

Report of the 35th Colloquium on the Law of Outer Space
Washington, USA, 28 August - 5 September 1992

The 35th Colloquium on the Law of Outer Space was opened on Tuesday 1 September 1992. The colloquium was well attended, and the overall quality of the papers was impressive. It was particularly appreciated that the *IAF President, Dr. A. Azcarraga* (Spain), made a statement during one of the sessions. This intervention was significant because it meant that the contribution by the legal specialists of the IISL is considered important for space technology in general and IAF Congresses in particular. *Dr. Azcarraga* stated that it was important for the IAF Congress to include interactions between lawyers and other social scientists and the scientific and engineering communities. He identified two areas in which the law of outer space needs to be clarified. First, there needs to be greater legal certainty about where air space ends and outer space begins. Second, legislation should facilitate space activities in a positive and safe manner.

Another important feature of this colloquium was the "Special Event" which had been organized by the Association of US Members of the IISL. The event consisted of an excursion to the Library of Congress and the US Supreme Court, but most importantly, it hosted the first IISL Space Law Moot Court Competition. The problem dealt with the rescue and return of a non-functioning satellite, liability for damage and competing ownership claims. The competition was judged by three distinguished members of the International Court of Justice, viz. Judge G. Guillaume, Judge S. Schwebel, and of course the IISL President, Judge M. Lachs. The winning team consisted of *Mr. S. Alexandrov* and *Mr. T.H. Cohen*. The IISL Board of Directors has decided to continue the IISL Moot Court Competition in the future, and work has begun to organize the 1993 competition at the next IISL Colloquium in Graz, Austria.

The topic of the first session of the Colloquium was "Emerging and future supplements to space law, specifically in the context of the International Space Year". *Prof. C.Q. Christol*(USA) was the Chairman, and *Ms. R. Trinder*(USA) acted as Rapporteur.

Mr. H.H. Almond, Jr. (USA) dealt with "Standardized Terms And Conditions For The Strengthening Of International Law Relating To Activities In Outer Space". Noting the important goal of developing a legal framework for achieving community goals with respect to outer space and promoting the value of human dignity, he proposed the introduction of standardized contracts as a further means to multiply the effectiveness of the law and to make the law (whether municipal or international) effective in both municipal and international tribunals.

"The Developing US Law of Liability Applicable to Launch Agreement Parties" was the title of the paper by *Mr. R. Bender* (USA). Reminding listeners that federal or state courts in the US ordinarily will apply choice of law principles and apply the law of the state with the most significant contacts with the transaction, the author noted that so long as losses involve the parties to the launch agreement and involve personal rather than property damage, launch exculpatory and waiver provisions will probably be enforced under the Commercial Space Launch Act. He recommended that for all parties to a launch agreement to be satisfied, all relevant risks (including the risk of canceled launches) should be identified, risks should be allocated specifically, and foreseeable losses should be insured against.

In his paper on "Developing a System of Dispute Settlement Regarding Space Activities", *Prof. Dr. K.H. Böckstiegel* (Germany) began by outlining existing dispute settlement instruments, while commenting that they are few in number and largely ineffective, the latter due especially to the lack of binding third party settlement. Thereafter followed an extensive listing of the criteria for the development of a dispute settlement system, designed to avoid a merely academic and unrealistic effort. *Prof. Böckstiegel* also examined the different factors that might apply in the case of disputes between states as compared with disputes involving private enterprises only.

Prof. H. DeSaussure (USA) argued in his paper entitled "The New Age of Discovery and the Changing Structure of Space Law" that, as outer space and the celestial bodies open up to industry and commerce and to a new migration of adventurers, space law also must adapt and

change to meet the demands for law and order which will follow. Noting that plans for bases on Mars and the Moon are already being made, Prof. DeSaussure suggested that space law must evolve from general principles to more detailed and universal rules to accommodate and facilitate an expanding population in outer space. Recommending close examination of traditional concepts of sovereignty and statehood, nationality and territoriality, he urged that these concepts be tested for their value in at least the following areas: the status of the individual in outer space; the status of the celestial community; and the role of the nation state in governing these new and unique space communities.

"Expanding Space Law into the 21st Century" was the subject of *Dr. Eilene Galloway's* (USA) paper. In identifying the trends that are likely to shape the future of space law, she first examined the impact of the achievements of the last thirty-five years, commenting on the convergence of circumstances that expedited early space exploration and the peaceful use of space. Having specified eight of these factors, she went on to note that two incentives for future space developments are currently dominant: non-profit space exploration to increase our knowledge of the Universe, and commercial enterprises undertaken solely for profit. Dr. Galloway warned that we must now find solutions to legal problems created by tensions between international co-operation and competition, space exploration and commercial enterprises, reduced funding, and choices between space development and other social values. She recommended that the IISL provide leadership by (1) appointing a committee to define the fundamental guiding principles of space law in a document that has overriding features similar to the US Constitution, perhaps a "Code of Conduct of Space Activities"; (2) planning a series of case studies on the legal aspects of space applications that involve policy and program issues; and (3) appointing a committee to study and report on methods used by states to co-ordinate national and international space laws.

Mr. G. Ganzkow (USA) then addressed "The Role of the Spaceport Florida Authority in the Development of Co-operative International Arrangements". His thesis was that the creation of legal relationships and innovative laws concerning the space industry nationally and internationally are more likely to arise now at the state level in the US than at any time in the past. The author described the activities of the Spaceport Florida Authority as it develops research and co-operative studies agreements with agencies of the Mexican government and space research organizations in Mexico. He also examined the impetus that prospective federal legislation have given to these agreements and the support they are likely to provide for space-based research and exchanges between Florida and Mexico when enacted. Mr. Ganzkow suggested that the activities of individual US states are likely to become more significant in the development of space law and legal relationships as federal budget difficulties continue and space industry developmental functions become more decentralized.

The next paper was called "Some Basic Concepts and Terms in International Space Law: toward a Clarification of Issues and Policies" and had been prepared by *Prof. S. Gorove* (USA). Setting himself the goal of determining whether some of the basic concepts and terms set forth in the five international space treaties need clarification and, if so, whether such clarification might serve as possible future supplements to international space law, Prof. Gorove attempted to clarify some of the significant issues and policy considerations centered on the notion of "space object" and associated with these space treaties. Discussing, *inter alia*, the definitions and meaning of "space debris", "launch", "space object", "extraterrestrial resources" and "space objects landed on the Moon", Prof. Gorove urged that the need for, and nature and extent of, basic terms and concepts in international space law should be undertaken by scientists, lawyers and policymakers in an interdisciplinary effort at the highest level.

