris problem would not be solved and finally urged all nations to look forward when dealing with those issues.

Finally, *Judge M. Lachs* (Poland) provided his thoughts on the general topic of "Definitional issues". As an example, he pointed at the importance of precise definitions of issues as "province of all mankind", "interests of all countries" and "common heritage of mankind", as in for instance Article I of the Outer Space Treaty and Article 11(1) of the Moon Agreement. These definitional issues have far-reaching consequences for deriving benefits from the outer space venture, since such definitions, as well as others, help to identify objects and subjects of the law, and help to juridically interpret the behaviour of persons and States. As the 25th anniversary of the conclusion of the Outer Space Treaty is very near, this provides for a moral obligation now to expand upon that very comprehensive Treaty, and to fill its loopholes in order to keep it operable and workable for many more years. All this, while taking due care of the context in which the space treaties and the definitions involved operate.

During the ensuing *discussion*, *Dr. H. Safavi* (Iran) noted that a definition of "outer space" is indeed important, and referred to his proposal of thirty years earlier to establish a definite boundary of 110 km, irrespective of perigees or other technical criteria.

*Prof. Dr. C.Q. Christol* (USA) provided a historical, a philosophical and a practical remark. Historically speaking, he noted a growing trend towards more specificity in legal terms, which was reflected in the discussions on "definitional issues". As a philosophical note, he remarked that making of definitions first and foremost amounted to making choices. From a practical point of view, definitions were necessary both in respect of more or less tangible "things" such as "debris", "space object", "responsibility" etc., and in respect of clearly intangible "things" such as "province of all mankind" and "common heritage of mankind". Finally, he suggested that apart from UNCOPUOS, there might be other institutions such as the ILC which could become involved in dealing with the definitional problems.

The last intervention was made by *Dr. L. Perek* (Czechoslovakia). He noticed a certain evolution in the understanding of what constituted "space debris". Whereas it first seemed to point to "fragments" of whatever kind, it now seems to focus more on aspects of "uncontrolability". He argued strongly in favour of legal definition following these practical and scientific understandings, in this respect as well as elsewhere.

Finally, the *Chairman* closed the session after concluding that the time seemed very ripe to elaborate on the key notions discussed. He expressed the hope that the International Institute of Space Law would meet those challenges, or at least sincerely contribute to their solution.

The second session of the Colloquium dealt with "Legal aspects of settlements on the Moon and Mars". *Prof. Dr. N.M. Matte* (Canada) was the Chairman, and *Mr. J.S. Thaker* (South Africa) was the session's rapporteur.

The *Chairman*, in opening the session, made mention of the Moon landing of 1969, and the excitement that followed. He also mentioned the American 'Space Exploration Initiative', and noted that the political will and technology exist. What remains to be done, he concluded, is to continue the idea of the Lunar Development Agency and to seriously consider the International Mars Mission Final Report produced by the 1991 session of the International Space University in Toulouse. He then turned the session over to that afternoon's speakers.

The first presentation was made by *Ms. M. Ulrich* (USA) and concerned a paper entitled "Transition of control and jurisdiction over space settlements", which she had co-authored with *Prof. H. DeSaussure* (USA). *Ms. Ulrich* described the manner in which orderly transition of power and government from earth-based sources to planetary communities could be achieved. She warned that the "state of registry" notion which currently determines jurisdiction and control over persons and property in outer space, and which is rooted in state sovereignty and territorial acquisition, will lead to chaos if applied to future space settlements. It is natural, she said, that as space habitation becomes routine and permanent, bonds of inhabitants of these settlements will weaken and hence the extension of (diverse) national laws to outer space will be less justified. Ultimately, a universal code governing space settlements established by an international agency will be required for orderly governance. During the age of transition an international supervisory agency will be needed to ensure that earth's diverse legal regimes are not transported into outer space. A trusteeship, an international corporation, etc. could be formed in this regard.

*Mr. M. Hintz* (Germany) spoke next on "Environmental aspects of settlements on the Moon and Mars: planetary protection". After briefly acquainting his audience with the history of planetary protection, he listed the possible risks that manned missions could cause to the Lunar and Martian atmospheres and to the ecosystem of, and possible life on, Mars. A detailed look at the current status of the law with respect to this matter, i.e. art. IX of the Outer Space Treaty, was then made. The speaker concluded by making suggestions on planetary protection for the future.

*Dr. C.C. Okolie* (USA) then presented his paper on "International law principle of jurisdiction in regard to settlements of humankind on the Moon and Mars". The 1980's saw the rise of space commercialization and privatization, with legislation being passed in the US and various European countries to protect the activities of their domestic companies in outer space. *Dr. Okolie* did not doubt that intensive commercial activities will be linked to human settlements on the Moon and Mars. He argued that, from a commercialization and privatization viewpoint, claims to space resources, inventions made in outer space and other rights may be made on the ground of jurisdiction 'in personam' and jurisdiction 'in rem', and that although such claims in outer space have been forbidden by the Outer Space Treaty, it will be necessary for jurisdiction to be re-examined because of the problems posed by commercial activities. The speaker then entered into a detailed discussion on the interpretation of jurisdiction 'in personam' and 'in rem', and debated the concept of domicile and resi-

dence on space stations and/or settlements. In concluding, he urged for the development of new rules to regulate space living, and he emphasized the fact that stations and settlements will give us the opportunity to develop one universal language, culture and civilization.

*Mr. C. Rebellon Betancourt* (Colombia) followed with his talk on "Legal aspects of settlements on the Moon and Mars". He began with a detailed look at the principles of the Outer Space Treaty, placing emphasis on the liability principles. He discussed within the context of the Treaty the concept of the common heritage of mankind and the important question of jurisdiction. He proposed that one single law ought to regulate human activities on the celestial bodies and on space stations, listing the constitutional principles of Lunar and Martian settlements.

The title of the paper of *Dr. H. Safavi* (Iran) was the same as that of the previous speaker. However, his paper was broader in nature, including a discussion on the purposes of settlements on the Moon and Mars, and the importance of the protection of the environments of these bodies. He examined the legal aspects of such settlements in detail, placing emphasis on matters like the freedom of exploration, the registration of space objects, Art. 11 of the Moon Treaty, and also touching upon the topic of jurisdiction. To conclude, he made note of the various benefits that these settlements could bring to earth and he called for the conclusion of a new international convention concerning the settlement on celestial bodies, so as to guarantee the peace, security, progress of science, education and better social and economic life for humans.

The final speaker in this session was *Dr. P. Sterns* (USA), who presented the paper she had co-authored with *Dr. L. Tennen* (USA) and which was entitled "Legal aspects of settlements on the Moon and Mars: international legal infrastructure and environmental considerations". The speaker laid out the basic concepts of the planetary environmental policy. She underlined the fact that in our exploitation of the Moon or Mars, we must understand the role of life, and take precautions against destroying extra-terrestrial life. Missions should be conducted having due regard for these pristine environments. In our environmental efforts, we must pool intellectual and financial resources. The speaker discussed principles of environmental protection in the "corpus juris spatialis" and, in closing, examined the needs of the inhabitants of space settlements for self-government and autonomy.

The *discussion* period that followed the presentations was largely taken up by the issue of "universal language, culture and civilization" on space stations and settlements that *Dr. Okolie* had referred to in his speech. Also, time was spent on the discussion of the right to self-determination of space settlements, which was compared to terrestrial situations. Furthermore, the discussion focused on the interdisciplinary approach that was required to successfully determine the laws that should govern such settlements. Here, various non-lawyers took part in the debate, which was widely appreciated by the lawyers. *Prof. H. Almond* (USA), *Ms. J.I. Gabrynowicz* (USA), *Mr. M. Duke* (USA), *Mr. M. Ashkenazi* (USA), *Mr. F. Smith* (UK) and *Lt. Col. F.K. Schwetje* (USA) participated in these deliberations.