Ms. V. Garshnek (USA) presented her paper on "Biojuridics and Astrolaw: an Updated Application to Social Law and Legal Theory". She explored the possible biomedical and psychological foundations of astrolaw and discussed the validity of their application to social and legal theory in light of the information gained since the publication of Robinson's 1975 book "Living In Outer Space". Noting that "astrolaw" is the body of law that governs human relations in space and the principles of social order flowing from the unique natural requirement of human

space existence, and that the jurisprudence that relates to the biological foundation of human values is known as "biojuridics", the paper discussed, *inter alia*, space flights effects on humans, and the need to address the complications of medical practice in space. Ms. Garshnek concluded that as more humans venture into space, theories of astrolaw will be further tested, that the progressive technology and improved ability to live in space for extended periods will necessitate a new jurisprudence, and that physiology, medicine and sociology will become tools of that jurisprudence.

Then, *Prof. P. Larsen* (USA) reported on the development of "Cross Waivers of Liability". Noting that the ongoing development of a new principle in space law, namely that the parties to an activity in outer space who stand to benefit from that activity shall share the risk of the activity, he discussed cross waivers in various instruments of space law, e.g. the US Commercial Space Launch Act and the Space Station Agreement, as well as a new NASA Rulemaking concerning cross waivers of liability during space shuttle operations and ELV program launches. Prof. Larsen commented that the practice of using cross waivers is spreading, and that we are likely to see them used even more widely in the future.

Drawing on history, and in particular on the efforts of explorers such as Lewis and Clark, Pike, Gagarin, Shepard and Aldrin, *Prof. R. Lawrence* and *W. Sadeh* (USA) reminded how valuable resources on earth frequently have been too quickly privatized following their discovery in their paper on "US Natural Resource Law - a Model for Space Law", and urged that as commercial space activities expand, we should look carefully at our space resources and develop sound frameworks for their protection and use.

Prof. Dr. P. Malanczuk (The Netherlands) made "Some Remarks On The European Community And Outer Space Activities" and noted that only recently the EC had become engaged in the attempt to formulate a coherent European space policy in a broader perspective and to define its role in this process vis-à-vis ESA, EUTELSAT, EUMETSAT and other relevant factors. Remarking on the paucity of literature on this subject, he provided a general framework for future development, describing the steps taken so far by the EC towards a coherent space policy, the present state of affairs, and selectively presenting a research interest as to the new role of the EC Commission and international trade aspects of outer space activities.

The following speaker was *Prof. P. Martin* (France), whose paper was called "Legislator versus Interpreter: How far is it Necessary to Supplement Space Law?" He argued that for space lawyers, the issue now is whether to keep space law as it is, and to trust the interpreters who will have to deal with future disputes, or to try to adopt new texts which ought to be increasingly sophisticated in order to avoid confusion and misunderstandings. He discussed the respective roles of legislator and interpreter, explaining the contributions that each has played in the development of the law to date. While taking no position as to whether we should trust the law to the interpreters or the legislators, Prof. Martin urged space lawyers to reflect and give due consideration to the choice.

"Spacecraft Motion Management (SMM): Institutional and Legal Frameworks" was the title of *Ms. P. Meredith's* (USA) paper. She reported that with space technology proliferating and the interest in the use of space for civil, military and commercial purposes increasing, the notion of "spacecraft motion management" is taking on new significance. As used in her paper, "SMM" refers to the adoption, implementation, and/or enforcement of laws, regulations, policies, and customary practices concerning the location, motion, and disposal of spacecraft and their component parts in the Earth orbital environment. She used the term "spacecraft" in the broad sense, encompassing satellites and launch vehicles, regardless of whether they are operational. Ms. Meredith noted that several international organizations and US domestic agencies have SMM responsibilities, but commented that the existing frameworks are still very rudimentary, with relatively few requirements or restrictions applicable with respect to trajectories, orbits, and disposal of spacecraft or their component parts. Thereafter she (1) set forth a listing of the institutions with SMM responsibilities, describing their functions and jurisdictional foci; (2) outlined applicable public international law and US domestic law; and (3) concluded that in order

for an SMM regime to evolve in an organized fashion, co-ordination among US regulatory agencies is imperative.

Using a case study of INTELSAT as the basis for his proposition, *Mr. M. Potter* (USA) described the history of international satellite organizations in his paper on "International Satellite Organizations: from Monopoly to Cartel", noting the recent shift to a cartel-like structure and the current debates as to the wisdom of this shift.

Dr. O. Ribbelink (Netherlands) described "The End of the Cold War and the Prospects for the Settlement of Space Law Disputes" and gave an overview of the developments that have occurred since 1987 in connection with the former Soviet Union's shift towards the acceptance of compulsory jurisdiction, also explaining the background to their earlier rejection of this principle. Factors enumerated as contributing to the earlier rejection included historical, ideological, practical and legal/doctrinal. He then posed the question of how the end of the Cold War can be of influence on the prospects for the peaceful settlement of space law disputes, concluding that such agreements will now be easier to reach. Finally, Dr. Ribbelink suggested that additional Protocols to existing treaties could perhaps be more easily reached than a completely new and general treaty, and he urged that efforts be made on an expedited basis to take advantage of the present economic climate, reminding that there are no guarantees that the Cold War has ended permanently.

Mr. D. Ribeiro (Portugal) discussed "Portuguese Space Related Legislation" and described the various pieces of legislation that have developed or are developing in Portugal that may affect Portugal's role in the international space community. Among other matters, he discussed the 1988 National Defense Institute Study, the Ministry of Planning's Policy Statement, and factors influencing Portugal's decision to join ESA.

In his paper on "Legal Issues Raised by the Possibility of Near-Earth Asteroids Colliding with Earth" *Mr. G.P. Sloup* (USA) remarked that the scientific community has begun to take seriously the possibility of an asteroid or comet colliding with Earth and causing widespread death and destruction. Such an asteroid or comet, he noted, is called an "Earth-crossing asteroid" (ECA) or a "Near-Earth Object" (NEO) because its orbit crosses Earth's orbit, posing the potential for a collision with Earth. He posited that credible scientific evidence exists to support the theory that such events have happened at various times in Earth's past, with the larger asteroids causing mass extinctions of plant and animal life. He argued that such an event happening now could seriously affect human life and society, even if the asteroid were not large enough to cause mass extinction, and that a formal worldwide detection effort should be undertaken.

Dr. A. Terekhov (Russia) began his presentation on "International Liability for Damage caused by Space Objects with Nuclear Power Sources on Board" with an outline of the history of current law on the important issue of international liability for damage caused by space objects, noting, *inter alia*, Article VII of the Outer Space Treaty, the Liability Convention, and the COPUOS Principles Relevant to the Use of Nuclear Power Sources. Moving on to the applicability of the Liability Convention to nuclear damage, he noted that this question has already been resolved in favour of coverage. Dr. Terekhov then discussed in detail the 1978 Cosmos 954 incident, and in particular the Canadian-Soviet settlement arising therefrom, and whether settlement was based on the Liability Convention, concluding that in fact it was an *ex gratia* settlement. Finally, Dr. Terekhov addressed the COPUOS principle on liability and compensation for damage caused by NPS space objects, concluding that the principle recommends reimbursement of duly substantiated expenses for search, recovery and clean-up operations, and, although non-binding, is a useful addition to the regime established by the Outer Space Treaty and the Liability Convention.