The third session of Thursday 10 October was intended to deal with "Legal implications of nuclear power for satellites", but due to the large number of papers scheduled for the Friday session on "Other legal subjects" it was decided that some of these papers would be presented during the present session. The session was chaired by *Prof. Dr. K.H. Böckstiegel* (Germany) and *Ms. P.M. Meredith* (USA) was the Rapporteur.

Four authors presented papers on the topic "Legal implications of nuclear power for satellites". In her paper entitled "The legal regime of nuclear power satellites: a problem at the crossroads of nuclear law and space law", *Mme. S. Courteix* (France) discussed nuclear-powered satellites in the context of nuclear law and space law. She considered the application of legal principles from both of these two bodies of law with respect to the prevention of accidents or incidents involving nuclear-powered satellites, emergency measures and crisis management, and compensation for damages.

The remarks of the three remaining authors focused on the United Nations draft principles on the use of nuclear power sources in space. This item had been on the agenda of the Legal Subcommittee of UNCOPUOS for over a decade under the heading "Elaboration of Draft Principles Relevant to the Use of Nuclear Power Sources in Outer Space". In his paper "The use of nuclear power Sources in outer space: a set of United Nations principles", *Dr. V. Kopal* (Czechoslovakia) provided a historic perspective and discussed recent developments regarding these principles. He noted that when the conclusion of the work on these Principles seemed imminent at the 28th session of the COPUOS Scientific and Technical Subcommittee in New York in 1991, the USA chose to reopen the discussions about Principle 3, which sets forth criteria for safe use of nuclear power sources in space.

*Ms. Y Lodico* (UN) suggested that the proposed US changes would "strengthen the principles". In her paper "Developing legal principles for the safe use of nuclear power sources in outer space" She noted that also the International Atomic Energy Agency (IAEA) had proposed that Principle 3 be reconsidered. IAEA recommended that the dose limitation specified in Principle 3 be changed to reflect the current exposure recommendations of the International Commission on Radiological Protection (ICRP).

*Dr. A.D. Terekhov* (UN) focused on Principle 8, which deals with international responsibility for activities involving nuclear power sources in space. In his paper, entitled "International responsibility for using nuclear power sources in outer space - reflections on the text adopted by COPUOS", he pointed out that the principles, when they are adopted, will not be legally binding. This presents a problem, he argued, since "international responsibility arises only in the case where an international legal norm is violated".

The papers on "Other legal subjects" which were presented during this session had been divided into three general categories: space environmental issues, space commercialisation and satellite communications.

*Dr. J.F. Galloway* (USA) started the discussion on space environmental issues with a paper entitled "Protecting the Ozone layer: the 1990 London revisions to the Montreal Protocol". Referring to his previous papers presented before the IISL dealing with the Vienna Convention for the Protection of the Ozone Layer (1985) and the Montreal Protocol (1987), Dr. Galloway focused his attention this time on the 1990 London revisions to the Montreal Protocol. He offered an interdisciplinary analysis of these revisions, including perspectives from science, technology, politics, economics and ethics.

*Mr. S. Hobe* (Germany) presented a paper on "Space debris: a proposal for its international legal regulation". He proposed an international agreement for the protection of the outer space environment to be elaborated within COPUOS. His proposal was prompted by the fact that the current legal regime does not adequately deal with the problem of space debris.

*Dr. D. Popescu* (Romania) agreed that current international law does not provide sufficiently for the protection of the space environment and she also proposed a new convention. Her paper on "The draft convention on global environment protection and outer space conservation" elaborates on what the ingredients of such a convention might be.

Further, on the issue of the inadequacy of international law, *Dr. B.A. Hurwitz* (Canada) dealt with "An international compensation fund for damage caused by space objects". He noted that the Liability Convention does not provide any mechanism to ensure the actual payment of claims pursuant to the Convention. Several of the major launching States do not have the funds to compensate the victims. Therefore, *Dr. Hurwitz* proposed the creation of an international compensation fund, to which launching states would contribute, and from which victims would receive compensation.

The discussion on the topic related to space commercialization began with the presentation by *Prof. T. Kosuge* (Japan) of his paper "An international regime for effective use of space resources - radio frequency spectrum and Geostationary orbit". *Prof. Kosuge* proposed to establish an "international regime of tax on utilization of space resources, radio frequency spectrum and Geostationary orbit". He suggested that the tax revenues could be used for the development of telecommunications infrastructures in developing countries.

The presentation of *Prof. P.B. Larsen* (USA) focused on the protection of security interests in satellites. His paper entitled "Creditors' security interests in satellites" noted that the protection of security interests in satellites is complicated by the fact that satellites are in contact with many legal systems. He recommended that COPUOS commence work on amendments to the Registration Convention, or, alternatively, that the UN Committee on International Trade Law (UNCITRAL) or UNIDROIT prepare a new convention establishing a legal regime for the protection of security interests in satellites.

In her paper on "Risk allocation provisions in commercial launch contracts", *Ms. P.L. Meredith* (USA) discussed the results of a comparison she had made of risk allocation provisions of five commercial launch contracts. She concluded that a remarkable similarity exists among the risk-sharing arrangements adopted for the contracts compared.

On the topic of satellite communications, *Mr. P.H. Tuinder* (Netherlands) discussed the European Space Agency's (ESA) Olympus direct broadcast satellite project in the context of the ESA Convention. In his paper "ESA and the development of space law - the Olympus programme" which he had co-authored with *Dr. O. Ribbelink* (Netherlands), *Mr. Tuinder* suggested that an issue may be raised as to whether Olympus was in accordance with ESA's mission, namely to research and develop space technology. He noted that the technology upon which Olympus was based was already mature, as evidenced by the fact that France and Germany launched their own direct broadcasting satellites.

*Dr. M.L. Smith* (USA) presented his paper on "Legal and policy developments in international satellite communications". The paper surveyed recent and upcoming developments within the International Telecommunication Union (ITU), including the World Administrative Radio Conference (WARC) scheduled for 1992. *Dr. Smith* also discussed Tongasat's attempt to lay claim to radio frequencies and orbital positions through the ITU registration process for 31 satellite networks. He referred to what he called "innovative action" by the International Radio Frequency Board, which led Tonga to cancel all but six of the satellite networks that had been the subject of advance publication for Tongasat.

In the *discussion*, several comments were directed at *Prof. Kosuge* and his proposal for an international tax on the use of the Geostationary orbit and associated frequencies.

*Dr. D. Popescu* (Romania) suggested that the tax might conflict with the "freedom of use of outer space" - a cardinal principle of international space law.

*Dr. M.L. Smith* (USA) noted that the economic impact on space operators might be severe.

*Dr. A.D. Terekhov* (UN) took issue with a statement by *Dr. Hurwitz* in his presentation that the Liability Convention provided the legal framework for settling the dispute concerning the "Cosmos 954" accident. *Dr. Terekhov* argued that the settlement between Canada and the USSR had been reached outside the Convention, since the Soviet Union denied that "damage" was caused within the meaning of the convention.

*Prof. Dr. C.Q. Christol* (USA) made an observation with respect to the nature of the orbit and spectrum resources. The notion that these resources are limited, he said, presupposes that science and technology are "closed universes", which they are not. In the sense that technological advances are possible and likely to occur, it may be more appropriate to characterize the orbit and spectrum as "unlimited resources".

*Ms. J.I. Gabrynowicz* (USA) disagreed with the statement by *Mr. Tuinder* that the Olympus project fell outside the ESA mission.

*Dr. M. Bourély* (France), formerly ESA's Legal Adviser, supported her and argued that Olympus fell within the purposes of ESA as stated in its Convention.

*Mr. F.G. von der Dunk*, in commenting on *Dr. Smith's* paper, suggested that Tongasat's attempt to lay claim on orbital positions in excess of its needs was nothing but "smart entrepreneurship". *Dr. Smith* disagreed. From a broader perspective, he contended, the Tongasat filings presented a "grave danger" to the integrity of the ITU regulatory system, which relies on the good faith of nations.

After these interventions, the *Chairman* closed the session.

The last session of the Colloquium dealt with the remaining topics falling under the general heading "Other legal subjects". The session was chaired by *Dr. V.S. Vereshchetin* (USSR) and *Dr. B. Schmidt-Tedd* (Germany) was the Rapporteur.