"ESA and the CEC: A Coherent Approach in Space" was the subject of the next paper by *Mr. W. Thiebaut* (France). He placed the relationship between ESA and the European Commission in an historical perspective, discussing the development of the relationship and the path it is likely to take in the future. He singled out in particular the development of legal protection for satellite data, and noted especially the Gibson Report. He predicted a closer co-operation in the future.

Naming the demise of the Soviet Union in 1991 as the most important political event affecting outer space and space law in recent years, *Mr. F. von der Dunk* (Netherlands) provided a

full description of developments regarding space since the Soviet breakup in his paper "Towards a European Space Agency, Mark II? The Space Program of the Former Soviet Union and the Commonwealth of Independent States". He noted that within a week of the Soviet Union's demise, nine of the eleven members of the new CIS had concluded the Minsk Agreement, which was in force instantly. Mr. von der Dunk remarked that this latter development points to the importance attached by these states to continuation in principle of conducting space activities together. He noted that it is in the framework of the Minsk Agreement that the future of the space program of the former Soviet Union should be analyzed in legal terms, both as to programs already in operation, and as to programs only in the developmental stage, and he referenced the comparisons with ESA. Using ESA as an example, Mr. von der Dunk reviewed the role that private enterprise may play under the Minsk Agreement, and questioned whether we are likely to see in the former Soviet Union the creation of an "ESA, Mark II", or an entirely different body. Following an extensive and thorough discussion of the relevant issues, he concluded that it is too early to determine how this question will be answered. He remarked that the organizational framework of the "Space Commonwealth" is fundamentally different from ESA, and that a new agreement would be necessary to create a true international organization on the basis of the Minsk Agreement. Mr. von der Dunk commented in particular that "CIS" is a rather ominous name given the history of other commonwealths.

Mr. W. White, Jr. (USA) spoke about "Resolution of Disputes Arising in Outer Space". Outlining first the various methods of dispute resolution presently available in the space law arena, he stressed the need for a new independent forum for the resolution of such disputes, and recommended the development of a complete listing of skilled space law arbitrators. He also recommended the publication of findings, although he noted that this should be done in such a way as to protect the privacy of the parties. Noting in particular some of the difficulties that might be encountered under US law in connection with these developments, should they occur, Mr. White noted especially the importance of dealing with the issue of federal pre-emption.

"Quo Vadis? Space Law in the 21st Century" was the title of the last paper which was presented in this first session. Its author, *Mr. W. Wirin* (USA) argued that initial space law and policy served to meet the needs of States as they developed their space capability. He noted that in the late 1950s, and throughout the 1960s and 1970s, space served primarily national security needs and international prestige. He remarked that in the 1980s and 1990s, however, the uses of space shifted away from national security interests and towards the commercial, and that with the decline in national security concerns, the inclination of the US Congress to fund space activities has lessened considerably. Mr. Wirin recommended that the space law of the 1990s and the 21st Century must begin to answer the myriad questions posed by the commercialization of space. He stressed that competition in the future will be economic, between blocks of nations, and that these regional arrangements will need space law and policy declarations. He urged individual nations to supplement their laws to accommodate and deal with the commercialization of space activity, noting that developments are needed now to establish the legal structure and climate so that venture capital can seize profitable opportunities as they present themselves.

In the *discussion* that took place following presentation of the papers, *Mr. M. Orrico* (Mexico) raised questions concerning *Mr. Ganzkow's* report on the growing relationship between Florida and Mexico, wondering whether the legal basis for such a relationship and treaty exists.

Commenting on *Dr. Terekhov's* paper, *Prof. J. Gabrynowicz* (USA) addressed the position that the Cosmos 954 claim was not settled pursuant to the 1972 Liability Convention, noting that the Convention provides that all claims must first be pursued through diplomatic channels, requiring signatories to enter consultations and acting as an incentive for them to settle out of court. She maintained that the Liability Convention successfully played the role it was intended to play in the Cosmos 954 case. *Dr. Terekhov* said that while the Cosmos 954 claim was indeed settled through diplomatic negotiations between Canada and the then USSR, the negotiations were not those provided for in Article XIV of the Liability Convention. The Convention mechanisms, including relevant negotiations, could have been applied only if both parties agreed that the

Convention as a whole was applicable to the case. On the other hand, diplomatic negotiations are one of the universally recognized means of settlement of international disputes, and they may be used by states in order to resolve disputes in the outer space field outside the scope of the Liability Convention. *Prof. J. Gabrynowicz* also commented on *Dr. Eilene Galloway's* suggestion that a document analogous to the US Constitution be drafted to embody the first principles of space law. Remarking on "A Declaration of First Principles for the Governance of Space Societies" drafted by members of the international community of space lawyers and policymakers in connection with the 1987 Bicentennial of the US Constitution, *Prof. Gabrynowicz* questioned how the document recommended by *Dr. Galloway* would be different. Responding, *Dr. Galloway* mentioned that she had been a member of the committee that drafted the 1987 "Declaration", but that certain members of the committee were familiar solely with the commercial aspects of space, and were surprised to discover that so much space law already exists. She noted that many viewed the law as a barrier to space activities, and that there was a great need for learning in this regard. She referred to *Mr. Wirin's* paper, and his comments about commercial space, although noted that she disagreed with his premise. Responding, *Mr. Wirin* commented that he felt that he and *Dr. Galloway* had essentially the same vision, but that it appeared differently to each of them. He saw government money dwindling, and felt that it is necessary to encourage the commercial space industry. He emphasized that he is not recommending a wholesale revision of existing space laws.

Commenting on *Dr. Terekhov's* paper, *Mr. B. Maiorski* (Russia) noted that the former Soviet Union initially indicated in a note to the Canadian government that it would act in accord with the Liability Convention, but subsequently it became clear that the definition of "damage" in the Convention is too narrow, noting that search and rescue is not damage. On the settlement of space law disputes, *Mr. Maiorski* noted that there is no definition of what constitutes a dispute, and questioned how to deal with the issue of compulsory jurisdiction. Regarding the CIS, and commenting on *Mr. von der Dunk's* paper, he suggested that we should not be concerned with semantics (in particular regarding the name "CIS"), and that in fact ten states, not nine, were involved in the Minsk Agreement (Ukraine was the last state to adhere to it). *Mr. von der Dunk*, agreed with *Mr. Maiorski* on the importance attached to space as shown by the rapid constitution of the Minsk Space Agreement.

Prof. S. Gorove (USA) asked *Mr. Maiorski* whether Russia's views would have been different regarding Cosmos 954 if the amount of compensation had been different. *Mr. Maiorski* gave an oblique reply.

Dr. C.Q. Christol (USA) asked about the status of the four major COPUOS treaties following the breakup of the Soviet Union, and *Mr. Maiorski* responded that Russia is the "continuing state". Finally, the *Chairman* closed the session.

The second session of the Colloquium was also held on Tuesday 1 September and dealt with "Legal regulation of economic uses of outer space". *Prof. Dr. V. Kopal* (Czechoslovakia) acted as Chairman, and *Dr. O.M. Ribbelink* (Netherlands) was the session's rapporteur.

Mr. R.L. Anglin Jr (USA) was the first speaker and presented his paper on "Alternative Legal Regimes to Enable Universal Telecommunications Roaming". The author submitted a proposal for a universal organization that would assure world-wide availability of telecommunication services made possible by global satellite systems, enabling "universal roaming" by end-users. The organization has two parallel components. The Operator is a traditional commercial corporation, and the Parliament is composed of delegates from each served nation. Parliament's main function is to franchise "Distributors" of the Operator's service in each served nation. The role of the Distributor would vary from country to country, depending on the nation's political system, the degree to which it regulates telecommunications and its customs and laws governing conflicts of interest. The author concluded that the foundation of the organization is fair treatment of all cultures and policies, and that it relies upon and fosters the good will of all nations and converges towards simplicity and fair dealing.

The next speaker was *Ms. A.M. Balsano* (Italy/France), whose paper was entitled "Industrial Property Rights in Outer Space: the International Governmental Agreement (IGA) on the Space Station and the European Partner". The signature of the IGA required that attention be given to the question whether IPRs should be adapted to the special characteristics of space activities. In particular European cooperation through ESA poses specific problems, involving the coordination of a multitude of national and international IPRs, ultimately requiring extensive harmonisation measures on a universal scale. The author discussed the problems involving the applicability of patent laws regarding research and inventions conducted and achieved in space. The applicability of national patent regulations is limited to the territory of the states, and thus useless in outer space. The agreed solution for the Space Station in the IGA is that each "Partner" will register each element as space object, thereby establishing jurisdiction and control. The part of the station in which the invention was made is deemed an extension of the territory of the state which registered that element. This creates a special problem regarding the ten European Partner states because they are considered to be a single territory, which is a legal fiction. The author also discussed the question of experiments executed aboard ESA's Attached Pressurized Module and indicated that contracts or other forms of agreement should be concluded between the experimenter and ESA.

Ms. C.B. Christensen and *Mr. R.G. Steen* (USA) presented their paper on "Regulation of Commercial Space Transportation". They discussed important future issues in the area of commercial space transportation which will require legal regulation, such as commercial or other non-federal launch sites, non-traditional vehicle launches (e.g. sea launches) and commercial space transportation to and from the Space Station and other orbiting platforms. The authors analyzed the current regulatory responsibilities and the method of meeting these responsibilities of the US Office of Commercial Space Transportation (OCST). They held that the dual role of the OCST as active agent and as regulator of space-related industries was important, and that the latter would be the main type of government involvement in a truly commercial environment of the future. The authors concluded that planned, pro-active regulation of emerging and growing industries is not a final solution, but without it no other solution will be effective over the long term.

The next paper was written by *Dr. G. Gàl* (Hungary) and dealt with the "Role of International and Municipal Space Law in the Regulation of Economic Space Activities". Dr. Gàl recalled that international space law binds only states and not private persons. He believed that in respect of commercial space activity, especially in case of private undertakings, implementation of space law in municipal law is needed. The legal link between the state and the objects carrying out commercial activities is the jurisdiction and control of the states, which bear international responsibility. The author further discussed the Swedish Act on Space Activities of 1982 and the UK Outer Space Act of 1986. The key-issue in Dr. Gàl's view is the international responsibility for national activities in outer space. The chance of conflict of laws is important today because of the different applicable laws, and the author stated that this may indeed become a practical problem if damage occurs and a claim is pursued in a state with insufficient civil law regulations. Conflict of laws may be eliminated by coordination of municipal space laws, and the 1980 Vienna Convention on Contracts for the International Sale of Goods could be helpful in that respect.

Prof. L.F. Martinez (USA) discussed "The Legal Implications of High Technology Export Controls for Commercial Activities in Outer Space". He investigated the legal implications posed by the Missile Technology Control Regime (MTCR) of 1987 and other export control arrangements for states' ability to enter and compete in commercial space markets. Prof. Martinez indicated that, to a greater extent than in perhaps any other major industrial sector, space-related commercial technology products and service share nearly identical characteristics with military products and services. The dividing line is extremely blurred. In his view, this contributes to jurisdictional ambiguities for distinguishing between military technology export controls and attempts to use governmental policy to protect commercial space markets. The MTCR is not a treaty but establishes identical guidelines to be implemented by the members in accordance with their national legislation. It aims to control transfers, to any destination beyond the Governments jurisdiction or control, of sensitive missile-relevant technology for ballistic missile systems that are

designed to exceed 300 km in range or 500 kg payload capacity. Its ultimate goal is to prevent the proliferation of nuclear weapons delivery systems.

"The Martin Marietta Case or How to Safeguard Private Commercial Space Activities" was the title of the paper by *Ms. T.L. Masson-Zwaan* (France/Netherlands). She analyzed the case and discussed its significance for the private commercial launch industry. INTELSAT's claims were rejected on the basis of, a.o., the cross-waiver in article 17 of the contract, the inclusion of which was required by the 1988 Amendments to the 1984 CSLA. The court reasoned that public policy favours the enforcement of waivers of all tort claims, including those for gross negligence. INTELSAT appealed the decision, and *Ms. Masson-Zwaan* argued that if the decision is confirmed, it will serve as a precedent and confirm the justification of cross-waivers of liability in launch-contracts, but if the appeal turns out against Martin Marietta, the result may be a confusing situation where private enterprise is never certain of the outcome of its disputes. She suggested that when space industry will have become a "mature" industry, it will be appropriate to reconsider the scheme, which is essentially designed to protect the "infant" space industry. This means that the international efforts to reach agreement on a predictable, uniform, objective and adequate international standard for the settlement of disputes regarding space activities must be continued and reinforced. In the meantime, the author suggested to include a provision in launch contracts to adopt the arbitration rules of the International Chamber of Commerce.

Next, *Mr. D.E. Reibel* (USA) presented a paper on "Procurement of Launch Vehicles and Services". He explained that the roots of most currently available launch vehicles can be traced back to highly classified military research and development programs. The potential for launch vehicles to be used as delivery vehicles for weapons of mass destruction, or as weapons in themselves, has restricted international trade in this area. As a result launch vehicles and services have been largely exempt from the general principles of procurement and trade. In addition, the international market is also distorted by state aids and other non-tariff barriers. *Mr. Reibel* indicated that in the US, where the general procurement policy promotes full and open competition, the procurement of launch vehicles and services can be limited to certain domestic entities. The author believed that if the current space-faring nations truly wish to prevent the proliferation of launch vehicle technology, they must address the legitimate interests of states seeking such capability, by assuring access on reasonable terms to launch services for peaceful uses of outer space. The application of general principles of procurement and trade, and the impact of state aids and non-tariff barriers, on the launch vehicle and service sector and industry in his view requires further study.