*Dr. R.S. Jakhu* (Canada) was the first speaker to present his paper, which was entitled "Space debris in the geostationary orbit: a matter of concern for the ITU". *Dr. Jakhu* emphasized the growing problem of space debris in the geostationary orbit and discussed possible procedures and policies to remove dead satellites. Up till now, only 30 to 35 satellites have been deliberately removed at the end of their useful life. At the 1985 ITU Space WARC some states advocated a compulsory removal. Later, the CCIR recommended the establishment of clear guidelines and information on how satellites may be safely removed. The author felt that the ITU is the most appropriate international organization for the settlement of debris problems in the GSO and proposed extra efforts to pursue this issue in the CCIR. Non-binding resolutions and recommendations of the ITU might be a first step towards an international treaty.

Next, *Dr. W.B. Wirin* (USA) presented his paper on "US policy on launches by the People's Republic of China". He elaborated on his ideas about the general US policy as established by the Reagan administration. This policy consisted of a prohibition for the People's Republic of China to provide launch services to Western satellites. The Bush administration had made an exception to his rule by allowing the export of the AUSSAT-satellite in 1990.

*Dr. L. Haeck* (Canada) explained that research and ballistic missile defense and related systems are areas of vital interest to Canada, and that the Canadian military must be capable of monitoring events closely and of advising the government. His paper "Space law in military academies in North America" set out that recent operations in Iraq had demonstrated the unprecedented degree to which space systems have become integrated in day-to-day battlefield operations. Strategic analysts should not only be familiar with the potential use of most space technology, but also with the space treaties. Space law is already part of the curriculum of several military academies in North America, and Dr. Haeck gave an overview of the Canadian activities in this respect.

*Prof. G. Catalano Sgrosso* (Italy), in her paper on "Non-discriminatory access of sensed states to data and information obtained by remote sensing", reflected upon the relation between on the one hand the principle of exploration and use on a non-discriminatory basis, and on the other the principles of sovereignty and non-interference in the internal affairs of other states with regard to remote sensing. A special problem in view of the distribution of information is the fact that many states have, either in part or totally, entrusted private entities with remote sensing activities. Of special interest are Principles X and XI of UN Res. 41/65 on remote sensing, which deal respectively with the protection of the earth's natural environment and the protection of mankind from natural disasters. Both principles establish the obligation to transmit relevant data to the states concerned. Despite the vagueness of the term "information", *Prof. Catalano Sgrosso* interpreted it so as to refer to both processed and analyzed data. These principles confirmed, in her view, the theory on the creation of an "aerospatial functional environmental system", which denies the necessity of a distinction between air space and outer space, affirming the singleness of aerospace.

In his paper entitled "Air and space transit: international law and space law: clarification of law and policy", *Prof. C.Q. Christol* (USA) outlined the need to establish separate legal principles applicable to aerospace planes next to the mature legal systems which govern the activities of aircraft and space objects. He observed that the considerations regarding such a regime either favour a unique legal regime or distinguish between sovereign air space and free outer space. These considerations are based on two different theories, viz. the functional theory and the spatial theory. The author argues that although the functional theory with the formulation of one single legal regime may be acceptable for traditional space objects and the space shuttle, they are not for a hybrid spacecraft such as the aerospace plane; the "unitary perspective" cannot meet the needs of a vehicle with dual capabilities. *Prof. Christol* distinguished between two allocative criteria to determine whether to apply air law or space law: (1) the intended purpose of the hybrid vehicle, and (2) the effects of hybrid vehicular activity. Since purpose or effect will be the critical determinates in identifying the specific legal status, it will not be necessary to rely on functional or spatial considerations, and furthermore this approach would allow for full reference to existing international space law.

*Ms. J.I. Gabrynowicz* (USA) talked about "Space law and feminist jurisprudence" and explained that she used the term "feminist jurisprudence" in a large sense, addressing issues of interrelatedness of humans among themselves and with the planetary ecosystem. She felt that the information age has too little consideration for human aspects, the ethic of care and the ethic rights. Nevertheless, she demonstrated that the space treaties incorporate care ethic values. As an example, she mentioned Intelsat, which provided various countries with affordable access to satellite communica-

tions long before they would have been able to develop their own capability. At present, the Mission to Planet Earth is the largest 'care ethic space activity'.

Next, the rapporteur of this session, *Dr. B. Schmidt-Tedd* (Germany) presented his paper "Data Sharing Agreement for the German Spacelab D-2 Mission - a new approach for protection of intellectual property rights in scientific cooperation" which he wrote with *Dr. K. Kreuzberg* (Germany). He presented this agreement as a practical example of how to protect publication rights by self-selected procedures during an open cooperation and data sharing. The practical background is the cooperation on human physiology experiments during the D-2 Mission. The Agreement comprises three different relations: the inter-Agency relation, Standard terms between Agency and Investigators and a joint declaration of the investigators. The basic concept has as key-elements a Data Sharing Plan and a Data Publication Plan. During a period of projected publication, each investigator of the group has the exclusive right to publish the results of his experiment. Finally, the author discussed the similarities and differences between the period of protected publication and the principle of prior access according to the new ESA Rules concerning information and data.

*Prof. F. Lyall* (UK) reflected on the question "Space law: what law or which law?" and pointed out that space law is an area classification and not a traditional category of law. It involves matters of public, private and commercial law, e.g. insurance, copyright, safety control, launch contracts etc. Private international space law hardly exists but there is a well developed set of laws and regulation of space activities in the United States that serves as a model for many international activities. *Prof. Lyall* compared this situation with the development of the law of the sea, which was largely dominated by English law. Nevertheless he saw the need for a truly international forum for the discussion and standardization of space law practice, at least for the very practical commercial space activities. This matter should in his view be forwarded to UNCITRAL, before too many different approaches are adopted by various jurisdictions.

The next paper was presented by *Prof. P.M. Martin* (France), on "Legal consequences of the lack of French space legislation". His starting point was the liability situation for launches from the Guyana Space Center. Originally, according to an agreement of 1976 between ESA and France, ESA has priority in the use of the launch pads and therefore ESA guaranteed France against liability claims. In 1980 the Declaration on Ariane arranged for Arianespace to carry out the launches and for the French government to bear the cost of any liability notwithstanding art. 13 of the Guyana Space Center Agreement. Claims for compensation either fall under the Liability Convention or under French municipal law. Special procedural questions arise when French law is applicable. Whether an administrative tribunal or a civil court is competent may make a big difference for the settlement of space business cases; a decision of the "Tribunal des Conflits" may take several years. Therefore, *Prof. Martin* urged for national space legislation in France which would make civil courts competent for space law disputes.

*Mrs. T. Masson-Zwaan* (France) presented the paper she had written with *Mr. W.W.C. de Vries* (Netherlands), entitled "The establishment of a legal regime for the exploitation of the natural resources of the Moon and other celestial bodies: when and how?" In order to determine how the natural resources of the moon should be regulated, the speaker compared two other areas, the deep seabed and Antarctica, where natural resources also exist. Regarding the seabed, as an alternative to the unsuccessful Law of the Sea Convention, eight developed nations signed the Provisional Understanding Regarding Deep Seabed Matters. This agreement does not have a system of control over

nations not party to the agreement, and access and non-interference are assured only among eight states. Concerning Antarctica, a Minerals Treaty was adopted in 1988, but subsequent environmental disasters led to a political climate of agreement that Antarctica should be preserved for future generations. The treaty has been replaced by a new instrument which forbids all exploitation activities for a period of fifty years. On the basis of the lessons learned from these analogies, the authors proposed two approaches for the establishment of an exploitation regime. On the one hand, a universal solution does not seem impossible and the speaker provided some details on how to achieve it. On the other, a small-scale agreement among like-minded parties similar to the agreement for the deep seabed could work well, of course avoiding the problems encountered there. The authors conclude that the universal approach fulfils the main purposes of the regime as laid down in Article 11 par. 7. The small-scale approach, although it does not directly violate international space law, fails to comply with some of its underlying principles.