Two additional presentations were made of papers that had been moved from the morning to the afternoon session. First, *Amb. A.A. Cocca* (Argentina) proposed "A Way to Complement, Enforce and Improve the Space Treaty and Related International Instruments of Space Law", and mentioned that the 1967 Space Treaty, as is natural, needs to develop permanently. Such development implies three aspects: to complement, to enforce and to improve. Technical developments require new principles and rules for the new activities of man. The author also exposed his views on consensus, which reflects the will of each nation which participates in international assemblies and, therefore, the legal feeling from which the people's legal conscience arises. The author believed that the principles of the Moon Treaty need to be clarified, to assure their benefits and clear up doubts. He also believed that Protocols on the Environment and the Settlement of Disputes were required. In short, he concluded that new international instruments were needed and should be elaborated in cooperation, to be submitted to COPUOS for consideration.

Lastly, the paper by *Dr. E. Kamenetskaya, Dr. V. Vereshchetin* and *Dr. E. Zhukova* (Russia) was presented by *Dr. Vereshchetin* and dealt with "Legal Regulations of Space Activities in Russia and Commonwealth of Independent States". *Dr. Vereshchetin* indicated that the former Soviet Union, despite its impressive space program, did not have specific space legislation in the proper sense of the term. Instead, space activities were regulated by numerous secret decisions, adopted by the Central Committee of the CP, the Government and various ministries and agencies. He believed

that today's situation has two aspects: first, the legal regulation of cooperation of former Soviet republics among themselves in the exploration and use of outer space, and second, the legal and organizational bases of space activities in Russia. The first treaty is Minsk Agreement of 30 December 1991 (to which there are now 10 States Parties) a rather general and vague document. It aims at the regulation of joint space activities of States Parties. On 15 May 1992 the Tashkent Agreement was signed by all CIS states except Moldova. It aims at the regulation of the utilization of ground-based facilities of space infrastructure for the fulfilment of space programs, e.g. by stipulating that these are declared to be the property of the states where they are located (art.1). On 25 May 1992, Russia and Kazakhstan signed an Agreement on the use of the Baikonur cosmodrome, which confirms that the facilities are the property of Kazakhstan. On 27 February 1992, by Decree of the Russian President, a Russian Space Agency was created. In August 1992 several Ministries and Agencies of the Russian Federation submitted a Draft Law on Fundamentals of Space Activities to the Russian Parliament. This law, if passed, would regulate goals and principles for space activities, competences, the formation of a State space program, principles of financing and licensing, as well as the legal status of space objects and astronauts, and the allocation of liability and responsibility. Finally, Dr. Vereshchetin announced that by the end of 1992 the Institute of State and Law of the Academy of Sciences in Moscow, would publish a Dictionary of Space Law (in Russian).

In the *Discussion*, the following comments were made.

Dr. B. Maiorski (Russia) objected to *Dr. Cocca's* suggestion to add protocols to the OST, since this may lead to multiple legal regimes regarding the same treaty, which is dangerous in international law. He would prefer a new agreement.

Prof. C.Q.Christol (USA) asked whether an ocean launch from an Exclusive Economic Zone (EEZ) would have any bearing on the question of who the "launching state" is, and *Prof V. Kopal* (Czechoslovakia) explained that the EEZ does not belong to national territory.

Dr. Safavi (Iran) affirmed that the EEZ is not part of the territorial waters, but subject to special rules to the benefit of the adjacent state. He also asked about the present situation and the destiny of INTERSPUTNIK.

Dr. Maiorski answered that INTERSPUTNIK still exists and flourishes. It was even reinforced as Germany has succeeded in the membership of the former GDR.

Prof. Dr. K.H. Böckstiegel (Germany) stated that he also would not favour amendments to the Space Treaty. He further referred to the Martin Marietta Case where gross-negligence is excused with reference to the CSLA, which explicitly prescribes cross-waivers. He wondered if the decision would be the same if such a legal obligation did not exist (e.g. in another state).

Prof. J. Gabrynowicz (USA) mentioned that the judge in the Martin Marietta Case expressly followed Congress' intention to protect launch companies.

Ms. T. Masson-Zwaan confirmed that the specific history of the US cross-waiver legislation determined the outcome of the Martin Marietta decision, and that a similar case might therefore be judged otherwise in a country where no CSLA exists.

Ms. C. Christensen (USA) added that the waiver history was related to NASA's history of avoiding that all involved companies would sue each other.

Lt. Col. F.K. Schwetje (USA) said that NASA's policy was meant to avoid Martin Marietta situations and that it prevents participating companies from expensive insurance-overpay.

Mr. F. von der Dunk (Netherlands) asked two questions to *Dr. Vereschchetin*. First, he asked him to elaborate on the status of Baikonur which now is property of Kazakhstan, whereas news reports say that Russia will pay almost 95% of the costs and will receive more than 85% of the potential profits, and second, with reference to Art. 3 of the Minsk Agreement, which states that "the fulfilment of inter-State programs of space-research and exploitation in the area of military and dual (military and civilian) purpose space facilities shall be assured by the joint strategic armed forces", he asked what "assured" meant in this respect. Do the armed forces retain ultimate authority with veto power, or are they basically obliged to provide support to all programs?

Dr. Vereschchetin replied to the first question that Baikonur should perhaps rather have become common property, since it had been paid for by the entire Soviet Union. Baikonur is the property of Kazakhstan but may be used by other states on the basis of the Minsk Space Agreement. Regarding the second question, he stated that the military space programmes are assured jointly by all states party to the Agreement. *Dr. Maiorski* added concerning the first issue that even though Baikonur is property of Kazakhstan, the military disposes of the use of the base. Baikonur is owned for 94% by Kazakhstan and for 6% by Russia.

Prof. Gorove (USA) asked *Mr. Reibel* the following question: if a US private entrepreneur procures the launching of a satellite in France, who is the launching state, only France or also the USA? *Mr. Reibel* responded that only France would be the launching state. *Prof. Gorove* agreed.

On another subject, *Amb. E.R. Finch* (USA) suggested that a future topic for IISL session could be the relationship, if any, between the law of Outer Space and the Law of the Sea in specific areas of space law, including but not limited to space rescues. He referred to a paper by Prof. H. Almond (*Acta Astronautica* Vol.17 No.1, pp. 151-152, 1988) for an Academy Note of Dr V. Vereschchetin and Dr E. Finch, entitled 'The Future of Outer Space Rescues'.

Finally, *Amb. Cocca* reacted to the remarks by *Dr. Maiorski* and *Prof. Böckstiegel*. He stressed that he never suggested that the Outer Space Treaty should be amended. He proposed a separate protocol to enforce and complement it, not to modify it.

The third session of 3 September 1992 was called "Managing Environmental Issues, Including Space Debris". The session was chaired by *Dr. N. Jasentuliyana* (UN/Sri Lanka) and *Mr. D.E. Reibel* (USA) was the Rapporteur.