*Mr. M. Rothblatt* (USA) talked about "Low earth orbit satellite communications systems" and outlined the institutional and regulatory issues arising from the use of new low earth orbit (LEO) systems since Geostar Corp. inaugurated the first commercial LEO communications satellite early 1987. In contrast to geostationary satellites which operate for a single region, LEO systems have global activities; therefore an internationally coordinated legal regime is necessary. A series of proposals for new LEO systems followed. The third wave of proposals were designed to operate near the microwave frequency, to provide normal cellular-phone type telecom service anywhere in the world. Those proposals raise unique institutional and regulatory issues because of their interference with traditional telecom services. Nevertheless, the author felt that there would be no way to enforce any kind of restriction for long.

In his paper "Gun launch to space: international policy and legal considerations", *Mr. M. Potter* (USA) presented the technology and application of "Gun launch to space" (GLTS) against the recent background of the destruction of the supergun in Iraq. Space guns are typical "dual use" technology that can be used either for military or for civilian/commercial applications. One military application for GLTS would be the rapid launch of reconnaissance and communications satellites. A civil application could be the supply of expendables such as air, fuel and water to the space station. A controversial commercial proposal has recently been put forward, calling for a UN structure of nuclear waste disposal. The proposed applications raise a number of space law issues, such as liability concerns or potential pollution. An essential question for *Mr. Potter* was whether or not developing countries should be supported by the development of such space gun technology. Despite the bad experience of military abuse by Iraq, the author supported the free access of developing countries to such inexpensive space projects; the contrary could be a discrimination in the sense of Art. 1 of the Outer Space Treaty.

*Lt. Col. F.K. Schwetje* (USA) gave an overview of the US legislation to implement the Missile Technology Control Regime (MTCR) agreed upon by a number of space-faring nations. His paper "US legislation to implement the Missile Technology Control Regime" explains that the purpose of the guidelines is to limit the proliferation of nuclear weapons and missile technology by controlling transfers of technology. MTCR established two categories of equipment and technology: category I items are those systems capable of delivering at least a 500 kg payload to a range of 300 km or more. The transfer of those items will be authorized only when enumerated government to government assurances are given and the recipient government assumes responsibility that the item

is put only to its stated end-use. Violations of MTCR as implemented by the US Export Administration Act of 1979 and the Arms Export Control Act, are punished by Presidential sanctions such as denial of licenses. Similar sanctions exist for foreign persons importing such technology. Therefore, the author concluded that both domestic and foreign corporations should be aware of the high risks for their business in case of violation of MTCR rules.

The next paper dealt with "United Nations peacekeeping in the age of ballistic missile defense". Its author, *Mr. G.P. Sloup* (USA) described different initiatives against the proliferation of ballistic missile technology and weapons of mass destruction and especially the peacekeeping role of the UN and its instruments. The Gulf war has demonstrated the increasing risk of proliferation of longer-range ballistic missiles to third world states or sub-state political entities. At the same time there is renewed hope that the UN could maintain international peace and security through effective collective measures. Export control laws can always be violated; therefore, *Mr. Sloup* believed that direct UN peacekeeping activities would be more effective. After an overview of the past and present UN peacekeeping missions, he analyzed the differences between Chapter VI and VII of the UN Charter. Chapter VII has never yet been invoked in its entirety. This led to peacekeeping operations as "holding actions", forming a bridge between the voluntary dispute resolution techniques of Chapter VI and the enforcement techniques of Chapter VII. The author concluded that the concept and legal basis of UN peacekeeping is not incompatible with ballistic missile defence operations.

*Prof. Sybesma-Knol* (Belgium) presented a paper on "Delimitation and outer space: a conceptual approach". She explained that the word "and" in her title refers to questions about effective control and management of the areas concerned. There are several definitions about the recognition of authority over areas which belong to nobody. *Prof. Sybesma-Knol* mentioned the Las Palmas and the Eastern Greenland case. However, fundamental changes have taken place, since some 25 years ago the international community started to formally designate certain areas (the deep seabed, outer space) as "res communis" in the sense of the common heritage of mankind. The important consequence is that the international community assumes the exercise of effective control and continuous authority. With regard to outer space, the fundamental question is whether current space law meets this condition which is necessary for the international community to retain its legal title over outer space. The author said that such is not the case until now. She recommended that the international community soon begins to fill this legal void in order to safeguard the concept of "common heritage" for outer space.

The last speaker in the session was *Mr. F.G. von der Dunk* (Netherlands), who presented his paper on "Liability versus responsibility in space law: misconception or misconstruction?". Art. 6 of the Space Treaty refers to responsibility, whereas art. 7 deals with liability. The author indicated that it is surprising to see that two of the authentic treaty languages - French and Spanish - have only one term for these two notions. His analysis leads the author to the conclusion that the traditional construction of the two concepts in general international law is a misconstruction. A further point in *Mr. von der Dunk's* presentation was the proposal of the ILC according to which the term "liability" should be used exclusively for acts not prohibited as such under international law. This would draw a clear borderline between cases where responsibility is involved and those involving liability. The author however concluded that the proposed matrix remained semantics and created a misconception. In space law, the liability concept as a whole does not conform to the above matrix, but rather to the traditional concept of international liability. The author proposed a simplifying option. Liability

should become part of the principle of state responsibility. By making liability a sub-principle of responsibility it would become applicable only once responsibility has been found to be involved.

Before the discussion, the floor was given to *Mr. P.H. Tuinder*, Secretary of the *European Centre for Space Law*, who gave an overview of this Centre's past and future activities. He mentioned that a publication about national space agencies is in preparation and that the current research project of the Centre deals with intellectual property rights.

In the *discussion* which followed the numerous presentations of this fourth session, *Prof. Dr. K.H. Böckstiegel* (Germany) pointed out that in his view the session on "Other legal subjects" was most stimulating and interesting. It provided an occasion to present a number of different subjects related to practical space business. He therefore suggested to maintain such an open subject in the sequence of the sessions. With regard to the presentation of *Prof. Lyall*, he agreed with the proposal to make use of the UNCITRAL mechanisms to develop model contracts for at least the commercial and practical Law of Space. UNCITRAL has been quite successful in some areas of international commercial law. Nevertheless, he would recommend to combine the know-how of both UNCITRAL and UNCOPUOS.

*Dr. C.C. Okolie* referred to the presentation of *Prof. Christol* about air and space transit. He felt that the theory about the two "allocative criteria" was timely and logical. In his view it was equally contributory for the development of air and space law to recognize the concept of practicality of the claim of jurisdiction advanced by C.W. Jenks, who argued that "any projection of territorial sovereignty into space beyond the atmosphere would be inconsistent with the basic astronomical facts". On the question of "functional jurisdiction", *Dr. Csabafi*, in his book on "The concept of State jurisdiction in international space law" had argued that "functional jurisdiction" is premised on the right of a State in international law to regulate rights of persons, or property of things, events and occurrences in designated zones. Thus, *Dr. Okolie* observed that these theories and concepts are generally carried out by legislative, executive and judicial measures to the extent and for the period of time that is necessary to safeguard and secure the rights of states to explore and exploit the benefits of air and outer space.

Referring to the presentation of *Dr. Sloup*, *Dr. Okolie* added that the UN Security Council did invoke Chapter VII of the UN Charter in regard to the war against Iraq. *Dr. Sloup* replied that - regardless of the factual support of the UN Security Council - the Iraqi war had not been a UN intervention in the sense of Chapter VII of the Charter.

Hereafter the *Chairman* closed the session and the 34th Colloquium on the Law of Outer Space. The 35th Colloquium will be held during the International Astronautical Congress in Washington DC, USA, from 28 August to 5 September 1992.\*

*Tanja L. Masson-Zwaan\*\**

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\* Information about the Colloquium, the session topics and the procedure for the submission of papers can be obtained from the IISL Secretariat, 3-5 rue Mario Nikis, 75015 Paris, France, tel. 33-1-4567 4260, fax 33-1-4273 2120.

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