Prof. Dr. C.Q. Christol (USA) presented the first paper on "The Stratosphere Ozone Problem and Space Activity". He discussed the difficulty of legal responses to the stratospheric ozone problem due to scientific uncertainties. He recommended proceeding with caution, noting that models need validation. Of particular concern are solid rocket fuels, especially those containing hydrogen chloride and aluminum oxide. Prof. Christol recommended using less damaging fuels such as hybrid and gel fuels, as well as development of new rockets with less damaging emissions. He stated that the lack of full scientific certainty should not prevent cost effective alternatives. The author concluded that it was necessary to establish environmental standards at the international level, which should be implemented by national legislation.

The next speaker was *Dr. E. Fasan* (Austria). His paper was called "Space Debris: A Functional Approach". Dr. Fasan began by noting that space debris was first mentioned in the Limited Test Ban Treaty of 1963. Although none of the UN treaties on outer space specifically deals with space debris, the author stated that Articles I, VI, and IX of the Outer Space Treaty, Article III of the Liability Convention and Article VI of the Registration Convention create an obligation of debris avoidance. He said that one way to reduce space debris would be to fire a booster motor at the end of a satellite's useful life to make it reenter the earth's atmosphere and burn up, to place it in a disposal orbit, or to achieve escape velocity and send it into deep space. Dr. Fasan then proposed a compulsive regime for satellite disposal. Under this regime, the state of registry must specify to the UN Secretary that such a booster motor is attached to the spacecraft. Without such assurances, the burden of proof for purposes of Article III of the Liability Convention would be presumed against that party.

The paper by *Dr. J.F. Galloway* (USA) dealt with "The Implementation of Environmental Treaties: The Case of the Montreal Protocol on Substances that Deplete the Ozone Layer". Dr. J. Galloway characterized the implementation of the Ozone Convention in the USA as an example of a national success story that is a model for future agreements on the space environment. He noted that when the Upper Atmosphere Research Satellite (UARS) and aircraft found high depletion of ozone above 50° N latitude, the USA accelerated the phase-out of CFCs. On 30 July 1992, the US Environmental Protection Agency (EPA) issued a final rule implementing the Montreal Protocol to the Ozone Convention. Dr. J. Galloway noted with approval the regulatory provision which stated that in conflicts between the US Clean Air Act and the Montreal Protocol, the more stringent

provision shall govern. Notwithstanding such legal developments, the author noted that the EPA had not yet approved any destruction technologies for CFCs. He also cautioned about the potential effects of regulatory impact analyses performed by the US government. On the positive side, Dr. Galloway noted the increasing role of international organizations such as the UN Environment Program, the World Bank, and the UN Development Program in environmental matters.

Dr. He Qizhi (China) discussed the "Legal Aspects of Monitoring and Protecting the Earth's Environment by Space Technology". He noted the increased use of land and marine space remote sensing in monitoring the earth environment. The International Space Year Mission to Planet Earth is the most conspicuous example. Dr. He stated that carbon dioxide and chlorines in the atmosphere are major problems that must be addressed. He then discussed the UN remote sensing principles of 1986. Dr. He stated that most principles for the protection of the space environment already exist in treaties or are part of customary international law. While international coordination is desirable, the World Environment Authority proposed by Dr. Courteix to operate global remote sensing and data distribution would be difficult to achieve in the near term. Due to cost and logistical considerations, Dr. He instead recommended an international coordination center of existing national systems, with an international data bank.

"Space Environmental Protection: The IISL Contribution" was the title of the paper by *Dr. I.I. Kuskovelis* (Greece). The author had reviewed the over 300 papers on space environment submitted by IISL members in five sessions of the colloquium plus scientific and legal roundtables. He recommended that this large body of literature needs to be studied, understood, and exploited further. In his review, Dr. Kuskovelis noticed several common themes. First, he identified four different phases of space flight (launch, ascent, in-orbit, and re-entry) that may have different implications for space environmental protection. He also noticed a growing consensus on a functional approach to space environmental protection, especially with regard to space debris. Dr. Kuskovelis expressed the intention to update his research with papers from the current session so that he could submit his report to the IISL Board for use and dissemination to the UN and other international bodies. *Chairman Jasentuliyana* commented that such a compendium and analysis would be a useful exercise for the IISL.

The title of the paper by *Dr. L. Perek* (Czechoslovakia) was: "Must Space Missions Be Beneficial?". Dr. Perek noted that Article I of the Outer Space Treaty states that space activity should be conducted for the benefit of mankind. That raises the question of what is beneficial for mankind, because what is beneficial for one country may not be beneficial for others. Dr. Perek stated that this potential for conflict gave rise to the consultation provisions in the various space treaties. Examples of such conflicts include (1) proponents of an Eiffel Tower commemorative orbiting structure versus ground-based astronomers; (2) the Celestis proposal for orbiting cremated remains; (3) a proposal for orbiting reflectors or solar energy; and (4) solar power satellites that would require many slots in the geostationary orbit. According to Dr. Perek, the lesson of these conflicts is that even highly beneficial space projects must be considered in the context of other potential projects. He agreed that there should be an international agreement on space environmental standards.

Dr. M. Rothblatt (USA) discussed "Environmental Liability Issues of Rocket Exhausts". The thrust of this presentation was that operators should be held liable for damage caused by rocket exhaust. Imposing such liability would create incentives for cleaner fuels. As authority for his position, Dr. Rothblatt noted that Article II of the Liability Convention imposed absolute liability for damage within the atmosphere. Although causation will continue to be difficult to prove, no showing of fault is required. The author then noted that two potential defenses could be raised. First, that there is no causation because rocket exhaust is only one minor contribution to ozone depletion. Second, that each operator could claim that it is only one of many launch providers. According to Dr. Rothblatt, both of these defenses fail because under the joint and several liability provisions of the Liability Convention and tort law, any contributing factor is sufficient for imposing liability. He also stated that policy arguments against imposing liability are not persuasive, because it is better to create incentives for cleaner fuels by making such liability a cost

of doing business. Internalizing environmental costs will not prevent space activities, and those who create environmental costs should be held accountable.

"Nuclear Power On The Moon" was the subject of the paper by *Ms. M.S. Smith* (USA). She began by noting that nuclear power has already been used on the moon. Six US and two Soviet radioisotope thermal generators (RTGs) have been left on the moon. Ms. Smith stated that Article IX of the Outer Space Treaty applies to nuclear power on the moon, but it is not clear that COPUOS principle number 3 applies on the surface of the moon. She stated that NASA recommended nuclear systems for powering a lunar base, because solar arrays and storage requirements would be too difficult. However, the issues of containment and radiation were raised in Congressional hearings. Ms. Smith concluded that if nuclear power is essential for lunar bases, safety in operation and disposal is essential.

Dr. A.A. Golrounia (Iran) wrote a paper about "Managing Environmental Issues, Including Space Debris"; his paper was presented by *Dr. H. Safavi* (Iran). The primary points of the paper included definition of space objects and space debris, the effects of space debris, the environmental viewpoint, international rules, responsibility and liability of states, and general observations. The conclusions were that a license fee should be imposed, that a group of experts should study the issue further, and that satellites should be boosted out of useful orbits at the end of their lives.

Mr. P.H. Tuinder (France/Netherlands) spoke about "A Perspective on the European Community Role in the Harmonization of European Regulations Applicable to Space Activities", and began his presentation by noting two European trends. First, greater political integration, and second, the growth in European space projects. These trends raise several issues. First, what institution has competency over space policy? The ESA's charter gives it the specialized role of integrating European space projects. However, the EC has broader authority over resources and the ability to exploit space activities. Second, there is the issue of cooperation and "complementarity." Although there are five joint working groups between ESA and the EC, complementarity is still to be defined. Third, there is the issue of regulatory power. The EC is the only European institution with the authority to impose regulations on member states. For example, regulations controlling property rights and remote sensing data are being studied by the EC. Mr. Tuinder concluded that integration of ESA and EC efforts will continue. The EC could one day become the primary player in European space activities, especially in the integration of space with other areas. ESA's role will be complemented by the EC's role.

An animated *discussion* followed the papers which were presented during this session.

Prof. C.Q. Christol (USA) asked *Dr. He Qizhi* about the difference between a hybrid system and free access to information. *Dr. He* responded by noting that the World Meteorological Organization gives weather information to states at no charge.

Dr. H. Almond (USA) wondered how solar power satellites would direct their energy to the earth. *Dr. J. Glaser* (USA) answered that transmission of energy would be done by microwaves.

Then *Amb. E.R. Finch* (USA) asked *Dr. Perek* whether it would be better to put solar power stations on the moon, and *Dr. Perek* replied that such stations would only be available for areas when the moon is visible, and therefore they would not be universal.

Dr. W. Wirin (USA) had a question for *Dr. Rothblatt*, about what would happen if liability were shared by governments and commercial entities, because the US government would claim immunity under the Federal Tort Claims Act. *Dr. Rothblatt* conceded that it would be easier to sue private entities than the government, and that the Liability Convention cannot be used by US citizens against the US government.

Ms. T. Masson-Zwaan (France/Netherlands) then asked *Dr. Rothblatt* whether he was implying that the space launch business was mature enough to cover such liability. *Dr. Rothblatt* replied that protection of the environment is more important than private profits. *Dr. Kuskovelis* then noted that *Dr. Rothblatt's* proposal would increase insurance costs, and the author replied that such increases would be a cost of doing business.

Concerning *Ms. Smith's* paper, *Dr. N. Jasentuliyana* (UN/Sri Lanka) clarified that the COPUOS principles dealt with nuclear power sources themselves, wherever found, including on the

surface of the moon. *Amb. Finch* noted that the Johns Hopkins Applied Physics Laboratory was researching the use of H3 in clean fusion reactors. *Ms. Smith* replied that it was unclear whether lunar bases or fusion reactors would be completed first.

Mr. F. von der Dunk (Netherlands) asked *Mr. Tuinder* about the lack of overlap in membership between ESA and the EC. *Mr. Tuinder* replied that this issue would soon be moot because most ESA states who are not yet EC members are applying for such membership.

Dr. J. Glaser (USA) stated that with regard to solar power satellites, 60% of the budget has been spent for environmental impact studies. Funds raised by power transmission would be available for observatories on the dark side of the moon. Microwave transmission will be happening soon, and it is also possible to beam energy to the moon.

Amb. E.R. Finch (USA) read relevant portions of a letter he received from Vice President Quayle regarding US domestic inter-agency and bilateral space efforts. He also stated that the definition of space debris is no clearer than the air space/outer space delineation. He said that the "Magna Carta" on space prepared by the IAA can be the basis for a new treaty on space environmental protection.

Prof. Dr. K.H. Böckstiegel (Germany) stated that the International Law Association space law committee is in the process of elaborating a legal text on the space environment. A first draft is expected at the 1994 meeting in Argentina, and he requested concrete suggestions from IISL members.

Prof. S. Gorove (USA) wondered whether fuels of solid rockets launched into outer space should be regarded as space debris. *Prof. Gorove* disagreed with those who maintain that space debris, like the broken pieces of a launch vehicle, are not to be regarded as space objects. He expressed the view that such a position ran contrary to Article I of Liability Convention. *Prof. Gorove* also emphasized that the issue of space debris is of worldwide concern and he expressed the hope that the USA will change its position in COPUOS and will not continue to oppose the placing of the space debris issue on the agenda of the committee or its subcommittees. He added that US Vice President Quayle's address to the World Space Congress raised hopes that the US position may soon change.

Finally, *Lt. Col. F.K. Schwetje* (USA) noted that nobody pollutes on purpose, and that there is a common interest in prevention of space pollution. With regard to internalizing liability costs, he noted that such costs will be passed on to consumers.

After these questions and remarks, the *chairman* thanked the speakers and attendees, and closed the session.

The last session of the Colloquium was held on Friday 4 September 1992 and dealt with the remaining topics falling under the general heading "Other legal subjects". The session was chaired by *Dr. E Fasan* (Austria), who replaced the original Chairman for this session, *Dr. B. Bakotic* from Croatia, who had not been able to come to the Colloquium due to the unfortunate developments in his country. *Dr. S. Hobe* (Germany) was the Rapporteur.

As the first speaker, *Ms. de la Mercedes Esquivel de Cocca* (Argentina) described the legal framework for permanent living in outer space in her paper on "Human Society on Mars: New Legal Needs for a Different Mankind". She found that besides the existing international treaties, a set of principles in the form of a "Charter for Mankind in Outer Space" should be adopted including, *inter alia*, a principle of respect as well as one of cooperation and solidarity.

Next, *Prof. D. Popescu* (Romania) investigated the interrelationship between "Space Activities and Human Rights". While most provisions of current space law are addressed to states, some could also concern human beings. The author considered that existing legal instruments were not adequate, and that new law was needed, especially in the fields of, e.g., travel into outer space, settlements on the moon and the right to a clean and healthy environment.

Dr. L. Haeck (Canada) then spoke about "The Legality of the Military Uses of Outer Space by the Canadian Forces". He held that current Canadian space related military activities were in conformity with international law. The author was of the opinion that even after the end of the Cold

War, a certain number of space weapons, including ASAT's, would be required to be available in times of crisis.

Then *Mr. U. Ekblad* (Sweden) discussed "Prospects of Verifying Space Weapons Treaties". Whereas current space law bans the deployment of nuclear weapons and weapons of mass destruction in outer space, the verification issue will not be treated there. The author pleaded for the design of verification techniques according to treaty provisions related to weapon characteristics. He concluded that the current prospects for verification of most regulations concerning space weapons are good.

In his paper on "Legal Definition of International Cooperation in the Exploration and Use of Outer Space", *Mr. Monserrat Filho* (Brazil) advocated a new and broader definition of international cooperation in the field of space activities, thereby underlining the essential need of developing countries as well as their current inability to profit adequately from space technology. The author held that, without a new concept of cooperation, the gap between North and South will become even wider in the next century.

Prof. J. Gabrynowicz (USA) spoke about "Property Rights Reviewed and Reexamined". She held that the notion of property should reflect elements of human nature, human condition and the nature of space. Space property has individual as well as community aspects, which is partly expressed in the "province of all mankind"-clause of Article 1(1) of the Outer Space Treaty.

Then *Mr. Hashimoto* (Japan) dealt with "The Space Plane and International Law". He categorized space planes into a 'surface-to-surface' (STS) type and a 'surface-to-outer space' (STO) type, depending on the purpose of their use. Whereas the STS-type of space plane should be considered as an aircraft with the consequence of the applicability of air law to their use, the STS-type should be classified as a space object. As foreseen in space law, the launching state will be responsible for registration and will retain jurisdiction and control over the space plane. The author concluded that this type of space plane still requires clarification regarding overflight of foreign airspace and the treatment of pilots.

The following speaker, *Prof. T. Kosuge* (Japan), discussed "International Regulatory Systems of the Frequency Spectrum and the Geostationary Orbit". He stressed that the main problem of the current frequency registration system is that it does not necessarily lead to efficient and economic use of the frequency spectrum. He advocated a new concept for frequency allocations, e.g. by the merging of different services (FSS and BSS), which could provide greater flexibility to the users. Another important contribution would be the simplification of the procedures for space services by creating one single set of administrative procedures applicable to all space services.

Prof. F. Lyall (UK) also discussed the changing regulatory framework of international telecommunications, and specifically addressed the institutional changes of "The International Frequency Registration Board". In his view, the proposed changes to a new Radio Regulations Board (RRB) would be indicative of change in the balanced range of responsibilities of the Board. Prof. Lyall was in favour of a permanent, full-time, wholly independent body of 9 members in order to guarantee confidence in the Board's work. *Prof. Lyall* had written a second paper, dealing with "UK Space Law". He explained that the establishment of the UK Space Act in 1986 was a constitutional necessity as a consequence of the ratification by the UK of the space treaties, which required an act of Parliament. He discussed the UK registration and licensing system, and described the British National Space Centre as the implementing administrative body. Prof. Lyall also touched the fields of broadcasting and telecommunications. He concluded that quite an effective body of law with, however, only very limited structure had been created.

The next paper was presented by *Mr. A. Mardon* (Canada), on "Fostering International Cooperation in Space Rescue Systems Through International Space Law". He advocated the introduction of an international Assistance Agreement as a further elaboration of the existing Rescue Agreement. This would strengthen general attempts to reduce man-made environmental hazards in the outer space environment. The very purpose of such an agreement would be, viewed from a proactive standpoint, the prevention of future accidents before they materialize.

Ms. Kwok, Mr. Morgan and Mr. Patel (USA) discussed "The Art and Science of the LEO Satellite License Game". An economic model of the interactive behaviour of various parties to the US FCC's procedure for licensing low earth orbit satellite systems was characterized as the "LEO Licensing Game". One finding was that the giving of more weight to customers, e.g. by educating consumers on the benefits of LEO systems, could shift weights towards a lowering of license fees.

Then *Prof. M. Nakamura* (Japan) presented his paper on "Consultation Regime in Space Law". Such a regime should consist of three phases, viz. (1) prior notification of the planning of space activities, (2) the right of any affected state to request consultation, and (3) the duty of the state whose consultation is requested to enter into such consultation. Such a regime should be endorsed as a procedural rather than a substantive regulation, and will contribute to the enhancement of international cooperation.

This paper was followed by a paper on "The Legal Status of the Aerospace Vehicle", written by *Dr. H. Safavi* (Iran). Stressing the deficiencies of the current legal system with respect to aerospace vehicles, the author concluded that new legal rules were needed to regulate this new technology. In this regard, Dr. Safavi referred to the example of air law, which had always adequately responded to technological innovations.

In the last paper of this session, *Dr. P. Sterns and Dr. L. Tennen* (USA) discussed "The Art of Living in Space: International Law and Settlement Autonomy". Existing international law cannot adequately cover the new legal issues which will arise from permanent settlement in space. Therefore, the authors advocated an international agreement recognizing the settlement's need for autonomy and its capacity for self-government, in order to build a framework for settlement autonomy in the 21st century.

In the *discussion* which followed the presentations of this fourth session, *Dr. B. Jasani* (UK) requested a precise definition of the term 'space weapons'. *Mr. Ekblad* (Sweden) responded that the scope of his paper was limited to space stationed weapons.

Next, *Prof. C.Q. Christol* (USA) stressed that uses of the aerospace plane would be governed by two legal regimes, i.e. air and space law. For the determination of the applicable regime, preference should in his view be given to an allocative theory. This theory would be based on the factors of interest and purpose of the mission, including the actual use of the vehicle, which would allow for the factual identification of the vehicle. From this factual base it would be possible to determine and apply the relevant legal regime.

Also referring to the legal status of aerospace planes, *Dr. M. Orrico* (Mexico) stressed the need for a solution of the still pending delimitation issue of air and outer space.

Mr. Hashimoto agreed with the previous speakers that main issues with regard to the legal status of the aerospace plane were not yet resolved, but he expressed the hope that his proposed differentiation between STS and STO types of space planes would help to find a constructive solution.

Again with regard to aerospace planes, *Dr. I. Kuskavelis* (Greece) underlined the legal significance of its use as a multi-mission vehicle.

Next, *Dr. H. Safavi* (Iran) stressed the need to define and delimit outer space, in order to settle disputes arising with respect to the applicability of either air or space law. In his opinion, the aerospace plane is neither an aircraft nor a space object. He referred to his 1961 proposal to delimit air and outer space at a height of 90 miles above sea level. He further proposed the adoption of a new convention covering the legal aspects of the aerospace plane, especially with regard to the transportation of passengers and cargo and the responsibility for damage caused by these vehicles in air space and outer space.

Prof. S. Gorove (USA) referred to his earlier contribution with regard to problems concerning the legal status of aerospace planes. With respect to the enlargement of international cooperation, he referred to the current discussions taking place within UNCOPUOS on the importance of Article 1(1) of the Outer Space Treaty. Prof. Gorove also asked *Prof. Gabrynowicz* whether the global commons would be included in her concept of property. *Prof. Gabrynowicz* answered that the importance of the survival of the species had to be stressed. The notion of

property should therefore also cover the global commons, because this is essential to humanity's well-being. Finally, *Prof. Gorove* referred to a definition of the notion of space weapons which had been provided in the past by *Dr. E. Galloway*, whereupon she indicated that her definition was based on article 5 of the regional Treaty of Tlatelolco of 12 February 1967, and was reproduced in her recent Book of Honour, edited by Dr. Jasentuliyana ("Space Law: Development and Scope").

Hereafter the last session and the 35th Colloquium on the Law of Outer Space were closed. The 36th Colloquium will be held during the International Astronautical Congress in Graz, Austria, 16-22 October 1993.*

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